

Disaster preparedness level in hazard laden environment: A case study of tertiary institution students in Osogbo, Osun State, Nigeria

*Bello T.B., Bamigbayan I.O., Adeyemi M.A., Odekuoye J.O., Ajayi, E.A.

Abstract

Objective: The aim was to assess disaster preparedness of tertiary institution students in Osogbo, Osun State.

Materials and methods: A cross sectional study carried out among 360 tertiary institution students using a semi structured self-administered questionnaire.

Results: Extreme heat, extreme cold and overcrowding are the hazards commonly exposed to by the students. While some respondents reported availability of safety equipment in their school, majority do not either have access to it or know how to operate these equipment. About two thirds (62.5%) are aware of disaster impact while only about one third (33.3%) are highly prepared for it. Bivariate analysis shows that religion ($p=0.032$), marital status ($p=0.027$) and family type ($P=0.008$) were significantly associated with their awareness level while only program of study ($P=0.013$) was significantly associated with preparedness level.

Conclusion: Tertiary institution students in Osogbo are exposed to various hazards and majority are not well prepared for it.

Key words: Disaster, preparedness, Students, Awareness

*Corresponding author

Bello Temilade Basirat

ORCID-NO: <https://orcid.org/0000-0003-2471-617X>

Email: temilade.bello@uniosun.edu.ng

¹Department of Public Health, Osun State University, Osogbo, Nigeria

Received: July 29, 2022

Accepted: November 3, 2022

Published: December 15, 2022

Research Journal of Health Sciences subscribed to terms and conditions of Open Access publication. Articles are distributed under the terms of Creative Commons Licence (CC BY-NC-ND 4.0). (<http://creativecommons.org/licenses/by-nc-nd/4.0>).

<http://dx.doi.org/10.4314/rejhs.v10i4.10>

Niveau de préparation aux catastrophes dans un environnement chargé de risques : étude de cas d'étudiants d'établissements d'enseignement supérieur à Osogbo, État d'Osun, Nigéria

*Bello T.B., Bamigbayan I.O., Adeyemi M.A., Odekuoye J.O., Ajayi, E.A.

Résumé

Objectif: L'objectif était d'évaluer la préparation aux catastrophes des étudiants des établissements d'enseignement supérieur à Osogbo, dans l'État d'Osun.

Matériels et méthodes: Une étude transversale menée auprès de 360 étudiants d'établissements tertiaires à l'aide d'un questionnaire semi-structuré auto-administré.

Résultats: La chaleur extrême, le froid extrême et le surpeuplement sont les dangers auxquels sont couramment exposés les élèves. Bien que certains répondants aient signalé la disponibilité d'équipements de sécurité dans leur école, la majorité n'y ont pas accès ou ne savent pas comment faire fonctionner ces équipements. Environ les deux tiers (62,5 %) sont conscients de l'impact de la catastrophe tandis qu'environ un tiers seulement (33,3 %) y sont parfaitement préparés. L'analyse bivariée montre que la religion ($p = 0,032$), l'état matrimonial ($p = 0,027$) et le type de famille ($P = 0,008$) étaient significativement associés à leur niveau de sensibilisation tandis que seul le programme d'études ($P = 0,013$) était significativement associé au niveau de préparation.

Conclusion: Les étudiants des établissements d'enseignement supérieur d'Osogbo sont exposés à divers risques et la majorité n'y est pas bien préparée.

Mots clés: Catastrophe, préparation, Étudiants, Sensibilisation

*Corresponding author

Bello Temilade Basirat

ORCID-NO: <https://orcid.org/0000-0003-2471-617X>

Email: temilade.bello@uniosun.edu.ng

¹Department of Public Health, Osun State University, Osogbo, Nigeria

Received: July 29, 2022

Accepted: November 3, 2022

Published: December 15, 2022

Research Journal of Health Sciences subscribed to terms and conditions of Open Access publication. Articles are distributed under the terms of Creative Commons Licence (CC BY-NC-ND 4.0). (<http://creativecommons.org/licenses/by-nc-nd/4.0>).

