American Journal of Tourism and Hospitality (AJTH)

ISSN: 2993-6519 (ONLINE)

VOLUME 3 ISSUE 1 (2025)

PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

American Journal of Tourism and Hospitality (AJTH)

Volume 3 Issue 1, Year 2025
ISSN: 2993-6519 (Online)
DOI: https://doi.org/10.54536/ajth.v3i1.3890
https://journals.e-palli.com/home/index.php/ajth

Crowd Management Strategies to Lessen Covid-19 Spread in Tourist Sites: A Case Study of Lekki Conservation Centre, Lagos State, Nigeria

Emmanuel T. Abidakun[1], Olalekan A. Tunde-Ajayi[2*]

Article Information

Received: October 15, 2024
Accepted: November 22, 2024
Published: June 21, 2025

Keywords

Covid-19, Crowd, Recreation Site, Visitors

ABSTRACT

Managing the environment is important to sustain the quality of experience in a recreation site. While the study of the ecological impacts of visitors to outdoor recreation is important, monitoring the social dimension should also be done by the management of recreation sites. Crowding and tourist density are grouped among the major social components of increased visitor activity. There are strategies imbibed to reduce the transmission of COVID-19 cases, some of which include the regular washing of hands, using sanitizer after washing hands, and trying to protect the face and mouth from coming in contact with the virus in a place that may be contaminated. Thus, this study investigates the management strategies that are being used for crowd control in order to reduce transmission of COVID-19 in Lekki Conservation Centre, Lagos, Nigeria. A well-structured questionnaire directed at all staff members was used to obtain primary data at the site. Data was analyzed descriptively and inferentially. Results revealed that there is the presence of COVID-19 safety precautions at the site as agreed upon by all members of staff. Furthermore, the staff also stated that the site has sufficient safety personnel to supervise the crowd at any given time. Results also revealed that majority of the staff (94.7%) were satisfied with the crowd management strategies at the site. This study concludes that the site has in place the necessary safety precautions to control crowding as well as mitigate the transmission of Covid-19.

INTRODUCTION

A generally accepted definition of a crowd is that it is a large gathering of diverse people at the same physical location, at the same time, not necessarily sharing the same goal or interest (Wijermans, 2011). Crowding refers to the level of saturation of a destination (Jurado *et al.*, 2013) and can be considered from environmental and socio-psychological perspectives (Saveriades, 2000). From an environmental perspective, crowding is a function of a destination's physical capacity to accept a multitude of visitors simultaneously without damaging the physical, economic, or socio-cultural environment (Coccossis *et al.*, 2002). Conversely, from a socio-psychological perspective, crowding is a subjective experience identified from the perspectives and experiences of tourists (Neuts & Nijkamp, 2012). If tourists perceive a destination as crowded, irrespective of actual tourist density, this evaluation will affect their satisfaction and may cause them to look for alternative destinations (Jurado *et al.*, 2013). Crowding is one of the most important and frequently investigated issues in management of parks and outdoor recreation (Manning, 2011; Vaske & Shelby, 2008). Since it is closely related to visitor satisfaction and motivation, understanding this construct is of keen interest to many researchers and practitioners (Kainzinger *et al.*, 2015). Contemporary Park and outdoor recreation management frameworks rely on formulation of standards of quality to answer the question of how many visitors can be accommodated in parks and related areas before visitors judge these places to be too crowded. (National Park Service, 1997; Manning 2001, 2007, 2009). Standards of quality define the minimum acceptable condition of parks. Crowding plays a role in planning and management frameworks such as Limits of Acceptable Change (LAC), (Stankey *et al.*, 1985), Visitor Impact Management (VIM), (Graefe *et al.*, 1990), Carrying Capacity Assessment Process (CCAP), (Shelby and Heberlein, 1986), and Visitor Experience and Resource Protection (VERP), (Manning, 2004).

When a visitors destination is crowded, it can either be viewed as being popular and reputable (Petr, 2009) or stir up negative reactions from the tourists (Dowling, 2006; Krebs *et al.*, 2007). The consistent improvement of the global economy has directly contributed to the increasing number of tourists visiting tourism destinations; this has resulted in people being crowded at different destinations, which has turned out to be a prospective social constraint (Neuts & Nijkamp, 2012). In recent times, the increased usage of destinations in urban areas for example urban parks, has resulted into the successful transfer of the concept of crowding from remote areas to cities. Researches have been carried out on national parks close to cities and the results show reduced level of crowding being reported by city tourists which is because they can endure meeting more people beyond their normal preference. This shows that norm strength in urban parks are generally low (Kuentzel *et al.*, 2008). Social carrying capacity concept is the major modern way to approach crowding. A destination is perceived to be crowded when a tourist observes, either through encounter or

[1] Department of Ecotourism and Wildlife Management, Federal University of Technology, Akure, Nigeria
[2] Department of Parks, Recreation and Tourism Management, Clemson University, Clemson, USA
* Corresponding author's e-mail: otundea@clemson.edu

perception, that there are many people present in the destination (Shelby *et al.*, 1989). The interference of a visitor's behavior with the activities of another visitor in a destination can also be termed as crowding (Tarrant *et al.*, 1997). Crowding in a tourist destination is evaluated based on individual perception and quality standards and in the case these quality standards are surpassed, then the tourist will judge the destination experience as a negative one and then the destination becomes undesirable.

