

ASSESSMENT OF DESIGN FEATURES FOR CROWD CONTROL IN SPORT CENTRES IN NIGERIAN UNIVERSITIES

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In view of the large crowd that attends sport events, the rate of crowd disaster and disorderliness is regularly high. An increase rate of accidents and injuries among participants at public events, particularly Sports Events has turned out to be one of the significant worries to researchers and professionals. Sport events in a student environment attracts crowd, the students, staff and other people who attends sport events constitute crowds whose safety must be guaranteed as crowded spaces are potentially risky. Therefore, the aim of this research is to assess the crowd control design features and strategies adopted in the design of Sport Complexes in selected Nigerian Universities. The research used a mixed method approach in the collection of data. This includes questionnaires, and interview on the respondents (students and staff) as well as participants' observation. These data were collected in five Nigerian Universities randomly selected. The study revealed that there are some salient spatial crowd control issues that are not featured in the design of sport centres. The paper therefore, recommends the integration of crowd control measures in the design of sport arena in Nigerian Universities.

Key words: Sport Centre, Crowd Control, Design Features, Nigerian Universities

INTRODUCTION

A crowd is a large number of people attending a particular event at a specific venue for a finite period of time (Memish et al, 2012). Examples of such events are concerts, religious and sporting events among others. Crowd control research focuses on improving the safety and wellbeing of crowd at events where a high flow of crowd is expected, one of such events is sport events. Sport events are being organized at various levels, one of these is the University sport. The university is the highest level of the tertiary educational institution of any country. Therefore, it is expected that sport events and facilities should be well developed and organized at this institutional level. Sport development at the University level will result in a substantial impact on National sports (Bamidele, 2012).

Crowd violence in sport centres has been a longstanding issue all over the world, however, various studies on crowd violence has been conducted in some countries. Lowrey (2002) carried out a study on football sport violence in England, and highlighted the causes of chaos such as alcohol intake, poor refereeing and fans rivalry. Krausz and Bauckhage (2012) asserted that in any large gatherings, such as sports and religious events, there is a high tendency of building up crowd densities whose actions may result in property destruction, injuries and death. For instance, the most notable sport crowd incidence in England occurred about twenty five years ago during the Football Association (FA) Cup semi-finals between Nottingham Forest and Liverpool whereby over 2000 spectators forced their way into a section of the Hillsborough Stadium in Sheffield which had already accommodated 1500 spectators. As thousands of people rushed into the stadium, the spectators in front were pinned against the fence that guarded the fans from the field and players. As a result of this, over 93 spectators died and more than 200 people were injured. The incidence was thereafter described as the worst ever sporting disaster in Britain's history (Kwalimwa, 2014).

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Nigerian Universities sport centres is not an exception in matters involving crowd disasters during sport events. Sport events in a student environment attracts crowd, the University is made up of strong, talented, intelligent, skilful, and energetic youths whose interest in sports is relatively high. The students, staff and other people who attend sport events in the university constitutes crowds whose safety must be guaranteed as crowded spaces are potentially risky, especially in sport events such as the inter-university sport competition organised by the most notable Nigerian University Games Association (NUGA). Violence has negative effects and is often detrimental to victims. Odili (2002) confirms that violence in an educational institution adversely affects students' academic activities and performance. The invasion of the culture of cultism in the Nigerian educational system has become worrisome. Ogidefa (2008) reveals that reported cases of frequent cult activities are gradually turning the university campuses into unsafe ground for effective learning and other activities due to deviant acts and other anti-social behaviours been displayed by cult members. He further asserts that there is hardly any academic session without reported cases of cultism in most Nigerian institutions. This confirms the presence of students with harmful and criminal minded vision and mission in Nigerian University campuses.

However, in view of the vast range of spectators that attends the various sport events organised in the Nigerian University, the likelihood of crowd disaster and disorderliness is high. Crowd Congestion during sports events has been referred to as a reason for disasters in Sport Centres (Dimmock, 2005). Crowd control at sport complexes is a noteworthy worry for sport event coordinators. The safety of the participants is of vital significance and must be dealt with as a design need, to guarantee constant utilization of the facility. Controlling the movement and conduct of people in a crowd through passive design can help to diminish the rate of casualties and deaths that occur in buildings and significantly sport events.