<http://dx.doi.org/10.4314/rejhs.v10i4.10>

INTRODUCTION

Environmental hazards abound within our immediate communities either in the form of man-made or natural hazards and the impact cannot be overlooked. Such hazards have been found to result in serious damages such as loss of lives and properties, injuries, or permanent disability in affected communities. Intervening in such unpleasant occurrences thus requires effective preparedness and response actions (1). Disaster preparedness refers to the development of interventions to effectively prepare for a disaster event, such as formulating policies and plans, training and education and sharing of information to prepare individuals and communities should a disaster eventuate (2). The Sendai Framework for Disaster Risk Reduction 2015-2030 which was adopted at the Third UN World Conference in Sendai, Japan, on March 18, 2015 laid particular emphasis on disaster preparedness and response and this was clearly spelt out in the priority four of the framework which stated thus; "Enhancing disaster preparedness for effective response, and to build back better in recovery, rehabilitation and reconstruction". The World Health Organization has also stressed that preventive measures and preparedness are of equal and perhaps more fundamental importance when it comes to the issues of disaster management (4). This, therefore, shows the importance of building the capacities of citizenry in disaster preparedness either at individual or community level. A study revealed that ordinary citizens can be the first responder to large natural disasters such as flood and preparatory action could be the most cost efficient and sustainable response to disasters (4). Occurrence of different types of environmental hazards in both developed and developing countries have been predicted to increase because of climate change, urban planning and industrial development (5, 6) and this does not exclude our educational system. The importance of school on a nation's development cannot be overemphasized. Aside the academic education provided by these institutions, they provide consistent routine, social support, life skills development and sometimes even meals. Thus, any disruption in those connections can be deeply distressing for students and care givers. Adequate and effective disaster preparedness will go a long way in reducing the impact of disaster on education. It is therefore imperative that schools have the resources and expertise to implement disaster reduction plans for a sustainable educational system.

Research on disaster preparedness (7) showed that university students are vulnerable to disasters and this important group is usually overlooked in preparedness efforts. Students spend a lot of their time in school and are therefore exposed to various hazards related to the school environment. Such hazards include exposure to dangerous chemicals from the laboratory, fire disasters from electrical sparks and explosives among others, hence, the need to assess their capacities in management of such occurrences. This study is therefore conducted to assess the level of preparedness towards environmental hazards among this important population. It is hoped that its findings will contribute to the general field of knowledge and the report will be useful to educational management authorities, Non-Governmental Organizations (NGOs) and other stakeholders who are interested in planning and directing programs for mitigation of disasters.

MATERIALS AND METHOD

Description of the Study Area

Osogbo is the capital city of Osun state which is an inland state in southwestern Nigeria. The state has 30 local government areas with two of these local government areas seated in the capital city namely Olorunda and Oke-Baale. The state is educationally enriched with various higher institutions of learning including Osun State University, Fountain University, Federal Polytechnic Ede among others. Safety issues such as electrical problems, fire extinguisher explosion and poor handling of chemicals are common occurrences among the students in these citadels of learning.

Study design

The study is a cross sectional descriptive design purposively carried out among 360 students from two tertiary institutions in Osogbo namely Osun State University (Osogbo campus) and Fountain University using Leslie Fischer's formular. Five faculties namely Engineering, Sciences, Management, Social Sciences and Basic Medical Sciences with two departments under each faculty were sampled following a proportional allocation. Students who have spent minimum of one year in the school were recruited while those who did not consent to participate were excluded from the study. Information was elicited from respondents using a self-administered semi structured questionnaire which was divided into sections to capture data on socio demographics, types of disasters

exposed to and frequency of exposure, awareness on impact of disasters, preparedness towards disaster and availability, access and use of disaster control equipment. Ethical approval was obtained from Osun State University Ethical Review Committee. Data collected from the research was processed and analyzed using Statistical Package for Service Solution (IBM SPSS V23).

Results

Socio demographic information

Table 1 presents the results of socio demographic variables of the respondents. Majority (62.2%) of the respondents are in the age range of 15 and 20 years with a little above half (51.7%) being female students. Larger number (57.8%) of the respondents are from Osun State University and over half (58.1%) of them are in 200 level. About one-third (30%) of the respondents are from sciences, a little above a quarter (26.1%) from Health Sciences while only one-tenth (10%) came from Social Sciences. Majority (97.8) of the respondents are not married and most (75.8%) of them came from monogamous family. Most (75.8%) of the respondent's fathers attained tertiary education likewise, most (61.4%) of their mothers too attained tertiary education.

Types of hazards and frequency of exposure (n=360)

The results of various types of disasters and frequencies of exposure experienced by the respondents are presented in Table 2. About one-third of the respondents are frequently exposed to laboratory chemicals (36.9%), naked wires (31.1%, flooded areas (31.7%) and animal bite(30.6%) while about half of them are frequently exposed to extreme heat (52.2%), extreme cold (47.2%) and overcrowding (50.6%).