When a protected area admits more than enough visitors thereby exceeding its carrying capacity, it has been known from previous researches that this leads to adverse physical effects like trampling on the flora resources, disruption of fauna habitats, erosion of trail, excess litter (Deng *et al.*, 2003; Tisdell & Wilson, 2005). Crowding also causes constant impacts at recreation sites through reducing the experience of tourists, which has overtime resulted in tourists developing several techniques to cope with excess crowd, e.g., leaving a crowded activity and taking up less crowded ones, leaving a crowded activity to come back at a later time when there is no more crowd, or leaving the recreation site entirely to another one with no crowd (Marion & Reid, 2007). To evade themselves of unwanted situations, visitors can sometimes combine all these coping techniques i.e. taking part in another activity, going to another recreational site for the activity, going back to the location at a later time (Johnson & Dawson, 2004). Crowding also affect the decisions of the management of recreation and tourist sites, as they have to balance between two goals; conservation of resources in their site and also sustaining public patronage for recreation. Actions to manage the environment are important to sustain the quality of experience in a recreation site. While the study of the ecological impacts of visitors to outdoor recreation is important, monitoring the social dimension should also be done by the management of recreation sites. Crowding and tourists density are grouped among the major social components of increased visitor activity. "The perception of crowding is defined by a normative concept (Vaske *et al.*, 1986; Shelby *et al.*, 1989; Manning, 1999), where crowding is said to occur if a certain user density is negative, from the visitor's perspective".

A new coronavirus was discovered in 2019, it was later identified as SARS-CoV-2. This virus was discovered as the cause of the sudden appearance of a severe respiratory sickness in Wuhan, China. The virus was named COVID-19 in February 2020 by the World Health Organization (WHO). The name depicts the year the coronavirus disease was first discovered, which is December 2019 (Fisher & Heymann, 2020). The virus responsible for COVID-19 has been said to be majorly transmitted from one individual to another individual when someone with the virus sneezes or coughs and the droplets of these sneezes and coughs hits people that are around in their mouths and/or noses and there is also a possibility of the virus being inhaled directly to the lungs from these droplets (Li *et al.*, 2020). The best defense that everyone has against COVID-19 is to prevent its transmission, and according to a WHO publication; "Responding to community spread of COVID-19," on the 7th of March 2020, the preventive measures to curb and reduce the transmission of the virus is not limited to the health sector alone but cuts across all other basic sectors of a society, sectors such as transportation, tourism, commerce, finance, security etc. (WHO, 2020). Some effective preventive measures that people have been advised to adhere to include the regular washing of hands, using sanitizer after washing hands, and trying to protect the face and mouth from coming in contact with the virus in a place that may be contaminated (Guner *et al.*, 2020). To minimize the risk of the virus spreading, it is recommended that people practice thorough hand hygiene by consistent washing of hands, cover their mouths when coughing, and avoid close contact with those who are unwell. Additionally, social distancing serves as another key strategy to limit the spread of COVID-19. This approach aims to reduce communications amidst individuals within a locality, particularly with individuals who may be infected but have not yet been identified and therefore not isolated (Wilder-Smith & Freedman, 2020). Diseases spread through respiratory droplets often necessitate close contact between individuals, making social distancing an effective strategy in limiting the spread of the diseases. This measure is especially important in situations where there is suspicion of community transmission but the connections between cases cannot be ascertained. In such cases, limiting interactions only for those known to have been exposed may not be sufficient to prevent further spread. Additional precautions, such as avoiding crowded areas and wearing face masks, can further help mitigate the risk of transmission (Guner *et al.*, 2020).

Conserving and managing natural and leisure locations for recreation are crucial for fostering development. By ensuring these sites are well-maintained, they can contribute significantly to the economic and social growth of the surrounding areas (Leung *et al.*, 2018). One of the key strategies for implementing sustainable development in tourism is the identification and management of over-tourism (Miller & Twinning-Ward, 2009; Torres-Delgado & Saarinen, 2014), and strategies to manage crowd should aim to conserve flora and fauna resources from degradation and also to enhance the overall visitor experience at recreation locations. Numerous studies have explored the issue of crowding, particularly in the context of parks and outdoor recreation areas, examining its impact on both environmental sustainability and visitor satisfaction (Fleishman *et al.*, 2004; Luque-Gil *et al.*, 2018; Vaske & Shelby, 2008; Zehrer & Raich, 2016); and crowding from the view of tourists (Beerli & Martin, 2004; Jurado *et al.*, 2013; Neuts & Nijkamp, 2012; Vaske & Donnelly, 2002; Vaske & Shelby, 2008). However, there is a dearth of information on crowd management strategies as they relate to the COVID-19 pandemic; thus, the necessity for this study, which investigates the management strategies that were used for crowd control

in order to reduce the transmission of COVID-19 in Lekki Conservation Centre, Lagos, Nigeria.