There are various crowd management strategies that can be adopted in the design of a sport complex to successfully manage crowd. Studies related to this has not been carried out in sport centres in Nigerian universities, this research therefore, sought to assess the crowd management strategies that can be adopted in indoor sport complexes in selected Nigerian Universities. The findings of this study will provide the administration of Sports in Nigerian Universities with essential data on successful management of participants for all sport events holding in their centres. The research will likewise contribute to the existing body of knowledge on crowd control for sport events and create opportunity for additional research on crowd control and will also be utilized as reference material by future researchers dealing with similar or related studies. The study was guided by the following research questions;

1. What are the crowd control design strategies adopted in the university sport centres?
2. How effective are these strategies during peak sport events and emergency situation?

Sport Facilities

Sport facilities in this study refer to sport arena, for example, fields, halls, courts, running tracks, boxing rings, swimming pools, among others. Omolawon (2000) expressed that this part of sports management can't be over-emphasized. This is because that sporting facilities are expected to encourage the various activities required in sports. Bamidele (2012) affirmed that the sport facility is the most sensitive zone in all area of sports management. In his research, he also observed that the existing sports facilities in Nigerian institutions of learning are exceedingly lacking and substandard. The issues are the design of sports facilities and that of maintenance. The design and maintenance culture in most Nigerian universities is defective. A bigger than anticipated gatherings of fans striving to enter a sport centre could motivate the security agents to open the entrance gate to assuage the crowd pressure. Rather than easing pressure, the subsequent surge of fans striving to enter enclosed spaces makes a basic congestion of the space, thereby subjecting ineffectively maintained sports facilities to a hazard prone zone which results in high level of risk to crowds utilizing it (Beech and Chadwick, 2004). Aside from deaths and injuries, crowd disaster in sport complexes has different results. For example, it might prompt a restriction of the sport centre from facilitating other future sport events. Other consequences may include loss of assets due to closing of the centre, poor observer turn-up for future sport events, diminished enthusiasm for sports support and low sport ability inquiry and improvement (Young, 2002).

There are so many organized institutional as well as collegiate sports events in Nigerian Universities. The most notable is the Nigerian University Games Association (NUGA) which organises various university level sport events in Nigeria. NUGA hosts a bi-annual inter-university sport competition called the University Games. NUGA approves fifteen different sporting events at the University Games, these includes; track and field, badminton, basketball, chess, cricket, handball, hockey, judo, soccer, squash, swimming, table tennis, taekwondo, tennis, and volleyball.

Review of Relevant Studies on Crowd Control

Simpson (2000) designed a concept of crowd gathering phases which includes; the assembling process, the temporary gathering and the dispersal process as shown in Figure 3.0 below. He affirmed that crowd gathering is a process that has a beginning, middle and an end. The assembling process is described as the movement of people from various locations converging at a point within a stipulated period of time. At this phase, the size of the crowd is been determined by the number of access routes, way finding and signage, advance sale of tickets and the level of lighting within the venue. Assembling can occur either on impromptu basis or by an organized mobilization effort. Both involve the level of invitation by the event planners and the attendees.

The next phase which is the temporary gathering is the result of the assembling process. Benjamin (2000) defined temporary gathering as a collection of individuals and groups in a particular location performing individual and collective activities and actions. For instance, spectators at a basket ball sports will either individually or collectively mourn failures or cheer successes of their team during the sport event. The final crowd gathering phase is the dispersal process which involves the movement of people from a particular point to one or more alternative directions. Dispersal can occur based on routine, emergency or coerced basis (Simpson, 2000). Dispersal based on routine is as a result of specified time duration of the event under an absolutely normal condition. Emergency dispersal occurs when people evacuate a place as a result of an unforeseen disaster such as fire, explosion or flood. In emergency situations, effective communication is required to minimize the level of disaster at the centre. The communication process must be flexible and the information transferred must be clear, concise, courteous, correct, complete and correctly directed (Watt, 1998). Coercion dispersal occurs when security personnel resort to use of force to move people or groups who refuse to disperse after the event. The three phases of crowd gathering and dispersal process is shown in the figure below;