Categorized level of awareness of impact of disaster and preparedness towards disaster

Figures 1 and 2 are representations of categorized levels of awareness on impact of disaster and that of preparedness towards disaster. It was observed that larger percentage (62.5%) of the respondents had high level of awareness of disaster impact. Similarly, when preparedness variables were categorized, only about one third had high level of preparedness towards disaster impact.

Availability, access and usage of hazard control equipment

The result of availability, access and use of disaster control equipment across the respondent's schools is illustrated in table 3 below. The result shows that about seven out of ten (69.4%) reported having fire extinguishers on every floor of the school buildings but about one-third (37.8%) of this group of students reported knowing how to use it. However, when this equipment was shown to them for identification, majority (81.7%) of them were able to identify it as fire extinguisher but only about a quarter (26.4%) of them were able to demonstrate its usage when asked to do so. While only about one-fifth (21.7%) reported having first aid box on every floor of the school building, over one-fifth (26.9%) of them do not have access to it. Less than one-fifth (15.3%) of the respondents claimed to have operational smoke detectors while more than half (63.7%) of this group do not know how to operate it.

Relationship between selected socio-demographic factors and levels of awareness and preparedness

Associations between some socio-demographic variables and awareness and preparedness levels of respondents are presented in Tables 4 and 5. It was observed that institution, religion, marital status and family type showed significant association ($P < 0.05$) with awareness of respondents towards disaster control while only program of study is significantly associated ($P < 0.05$) with preparedness.

DISCUSSION

The average age of students in this study is 20 years with majority of them falling in the range of 15 to 20 years. This is in line with average age of 16 -20 years found among 75% of respondents in a study carried out from 5 main colleges in Afe Babalola University (8) which investigated factors influencing enrolment of students in tertiary institution.

Although, the percentages of students who reported being frequently exposed to all forms of hazards inquired in this study are lower in almost all cases than those who reported "hardly exposed" except in the case of exposure to extreme heat event and overcrowding which reported more students being frequently exposed. This may not be unconnected with the observable changes in the climate which has presented in form of extreme heat, affecting all and sundry except those with strong and effective coping strategies. In a study (9) to demonstrate the

impact of heat on school children, the result showed a strong significant and positive correlation between indoor air temperature and the percentages of schoolchildren, who demonstrated the symptoms of heat stress such as feeling very hot, having fatigue, and headaches. Similarly, other authors (10) reported that students from federal colleges of education also experienced thermal discomfort in their learning environment and students perceived this thermal stressor as a factor affecting their task performance in workshop practices.

About one-third of the respondents reporting frequent exposure to laboratory chemicals, naked wires, flooded areas, and animal bite may not be palatable. It has been demonstrated in various studies that students don't usually have a perfect learning environment especially with respect to environmental hazards. For instance, Onyango (11) in an attempt to study disaster preparedness of secondary school students in Kenya observed that majority of secondary schools in Homa Bay County are faced with rain related disasters such as floods, strong winds/storms and thunder and lightning. The author also noted that the schools are faced with health/hygiene related disasters, physical facility related disasters and fire related disasters. All these forms of environmental hazards are recognized globally as a serious threat to the health of students. Thus, to forestall possible negative outcomes from such events, Ahmedabad Action Agenda for School Safety conference was held in 2006 with the view of attaining zero mortality of students in schools from preventable disasters by the year 2015. Part of the priority action to achieve this was to introduce co-curricular activities involving disaster risk reduction in schools such as training on fire safety, search rescue, evacuation task, humanitarian services in emergencies among others (12).

High level of awareness of impact of disaster as revealed in this study could be due to the fact that disaster impacts are largely reported both by the media and interpersonal communication, thus enhancing the spread of information about disaster incidences. Usually, people are made aware of hazards be it natural or manmade that they are likely to face in their immediate environment either from previous personal experiences of such disaster, from media or public. Also, impact of environmental hazards is widely thought in various courses right from secondary school to higher institutions of learning and this may be a contributory factor to

high level of awareness of respondents. For instance, in this study, over two-third of the respondents are aware that disaster can lead to loss of lives and injuries, cause infrastructural damage and result into poor health conditions. It is however noteworthy that the student's low preparedness level in this study may signify the institutional preparedness level as well since most of the questions inquired on are, institution based. This poor preparedness may be attributed to the fact that majority of respondents have not had any formal training on disaster preparedness in their schools while majority do not know about their school disaster plans. For instance, about two-third of the respondents in this study reported that disaster/ hazard control has not been discussed in any of their classes while about nine out of ten students reported not knowing about their school disaster plan.