MATERIALS AND METHODS

The study was carried out in Lekki Conservation Centre, Lagos state, Nigeria, which is a nature tourism site that is located between latitude 6° 26' N and longitude 3° 32' E (Abidakun & Tunde-Ajayi, 2021). This study made use of well-structured questionnaire to obtain information on staff socio-demographic characteristics, and the management strategies used for crowd control at the site. Total sampling was used to select all members of staff at the site (19). Data was retrieved and analyzed using Statistical Package for Social Sciences (SPSS version 21) and results were presented descriptively using tables and charts. Results were also presented inferentially using Pearson Correlation.

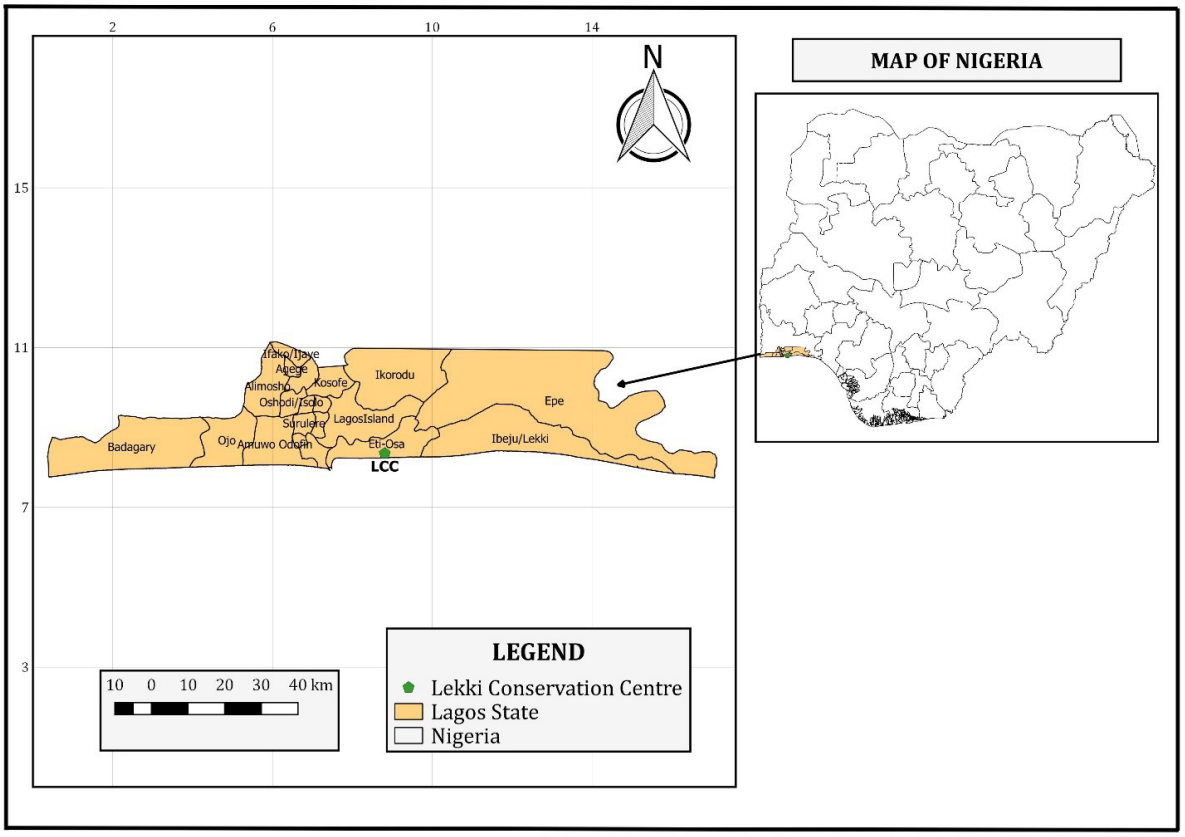

Figure 1: Map of the Study area

RESULTS AND DISCUSSION

Results

Table 1 reveals the socio-demographic characteristics of the staff at Lekki Conservation Centre. The highest percentage of the staff were males (63.2%), while 36.8% were females. The highest percentage of the staff belonged to the age group 25-54 years, were married (52.6%), and were Christians (84.2%). Also, all the staff had tertiary education (100%) and majority of them were wildlife officers (31.6%) at the site with experience mostly from one to five years (52.6%).