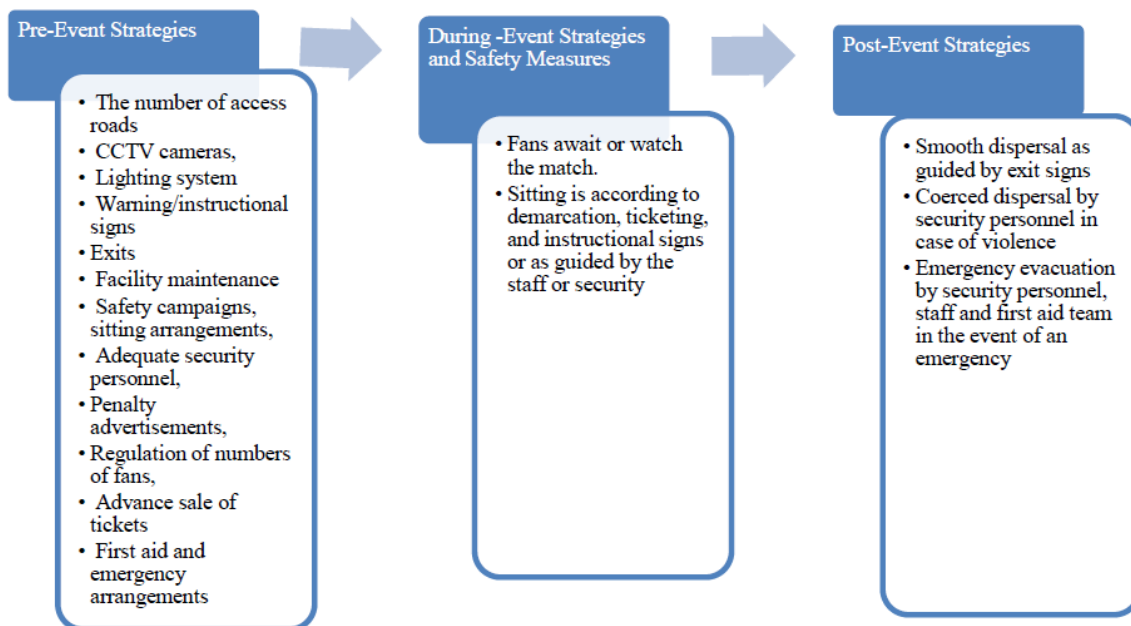


Figure 1.0: Crowd Gathering Phase and Dispersal {Source: Simpson (2000)}

According to Fruin (1993), architects and engineers usually give negligible considerations to the movement of individuals in their initial designs of buildings; most of these designs do not comply with the building standards. Consistency with building standards ensures that a building will function well during normal or emergency conditions. Designing for crowd control and management requires that the expected maximum occupancy levels of a space correlates with the movement capacities of all passageways, stairs, ramps, elevators, and other facilities. Architects have the duty of setting up a passive crowd management design

as a component of the life security assessment of a new public event facility. The design ought to set up the gathering and crowd movement abilities of all parts of the venue, a well designed circulation pattern will point out possible problem regions, and most importantly defines how the design will suit normal and emergency crowd movement.

The capacity of corridors, stairs, pedestrian and vehicular movements, and waiting spaces should be the focus of the architect in passive crowd control designs. The design of a building in which the users can easily understand the spaces and can also grasp the graphical image is dependent on the architectural design composition, spaces and details adopted in the design (Fruin, 1993). The design should give considerations to details such as; People's flow rate, Door measurements, Visibility of the exits, Door condition (open or closed), Building geometry, Obstacles while in transit to exits (such as furniture and columns), Circulation routes, Barriers, way finding and signage.

Crowd Dynamics and Behaviour at Sport Events

Crowd dynamics is the study of how, where and when crowds are formed. People's behaviour at public events is been influenced by various factors. Most of these factors are related to design while others are based on individuals or specific circumstances. The individual factors can be categorised into four main stages (Zachary and Carey, 2017);

1. To sense: at this stage, the individual obtains information from the environment through their sense knowledge
2. To interpret: at this stage the individual derives meaning to the information received
3. To decide: the individual takes a decision on what to do with the information
4. To act: the individual carries out an action based on the information.

A crowd is comprised of a gathering of individuals; it has been observed that the conduct of some individuals determine the conduct of the crowd in normal and panic circumstances (Benthom, 2016). At departure, it is human instinct to take after impulse by trying to get out as fast as would be prudent. In most cases, the diverse exit alternatives are not completely utilized; most people adopt a principle called 'faster-is-slower', where quick uncoordinated movement by people make the entire crowd move slower. The instinct and experience of an individual is frequently vigorously depended on during panic circumstances, and this could result in either a positive or a negative action (Pan, 2007). It has been observed that most people will leave buildings along a route that they are most familiar and comfortable with, (in most cases; the main entry or exit). In this situation, experience works adversely because a high number of individuals will disregard alternative exits and congestion could occur at those exits being used as shown in figure 1. In non emergency circumstances a judicious decision could be made by assessing which of the exits is most suitable and picking the one that minimises the exit time. However, in a panic circumstance the degree to which an individual reasonably picks an exit relies on time and the level of the perceived danger.