Not having early warning system on ground as reported by majority of the respondents could also negatively affect their sense of preparedness in cases of emergencies thus its purpose to detect, forecast, and when necessary, issue alerts related to impending hazard events is defeated. Another factor that could be responsible for student's poor preparedness towards disaster is the fact that most of them do not possess school safety manual which is a document that the school should use to maintain a safe, secure and caring environment that fosters teaching and learning. In a related study (11), it was noted that 70.9% of principals in studied secondary schools do not have safety manuals for their schools. The inability of students in this study to operate most of the disaster control equipment despite their access and availability may not be unconnected with the fact that respondents have not been put to training on disaster management / prevention. For instance, majority of students in this study reported availability of fire extinguisher on floors of their building but surprisingly, only about one quarter was able to effectively demonstrate its operation. This is similar to the outcome of the study carried out by Sravan *et al* (13) which demonstrated that very few study participants who are undergraduates, internship students, postgraduates and staff knew about correct fire control measures in case of fire accidents. Similarly, Musigapong and Phanpravit (14) reported that the level of knowledge and attitude of students relating to fire prevention was associated with practices and that the students who had not been trained in fire evacuation had more inappropriate behavior or practice and poorer attitude toward fire prevention than those

who had the experience. This is an indication that building the capacity of people cannot be overlooked for correct and effective usage of fire extinguisher in fire disaster control. Also, Poole (15) in his work demonstrated that the ordinary people were able to operate a fire extinguisher without prior training, but participants demonstrated increased confidence and performance in effective operation of the extinguisher when exposed to just basic levels of training. All these outcomes point to the fact that for effective use of fire extinguisher and other disaster control tools, training cannot be overlooked.

Program of study was significantly associated with disaster preparedness, with engineering students having higher level of preparedness than their counterparts. This may be due to their field of study which puts emphasis on safety and equipment handling. Religion was also found to be significantly associated with disaster impact awareness with Christians having higher level of awareness than their Muslim counterparts. This may be due to various activities carried out among Christians in their various places of worship which usually include, safety training and drilling. This is similar to the findings of researchers (16) in Indonesia who found out from their study, carried out predominantly among Muslims that religious gatherings and practices serve as an important factor bonding local people together and contributing to successful coping with disasters.

CONCLUSION

This study reveals that students of tertiary institution in Osogbo are exposed to various environmental hazards such as extreme heat, extreme cold, over-crowding, frequent exposure to laboratory chemicals etc. While some of the respondents reported availability of safety equipment in their school, majority do not have access to it and those that have access do not know how to operate the hazard control equipment. Although, most of the respondents in this study are aware of disaster impact, majority of them have poor preparedness against it. Therefore, colleges and universities should be encouraged to include disaster management training in their curricula. Materials on mitigation and preparedness should be made available and accessible to students and other members of the institution community. Preparation of books, articles, teaching aids and research on disaster management by staff and students should be encouraged and supported.

References

1. Rokkas P, Cornell V, Steenkamp M. Disaster preparedness and response: challenges for Australian public health nurses - A literature review. *Nurs Health Sci.* 2014; 16(1):60-66
2. Alston, M., Hazeleger, T. and Hargreaves, D. (2019) *Social Work and Disasters: A Handbook for Practice*, Abingdon, Routledge.
3. Mediterranean, World Health Organization Regional Office. Strategy resolution on emergency preparedness and humanitarian actions, [internet]. 2015 Oct (cited on May 6, 2021). Available from: <http://www.emro.who.int/emergency/strategy-resolutions/>.
4. World Metrological Organization (WMO). Urban Flood Risk Management: A Tool for integrated flood management, [Internet]. 2008 (cited on May 6, 2021). Available from: http://www.apfm.info/pdf/ifm_tools/Tools_Urban_Flood_Risk_Management.pdf.
5. ChikZ, and IslamT. Disaster in Bangladesh and management with advanced information system. *Disaster Prev. Manag.* 2011; 20:521–530
6. SaidA, Ahmadun, F, Mahmud A, and AbasF. Community preparedness for tsunami disaster. *Disaster Prev. Manag.* 2011; 20: 266–280
7. Tanner A, and Doberstein B. Emergency preparedness amongst university students. *Int J Disaster Risk Reduct.* 2015;13:409-413. <http://dx.doi.org/10.1016/j.ijdr.2015.08.007>
8. AdemolaEO, Ogundipe, AT, BabatundeWT. Students' enrolment into tertiary institutions in Nigeria: The influence of the founder's reputation -A case study. *Computing, Information Systems Development Informatics & Allied Res. J.* 2014; 5 (3) 55 – 82.
9. Léonie N, DapiJR, Georges N, EkoeT, Tord K. Heat impact on schoolchildren in Cameroon, Africa: potential health threat from climate change, *Global Health Action*, 2010 Nov; 3(1): DOI: 10.3402/gha.v3i0.5610
9. JapoA andAlexanderO. Thermal discomfort in the school workshop as a stress factor affecting students' tasks performance in workshop practice. 2014 Jul; 3(4): 465. Retrieved from <https://www.richtmann.org/journal/index.php/ajis/article/view/3353>
10. Onyango MA. Disaster awareness and preparedness of secondary schools in Homa Bay count, Kenya (Dissertation). Kenya; University of Nairobi, 2013.
11. Ahmedabad action agenda for school safety. International conference on school safety, [Internet]. 2007 Jan (cited on May 6, 2021). Available from: https://www.preventionweb.net/files/5146_INO1MH844-Ft.pdf
12. Sravan K Y, Annapurani R1, Chandrashekhar J1, Joe J1, Kalyana CP. Assessment of Knowledge and Attitudes of Fire Safety. *J. Pharm. Sci. & Res.* 2016; 8(11):1281-1284