Table 1: Socio-demographic characteristics of LCC staff

Variables	Frequency (N=19)	Percentage
Gender		
Male	12	63.2
Female	7	36.8
Age		
18-24 years	2	10.5
25-54 years	15	78.9
Above 64 years	2	10.5
Marital status		
Single	9	47.4
Married	10	52.6

Religion		
Christianity	16	84.2
Islamic	3	15.8
Education		
Tertiary education	19	100.0
Position		
Cash officer	4	21.1
Conservation officer	5	26.3
Canopy walkway technician	3	15.8
Wildlife officer	6	31.6
Travel consultant	1	5.3
Years of Experience		
1-5 years	10	52.6
6-10 years	4	21.1
Above 10 years	5	26.3

Figure 2 reveals the number of people that Lekki Conservation Centre can accommodate at once. Majority of the staff stated that the park can accommodate between 4001 and 5000 number of people at once. Figure 3 also reveals that there is presence of covid-19 safety precautions at the site as agreed upon by all members of staff (100%).

Figure 4 reveals safety precautions obtainable at the site. Washing of hands properly as well as use of nose mask both had the highest percentage of response (24.4%), 23.1% stated use of sanitizer and social distance maintenance as well as online booking both had 14.1%.

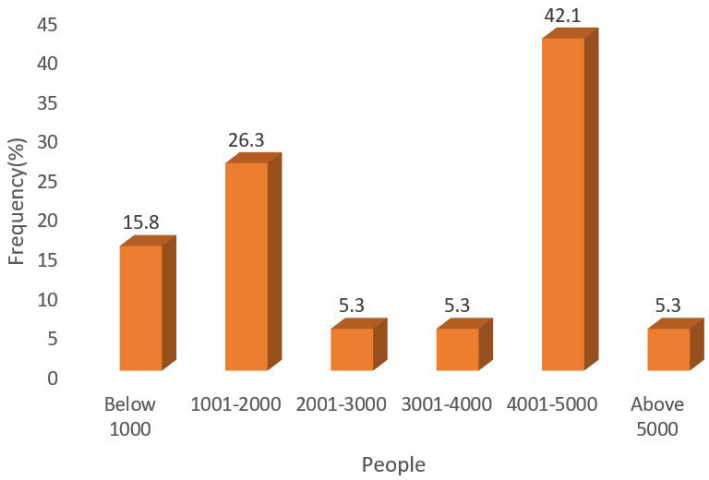

Figure 2: Crowd capacity of LCC

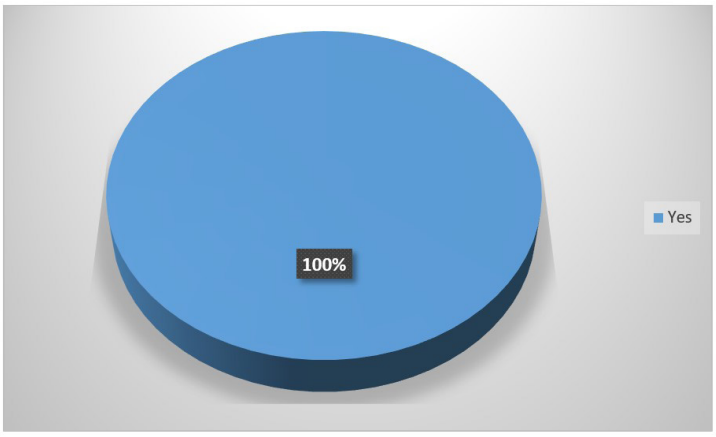

Figure 3: Presence of Covid-19 safety precautions at LCC

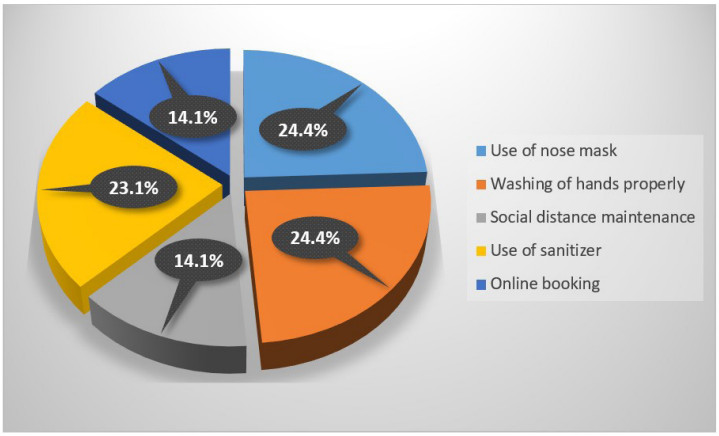

Figure 4: Safety precautions available at LCC

Table 2 reveals the crowd management strategies obtainable at the site. The statements were subjected to mean values and the mean ranged from 4.68 to 4.42. "LCC has sufficient safety personnel to supervise crowd at any given time" had the highest mean value of 4.68 while "The reception is big enough to handle the crowds" had the lowest mean value of 4.42.