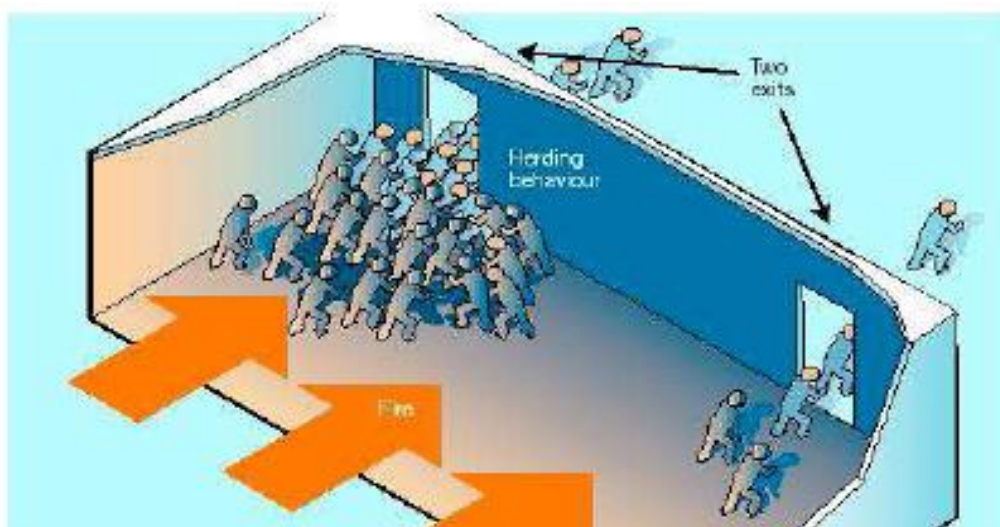


Figure 2.0: Crowd trying to escape from a Smoke-Filled Room [Source: Helbing and Molnar, 2001]

Crowd Disaster Process

The causes of crowd disaster can be classified into structural failure as a result of higher than expected level of attendance, Crowd Behaviours which are the actions and reaction to

situations and events by individuals making up a crowd, and natural occurrence such as heavy rainfall (National Disaster Management Authority(NDMA), 2014). Due to these factors, a form of Panic or excitement is been created in the minds of the spectators/users of the facility, which further leads to evacuation or crowd congestion. In an evacuation circumstance, there is a critical change in the way that individuals associate with each other. People who are terrified follow up on impulses which may not align with social standards. High level of perceived danger can prompt more physical interactions between individuals which steadily slow down the crowd. People pushed to the ground can be trampled over, turning out to be noticeably resolute items which block the evacuation routes of other individuals. People who lack experience in evacuation circumstances will probably look to the conduct of others as a guide on their behaviour.

Crowd incidence in sport events has been a longstanding issue. As indicated by Lewis (2007), there are six most basic types of spectator's aggression: verbal, which incorporates singing, chanting and hollering insults or obscenities; signalling for example, signalling to others with threatening or vulgar movements; 'missile' i.e. throwing which incorporates throwing things, for example, food, drinks, blocks, bottles, broken seats and mobile phones at specific or random targets; swarming, for example, rushing to the field or stage, and attempting to crash the entryways to pick up passage; or racing to the exit, both of which may bring about damage or demise from trampling; property devastation which incorporates thumping down sound frameworks, tearing up the playing field, and damaging the setting or different properties; physical attacks which incorporate spitting, kicking, pushing, clench hand battling, stabbings and shooting. In addition, figure 2 below summarises the factors responsible for crowd disaster in public event such as sports.

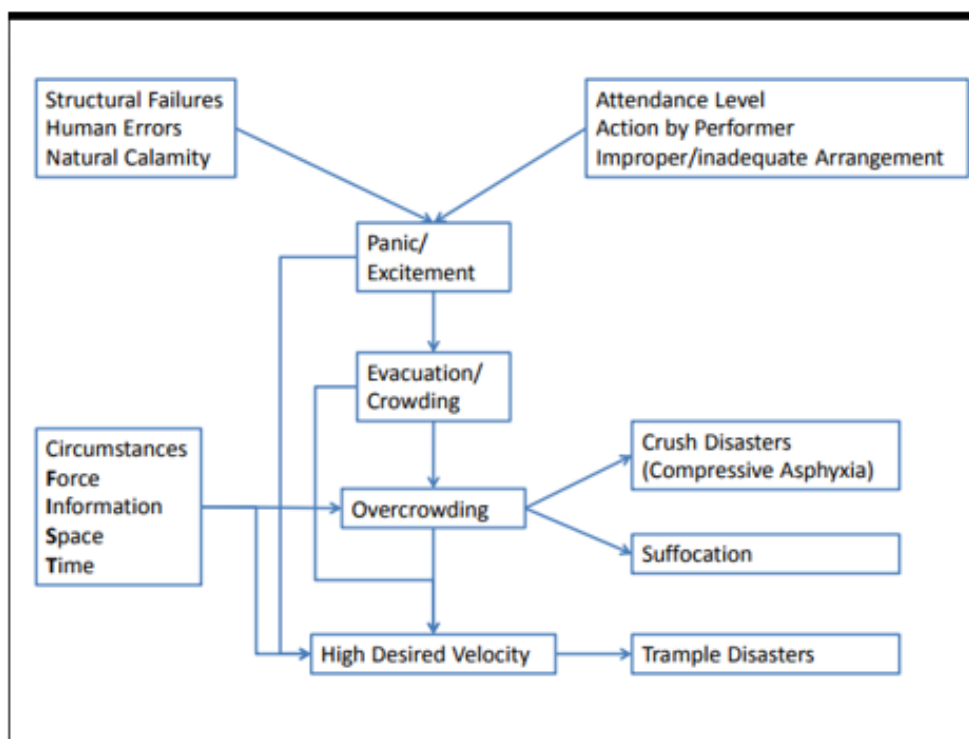


Figure 2.0: Crowd Disaster Process

Source: (National Disaster Management Authority(NDMA), 2014)

RESEARCH METHODOLOGY

The research methodology adopted in the course of this study is the qualitative research approach. The qualitative research methods mostly makes use of the interview, journals, observations and literatures to obtained and analyse qualitative data. In addition to the information obtained from reviewed literature, this research also adopts the use of an in depth interview, and a prepared observation schedule in obtaining data. Burns (1999) expressed that the use of interviews are a popular and most reliable means of obtaining qualitative data because it enables the researcher to obtain first hand information from the respondents. Flick (2006) adds that the purpose of interview is to reveal existing knowledge in a way that can be expressed in the form of answers and so become accessible to interpretation. He also confirms that the use interviews enables high rate of response from the respondents. Flick (2006) also asserts that observation is mostly adequate in observing events as they naturally

occur. More importantly, observation enables the researcher to combine it with checklists and interviews to collect relatively objective firsthand data.

However, in the course of this research, in-depth interviews were conducted with respondents who are the sport officials, students and staff of the institution whereby information such as capacity of sport hall, number of participants at peak period, time and period of usage of the sport facility, type of spectator, adequacy during emergency, nature of Crowd Violence experienced in the past among others were gathered. On the other hand, the observation schedule which is was constructed based on the research questions and objectives which was used to obtain information on availability, strategic positioning, number, sizes, adequacy, design and functionality of various crowd control design features adopted in the studied sport complexes. These variables were studied in comparison with the recommendations by the Department for culture, media, and sports (2008)

Five randomly selected Federal Universities were studied out of the forty Federal Universities in Nigeria. Federal Universities in Nigeria were selected as the population sample because every Federal University is expected to reflect the federal image and character of the country in terms of admission (heterogeneous mix of students), facilities and academics. These five were selected on the basis that they have either hosted or have the potential to host (having hosted pre-NUGA games) the bi-annual interuniversity sport competition organized by the Nigerian University Games Association (NUGA). Due to the vast number of participants and spectators attending the NUGA games event, these universities would have adopted some strategies in controlling the crowd and ensuring the safety of the participants at the event. Hence, this crowd control strategies were studied in the course of this research and also data were collected based on the prepared observation checklist which analyses variables such as; the number of entrance and exits available, the width of the doors and walkways, availability of way finding and signage, use of barriers, type of flooring materials, and consideration for disabled spectators. While the questionnaires administered were based on the total population of students in the University, the capacity of the stadium, the size of the crowd at sport centre at peak period, the behaviour of the crowd before, during and after the event, the time and period of events, the nature of crowd violence experienced in the past and recommendations from the respondents.

The five university sport centres studied are; Obafemi Awolowo University, Ife (OAU IFE), University of Ibadan (UNI IBADAN), Ahmadu Bello University, Zaria (ABU ZARIA), Federal University of Technology, Minna (FUT MINNA), and University of Benin (UNI-BEN). Table 1.0 below shows the names of institutions, their year of establishments, the students and staff population of the studied universities, and the last time the institutions hosted the NUGA games event.