Table 2: Crowd management strategies at LCC

Crowd Management Strategies	SA	A	N	D	SD	Mean	St. Dev
LCC has sufficient safety personnel to supervise crowd at any given time	14(73.7%)	4(21.1%)	1(5.3%)	0(0%)	0(0%)	4.68	0.582
The safety personnel are experienced and knowledgeable	12(63.2%)	6(31.6%)	1(5.3%)	0(0%)	0(0%)	4.58	0.607
The safety personnel are responsive to crowd needs	13(68.4%)	5(26.3%)	1(5.3%)	0(0%)	0(0%)	4.63	0.597
LCC uses warning signs	13(68.4%)	4(21.1%)	2(10.5%)	0(0%)	0(0%)	4.58	0.692
There are instructions on the proper use and behavior inside LCC	13(68.4%)	5(26.3%)	1(5.3%)	0(0%)	0(0%)	4.63	0.597
LCC has safety instructions to control crowds	13(68.4%)	5(26.3%)	1(5.3%)	0(0%)	0(0%)	4.63	0.597
The reception is big enough to handle the crowds	10(52.6%)	7(36.8%)	2(10.5%)	0(0%)	0(0%)	4.42	0.692
The tourists are sensitized on COVID-19 safety rules before entering LCC	11(57.9%)	7(36.8%)	1(5.3%)	0(0%)	0(0%)	4.53	0.612
The walkways are wide enough to handle the crowds	11(57.9%)	7(36.8%)	1(5.3%)	0(0%)	0(0%)	4.53	0.612

Keys: SA-Strongly Agree, A-Agree, N-Neutral, D-Disagree, SD- Strongly Disagree

Figure 5 reveals that majority of the staff opined that the crowd management strategies at Lekki Conservation Centre is very effective (68.4%), 21.1% opined it is moderately effective, 5.3% opined it is very ineffective while 5.3% were neutral.

Figure 6 reveals that the staff were satisfied with the crowd management strategies at the site (94.7%) while 5.3% were not satisfied with crowd management strategies at the site.

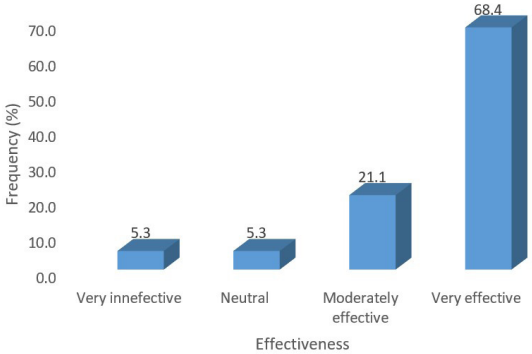

Figure 5: Effectiveness of crowd management strategies

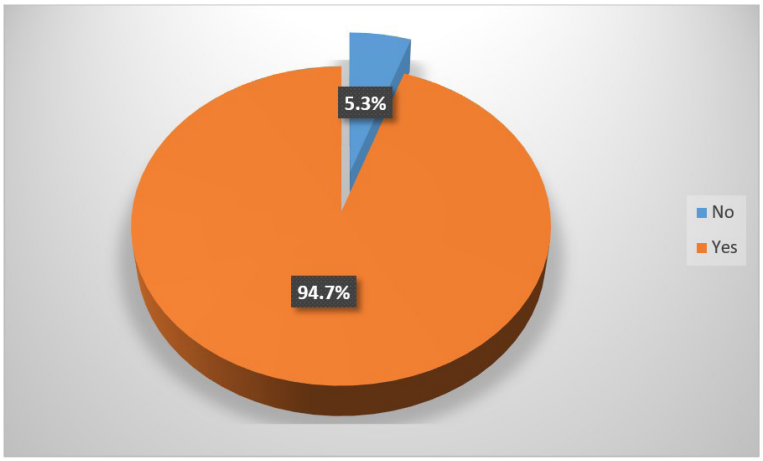

Figure 6: Satisfaction with crowd management strategies

Table 3 reveals the relationship between the crowd management strategies at Lekki Conservation Centre and effectiveness of the crowd management strategies. "LCC has sufficient safety personnel to supervise crowd at any given time" is the only crowd management strategy that has a significant relationship with the effectiveness of crowd management strategies at the site.