Table 1.0: Institutions Studied (Source: Authors' fieldwork, 2017)

Institution	Year of Establishment	Students Population	staff Population	Number of Editions hosted	Most recent year of Host NUGA Games
OAU IFE	1962	26,000	5,000	3	2014
UNI IBADAN	1948	19,521	6288	4	2002
ABU ZARIA	1962	49436	6177	3	2001
FUT MINNA	1983	20,000	3500	potential host	-
UNI-BEN	1970	56,501	5744	1	2011

RESULTS AND DISCUSSION

The findings from the study revealed that there are some salient spatial crowd control issues that are not featured in the design of sport centres. The findings of the research were represented in tables and charts. Figure 3.0 represents the findings on the type of facility that attracts crowd in the studied universities.

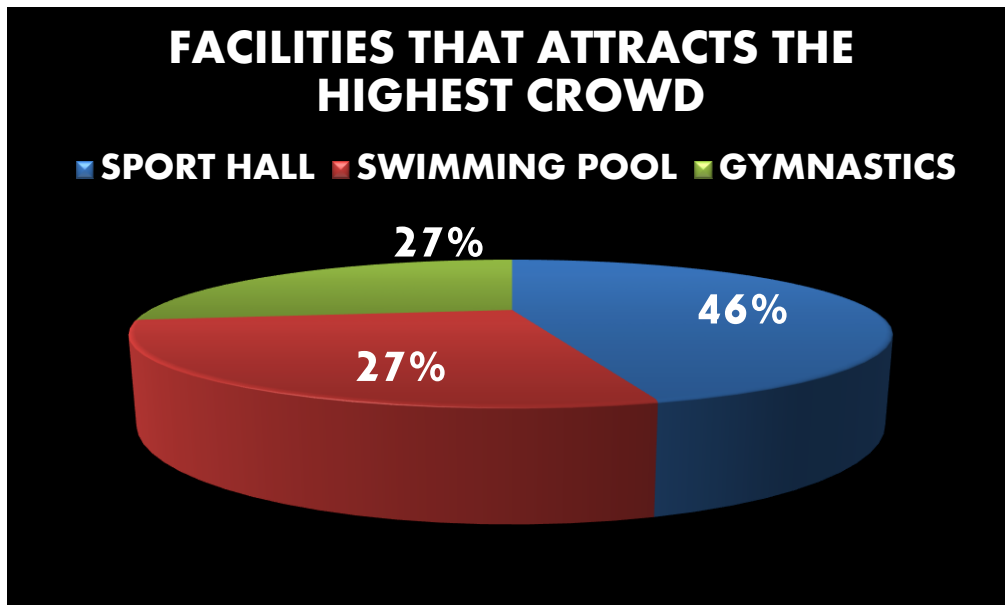


Figure 3.0 Facilities that attracts the Highest Crowd (Source: Authors' fieldwork, 2017)

The chart in Figure 3.0 shows that 46% of the users/spectators of the sport facilities of the Federal Universities visited are attracted to the sport hall. The sport hall is a large indoor facility used for multiple sporting activities such as badminton, volley ball, basketball among others. Figure 3.1 below shows an image of a crowded sport hall of one the studied Federal universities. Other facilities such as the gymnasium and the swimming pool attract 27% of the crowd at the sport facility.



Figure 3.1 Crowds at Ahmadu Bello University Sport Hall

Table 3.0 below shows the analysis of the major point of crowd congestion at the sport facilities study;

Table 3.0 Major Point of Crowd Congestion in Sport Hall

NAME OF UNIVERSITY	MAJOR POINT OF CROWD CONGESTION IN SPORT HALL			
	ENTRANCES	EXITS	TICKET POINT	CORE AREAS
OAU IFE	✓	✓	✓	✓
UNI IBADAN		✓		
ABU ZARIA	✓	✓		
FUT MINNA		✓		✓
UNI-BEN	✓	✓	✓	✓
TOTAL	3	5	2	3

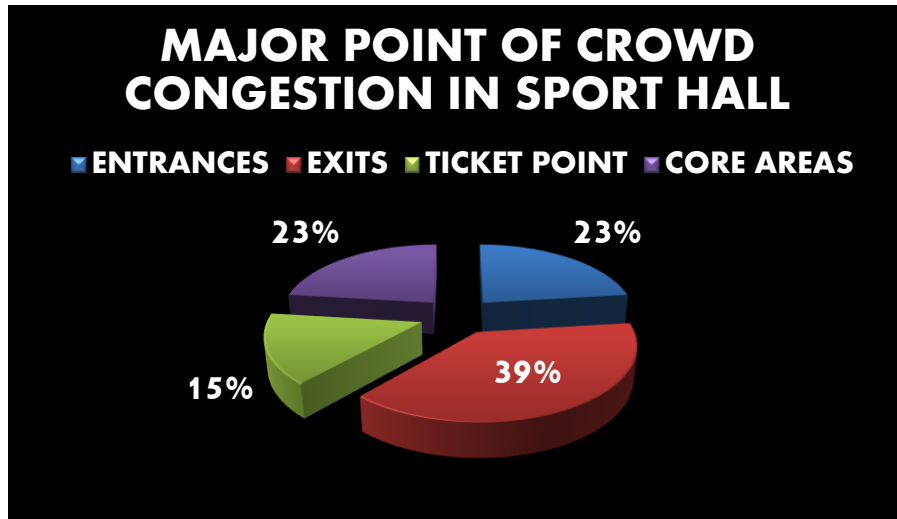


Figure 4.0 Major Point of Crowd Congestion in Sport Hall

The data obtained from table 3.0 was analysed in a chart shown in Figure 4.0 above. Crowd congestion in 39% of the studied Federal universities occurs at the exit. The findings were also confirmed through an interview with one of the officials of the sport facility during the field work. Passive crowd control strategies such as multiple number of exits, opening of exit doors and gates, use of barriers, way finding and signage system to coordinate crowd movement towards the exit points to avoid congestion and proper communication of emergency should be adopted in sport facilities to minimise crowd congestion. Other points of crowd congestions discovered during this research are the ticket points, the core areas such as stairs, entrance, passage ways and corridors. The charts in Figure 5.0 show that emergency exits are available in only 62% of the studied Universities. Also, 40% of the studied Universities made provision for two numbers of exits for spectators and users of the building after the event. Furthermore, the widths of the access door, walkways and corridors were also studied and analysed in Figures 6.0, 7.0 and 8.0.



Figure 5.0 Numbers of Exit Points at Post Event and Availability of Emergency Exits