Table 3: Relationship between effectiveness of crowd management strategies and crowd management strategies

Variables	Correlation value (r)	Sig. value	Decision
LCC has sufficient safety personnel to supervise crowd at any given time	0.546*	0.016	Significant
The safety personnel are experienced and knowledgeable	0.161	0.511	Not significant
The safety personnel are responsive to crowd needs	0.120	0.625	Not significant
LCC uses warning signs	-0.017	0.946	Not significant
There are instructions on the proper use and behavior inside LCC	0.029	0.907	Not significant
LCC has safety instructions to control crowds	0.211	0.386	Not significant
The reception is big enough to handle the crowds	0.017	0.946	Not significant
The tourists are sensitized on COVID-19 safety rules before entering LCC	0.201	0.408	Not significant
The walkways are wide enough to handle the crowds	0.112	0.647	Not significant

***P<0.01, *P<0.05*

Discussion

The crowd capacity recorded at Lekki Conservation Centre reveals that it is a big site capable of being overcrowded if not checked. The ability of the site to be able attract such great number of people makes it pertinent for the management to create management strategies to control crowd numbers in the post-pandemic era so as to curb the spread of Covid-19 and other associated diseases. It is also worthy to note that this site of international reputation has put in place covid-19 safety precautions such as washing of hands, use of nose masks and sanitizers as well as maintenance of social distancing. It was also noted that the site encourages online booking which is a technological amenity that would limit physical contact with staff of the site as well as help service providers prepare for the number of people to expect per time. This online booking will also help to restrict and control the number of people expected to visit the site per time as it ensures proper preparation is done before physical presence of visitors as supported by Martella *et al.* (2017) that advent in technology is capable of supporting crowd management operations at destinations.

This study revealed the site has some crowd management strategies available which are enough to combat the spread of covid-19 and other diseases. The staff claimed that Lekki Conservation Centre has sufficient safety personnel who are experienced and knowledgeable enough to supervise crowd at any given time and that these safety personnel are responsive to crowd needs. The need for safety personnel to be knowledgeable and experienced about their duty cannot be overemphasized as this is important prevention of danger and as well as smooth running of the destination as supported by Gong *et al.* (2020) that it is important for important personnel to be knowledgeable about the actual and expected behavior of the crowd. The staff also claimed that the site has warning signs as well as instructions passed to the visitors on proper behavior and use of site resources so as to ensure their safety and enjoyable experience at the site. This shows that the site is employing visual and audio

strategies to effectively communicate instructions to the visitors to ensure their safety. The site also has facilities such as reception and walkway wide enough to handle the number of visitor per time while ensuring social distancing, indicating that the site has facilities for effective crowd management and they also make conscious efforts verbally and visually to keep their visitors safe and ensure a satisfactory experience for them. This is in line with study by Martella *et al.* (2017) that crowd management of destinations should encompass effective planning and preparation, detailed verbal and visual communication with the visitors, involvement of knowledgeable and experienced personnel in crowd management.

The site is making a commendable effort as crowd management not only helps in preventing the spread of diseases, it also helps in ecological restoration of damaged natural areas as well as risk management of ecological fragile areas at nature-based sites. Crowd management also helps in the prevention of damage to site facilities in tourism destinations as each visit company can be monitored and accounted for effectively. These strategies will improve the destination image of the site because if crowd at a site are not controlled, the visitors at the site can be exposed to danger and violent occurrences (Kingshott, 2014). The staff claimed the crowd management strategies in place are effective and they are satisfied with it. This is very important for the success of the destination in its fight against spread of diseases as well as in its bid to continue to have a competitive edge over other destinations as supported by Yu and Egger (2021) that effective crowd management procedures are important for destination marketing organizations. Hypothesis revealed that of all the crowd management strategies obtainable at the site, having sufficient safety personnel to supervise crowd at the site had the significant relationship with the effectiveness of crowd management strategies at the site indicating that management of tourist sites should work towards employing sufficient safety staff in order to be able to manage crowds at their sites effectively.

CONCLUSION

This study investigated the crowd management strategies obtainable at Lekki Conservation Centre in order to combat the spread of the COVID-19 virus and concludes that the site has necessary safety precautions against COVID-19 in place. They also have sufficient crowd management strategies sufficient to combat the spread of Covid-19 as well as maintain the ecological integrity of the site. The site has sufficient experienced and knowledgeable safety personnel that are responsive to guide the crowd in their exploration of the site. They also use visual and audio aids to communicate with their visitors on how to navigate site resources without causing harm to one another and the site. These crowd management strategies have proven effective in their operations and the staff are satisfied with the crowd management strategies. This implies that the site is not only concerned with the conservation of its natural environment but is also concerned about the welfare of its visitors as it continues to monitor the trend of events so as to provide a more satisfactory experience for its visitors.

REFERENCES

Abidakun, E. T., & Tunde-Ajayi, O. A. (2021). Tourists' choice for tour guides in enhancing site experience at Lekki Conservation Centre, Lagos State. *International Journal of Progressive Science and Technology, 3*0(1), 543–550.

Arnberger, A., & Haider, W. (2007). Would you displace? It depends! A multivariate visual approach to intended displacement from an urban forest trail. *Journal of Leisure Research, 39*(2), 345–365.

Beerli, A., & Martin, J. D. (2004). Factors influencing destination image. *Annals of Tourism Research, 31*(3), 657–681.

Beerli, A., & Martín, J. D. (2004). Tourists' characteristics and the perceived image of tourist destinations: A quantitative analysis—A case study of Lanzarote, Spain. *Tourism Management, 25*(5), 623–636.

Bultena, G., Field, D., Womble, P., & Albrecht, D. (1981). Closing the gates: A study of backcountry use limitation at Mount McKinley National Park. *Leisure Sciences, 4*(3), 249–267.

Ciegis, R., Ramanauskiene, J., & Startiene, G. (2009). Theoretical reasoning of the use of indicators and indices for sustainable development assessment. *Engineering Economics, 3,* 33–40.

Coccossis, H., Mexa, A., Collovini, A., Parpairis, A., & Konstandoglou, M. (2002). Defining, measuring and evaluating carrying capacity in European tourism destinations: Final report (B4–3040/2000/294577/MAR/D2). European Union.

Dodds, R., & Butler, R. W. (2019). *Overtourism: Issues, realities and solutions.* De Gruyter. https://doi.org/978-3-11-62045-0

Dowling, R. K. (2006). *Cruise ship tourism.* CABI.

Fisher, D., & Heymann, D. (2020). Q&A: The novel coronavirus outbreak causing COVID-19. *BMC Medicine, 18*(1), 1–3. https://doi.org/10.1186/s12916-020-01867-2

Fleishman, L., Feitelson, E., & Salomon, I. (2004). The role of cultural and demographic diversity in crowding perception. *Tourism Analysis, 9,* 23–40.

Gong, V. X., Daamen, W., Bozzon, A., & Hoogendoorn, S. P. (2020). Crowd characterization for crowd management using social media data in city events. *Travel Behavior and Society, 20,* 192–212.

Graefe, A. R., Kuss, F. R., & Vaske, J. J. (1990). *Visitor impact management: The planning framework.* National Parks and Conservation Association.

Gramann, J. H., & Burdge, R. J. (1984). Crowding perception determinants at intensively developed outdoor recreation sites. *Leisure Sciences, 6*(2), 167–186.

Hammitt, W. E., & Cole, D. N. (1998). *Wildland recreation: Ecology and management* (2nd ed.). John Wiley & Sons.

Helmy, E., & Cooper, C. (2002). An assessment of sustainable tourism planning for the archaeological heritage: The case of Egypt. *Journal of Sustainable Tourism, 10,* 514–535.

Jacobsen, J. K. S. (2000). Anti-tourist attitudes. *Annals of Tourism Research, 27,* 284–300.

Jurado, E. N., Damian, I. M., & Fernández-Morales, A. (2013). Carrying capacity model applied in coastal destinations. *Annals of Tourism Research, 43,* 1–19.

Kainzinger, S., Burns, R. C., & Arnberger, A. (2015). Whitewater boater and angler conflict, crowding, and satisfaction on the North Umpqua River, Oregon. *Human Dimensions of Wildlife, 20,* 542–552.

Kingshott, B. F. (2014). Crowd management: Understanding attitudes and behaviors. *Journal of Applied Security Research, 9*(3), 273–289.

Krebs, A., Petr, C., & Surbled, C. (2007). La gestion de l'hyper fréquentation du patrimoine: D'une problématique grandissante à ses réponses indifférenciées et segmentées. *Proceedings of the 9th International Conference on Arts & Cultural Management.* University of Valencia.

Kuentzel, W. F., Laven, D., Manning, R. E., & Valliere, W. A. (2008). When do normative standards matter most? Understanding the role of norm strength at multiple national park settings. *Leisure Sciences, 30*(2), 127–142.

Lawson, F., & Baud-Bovy, M. (1977). *Tourism and recreational development.* Architectural Press.

Leung, Y. F., Spenceley, A., Hvenegaard, G., & Buckley, R. (2018). *Tourism and visitor management in protected areas: Guidelines for sustainability* (Best Practice Protected Area Guidelines Series No. 27). IUCN.

Li, P., Fu, J. B., Li, K. F., Liu, J. N., Wang, H. L., Liu, L. J., & Yan, J. B. (2020). Transmission of COVID-19 in the terminal stages of the incubation period: A familial cluster. *International Journal of Infectious Diseases, 96,* 452–453.

Luque-Gil, A. M., Gomez-Moreno, M. L., & Pelaez-Fernandez, M. A. (2018). Starting to enjoy nature in Mediterranean mountains: Crowding perception and satisfaction. *Tourism Management, 25,* 83–103.

Manning, R. (2004). Recreation planning frameworks. In M. J. Manfredo, J. J. Vaske, B. Bruyere, D. R. Field, & P. J. Brown (Eds.), *Society and natural resources: A summary of knowledge* (pp. 83–96). Modern Litho.