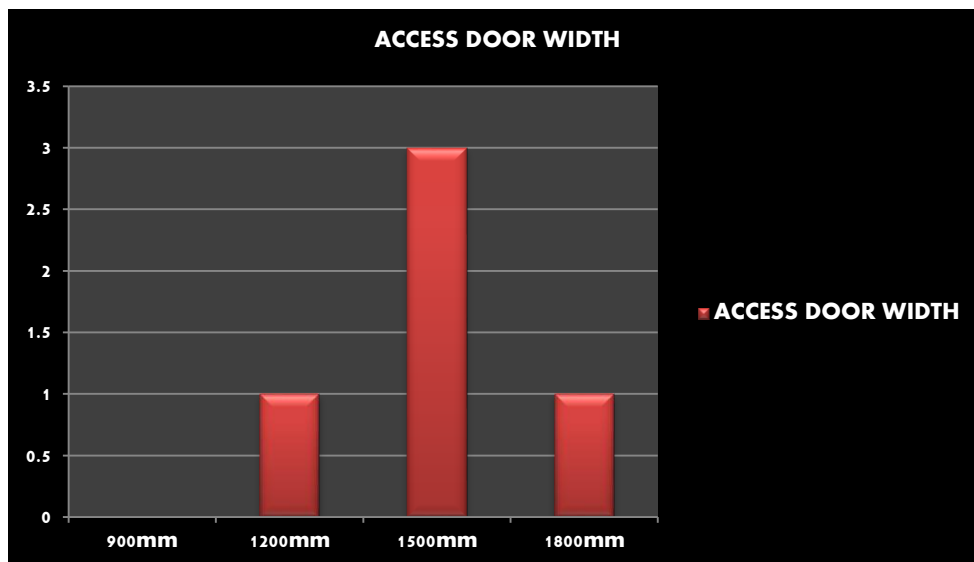


Figure 6.0 Widths of the Access Doors

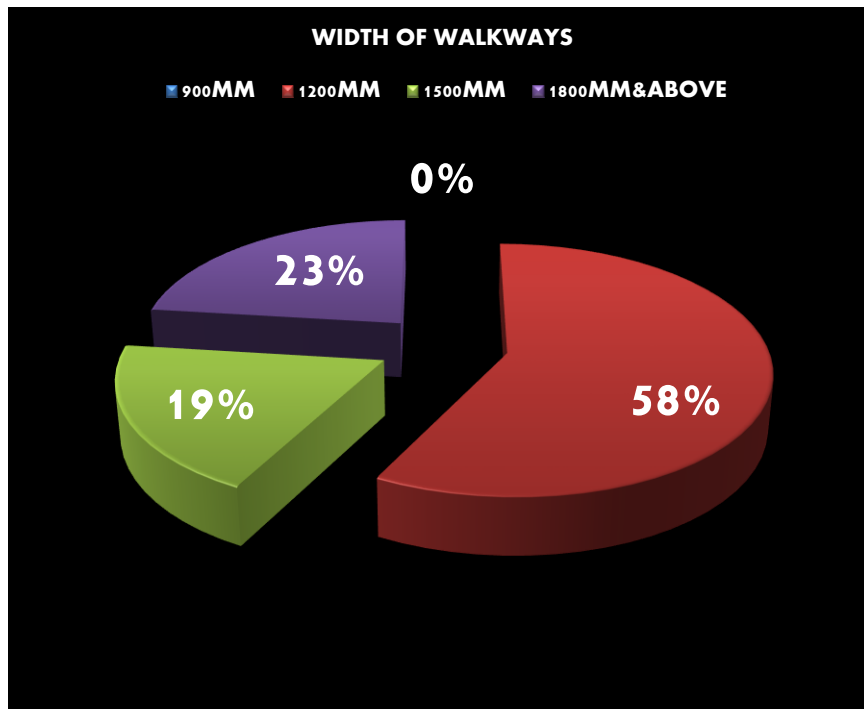


Figure 7.0 Width of the Walkways of the studied Universities

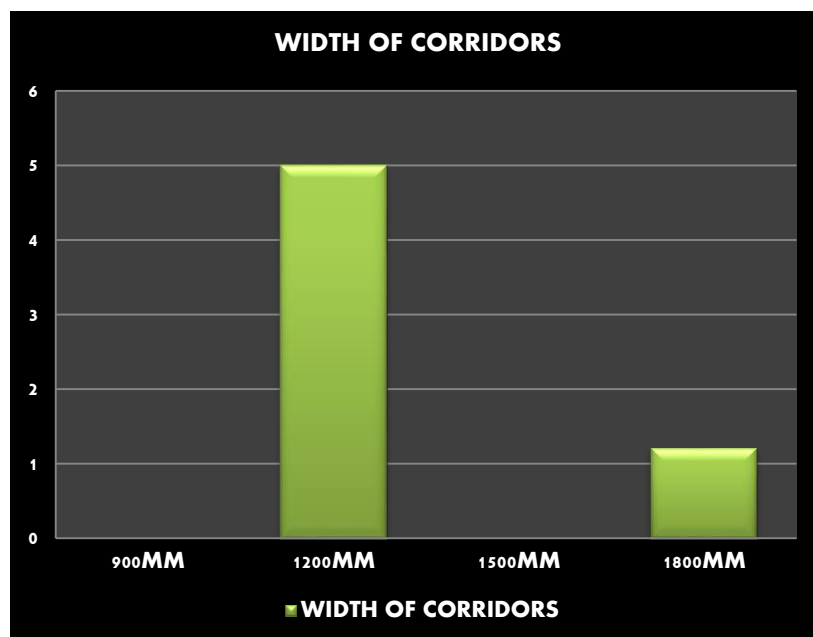


Figure 8.0 Width of the Corridors of the studied Universities

CONCLUSION AND RECOMMENDATIONS

The crowd control design strategies adopted in a higher proportion of the studied universities is considered partially adequate and inadequate in some cases because of inadequate coordination of dispersal process of crowds towards the exits, limited number of exits, partially adequate door and walkway sizes. Research findings also revealed that there is no special provision for the disabled which could result in slow movement which further leads to congestion at entrance or exits. Most of the studied universities did not provide a separate entrance and exit for the players which may result in rivalry among spectators. Also, a high proportion of the studied university have no provision for emergency exit. The available exits may be insufficient during emergency which could result in a high rate of casualties.

Therefore, based on the findings and the conclusion drawn from this study, the paper recommends the design of multiple entries and exits that will cater for normal and emergency conditions. There is a need for the design of sport facilities to make special provision for the disabled spectators and participants. Considerations such as ramps, special entry/exit, separate sitting area and conveniences will minimise the rate of crowd slow movement and congestion as a result of wheel chair users and disabled spectators. The paper also recommends the integration of crowd control design features like the use of signage, way finding and barriers in the design of sport facilities in Nigerian Universities.

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