Manning, R. (2007). *Parks and carrying capacity: Commons without tragedy.* Island Press.

Manning, R. (2009). *Parks and people: Managing outdoor recreation at Acadia National Park.* University Press of New England.

Manning, R., Valliere, W., Wang, B., & Jacobi, C. (1999). Crowding norms: Alternative measurement approaches. *Leisure Sciences, 21,* 219–229.

Manning, R. E. (2011). *Studies in outdoor recreation: Search and research for satisfaction* (3rd ed.). Oregon State University Press.

Manning, R. E., & Anderson, L. E. (2012). *Managing outdoor recreation: Case studies in the national parks.* CABI Publishing.

Martella, C., Li, J., Conrado, C., & Vermeeren, A. (2017). On current crowd management practices and the need for increased situation awareness, prediction, and intervention. *Safety Science, 91,* 381–393.

Miller, G., & Twining-Ward, L. (2005). *Monitoring for a sustainable tourism transition: The challenge of developing and using indicators.* CABI Publishing.

National Park Service. (1997). *Visitor experience and resource protection (VERP) framework: A handbook for planners and managers.* Denver Service Center.

Neuts, B., & Nijkamp, P. (2012). Tourist crowding perception and acceptability in cities: An applied modelling study on Bruges. *Annals of Tourism Research, 39*(4), 2133–2153.

O'Reilly, A. M. (1986). Tourism carrying capacity: Concept and issues. *Tourism Management, 7*(4), 254–258. https://doi.org/10.1016/0261-5177(86)90042-5

Petr, C. (2009). Fame is not always a positive asset for heritage equity! *Journal of Travel & Tourism Marketing, 26*(1), 1–18.

Ryan, C., & Cessford, G. (2003). Developing a visitor satisfaction monitoring methodology: Quality gaps, crowding, and some results. *Current Issues in Tourism, 6,* 457–507.

Saveriades, A. (2000). Establishing the social tourism carrying capacity for the tourist resorts of the east coast of the Republic of Cyprus. *Tourism Management, 21*(2), 147–156.

Shelby, B., & Heberlein, T. A. (1986). *Carrying capacity in recreation settings.* Oregon State University Press.

Shelby, B., Vaske, J. J., & Heberlein, T. A. (1989). Comparative analysis of crowding in multiple locations: Results from fifteen years of research. *Leisure Sciences, 11,* 269–291.

Stankey, G. H., Cole, D. N., Lucas, R. C., Peterson, M. E., & Frissell, S. S. (1985). *The limits for acceptable change (LAC) system for wilderness planning* (Gen. Tech. Report INT-176). USDA Forest Service, Intermountain Forest and Range Experiment Station.

Tapachai, N., & Waryszak, R. (2000). An examination of the role of beneficial image in tourist destination selection. *Journal of Travel Research, 39*(1), 37–44.

Tarrant, M. A., Cordell, H. K., & Kibler, T. L. (1997). Measuring perceived crowding for density river recreation: The effects of situational conditions and personal factors. *Leisure Sciences, 19,* 97–112.

Torres-Delgado, A., & Saarinen, J. (2014). Using indicators to assess sustainable tourism development: A review. *Tourism Geographies, 16,* 31–47.

Vaske, J. J., & Donnelly, M. P. (2002). Generalizing the encounter-norm-crowding relationship. *Leisure Sciences, 24,* 255–269.

Vaske, J. J., & Shelby, L. B. (2008). Crowding as a descriptive indicator and an evaluative standard: Results from 30 years of research. *Leisure Sciences, 30,* 111–126.

Vaske, J. J., Shelby, B., Graefe, A. R., & Heberlein, T.

A. (1986). Backcountry encounter norms: Theory, method, and empirical evidence. *Journal of Leisure Research, 18,* 137–153.

Wijermans, F. E. H. (2011). *Understanding crowd behavior: Simulating situated individuals.* University of Groningen.

Wilder-Smith, A., & Freedman, D. O. (2020). Isolation, quarantine, social distancing and community containment: Pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *Journal of Travel Medicine, 27*(2).

Wong, J. Y., & Yeh, C. (2009). Tourist hesitation in destination decision making. *Annals of Tourism Research, 36*(1), 6–23.

World Health Organization. (2020). *Responding to community spread of COVID-19.* https://www.who.int/publications-detail/responding-to-community-spread-of-covid-19 [accessed 12 April 2020].

Yu, J., & Egger, R. (2021). Tourist experiences at overcrowded attractions: A text analytics approach. In *Information and communication technologies in tourism 2021* (pp. 231–243). Springer.

Zehrer, A., & Raich, F. (2016). The impact of perceived crowding on customer satisfaction. *Journal of Hospitality and Tourism Management, 29*, 88–98.