13. Musigapong P, Phanprasit W. Knowledge, attitude and practices relating to fire prevention among students in the elementary schools of Muang Nakhon Ratchasima, Thailand. *Journal of Educational and Social Research*. 2013; 3(7):288-91.
14. Poole B. Ordinary people and effective operation of fire extinguishers (Unpublished dissertation). Eastern Kentucky University, 2012
15. Gianisa A and Le De,L. The role of religious beliefs and practices in disaster: The case study of 2009 earthquake in Padang city, Indonesia, *Disaster Prevention and Management*. 2018; 27 (1) 74-86. <https://doi.org/10.1108/DPM-10-2017-0238>

Table 1: Socio-demographic characteristics of the respondents (n=360)

Variables	Sub Variables	Frequency (%)
Age	15-20	224 (62.2)
	21-25	127 (35.3)
	26-30	9 (2.5)
Mean age		20.2 ± 2.390
Sex	Male	174 (48.3)
	Female	186 (51.7)
Level of study	200 L	209 (58.1)
	300 L	75 (20.8)
	400 L	71 (19.7)
	500 L	5 (1.4)
Name of Institution	Fountain University	152 (42.2)
	Osun State University	208 (57.8)
Program of study	Engineering	61 (16.9)
	Sciences	108 (30.0)
	Management	61 (16.9)
	Social sciences	36 (10.1)
	Health Sciences	94 (26.1)
Religion	Christianity	154 (42.8)
	Islam	206 (57.2)
Marital status	Married	8 (2.2)
	Not married	352 (97.8)
Family type	Monogamous	273 (75.8)
	Polygamous	87 (24.2)
Father's highest level of education	Primary / Secondary	73 (20.2)
	Tertiary	273 (75.8)
	No formal education	14 (3.9)
Mother's highest level of education	Primary / Secondary	113 (31.4)
	Tertiary	221 (61.4)
	No formal education	26 (7.3)

Table 2: Types of hazards and frequency of exposure

Variables	Level of exposure	Frequency (%)
Laboratory Chemicals	Frequently exposed	133 (36.9)
	Hardly exposed	227(63.1)
Fire outbreak	Frequently exposed	58 (16.1)
	Hardly exposed	302 (83.9)
Naked wires	Frequently exposed	112 (31.1)
	Hardly exposed	248 (68.9)
Poorly constructed buildings with tendency of collapse	Frequently exposed	67 (18.6)
	Hardly exposed	293 (81.4)
Road traffic accidents	Frequently exposed	98 (27.2)
	Hardly exposed	262 (72.8)
Extreme heat	Frequently exposed	188 (52.2)
	Hardly exposed	172 (47.8)
Extreme cold	Frequently exposed	170 (47.2)
	Hardly exposed	190 (52.8)
Staircases without rails	Frequently exposed	73 (20.3)
	Hardly exposed	287 (79.7)
Flooded areas	Frequently exposed	114 (31.7)
	Hardly exposed	246 (68.3)
Explosive containers	Frequently exposed	48 (13.3)
	Hardly exposed	312 (86.7)
Cultism/Riots/Student unrest	Frequently exposed	79 (21.9)
	Hardly exposed	281 (78.1)
Animal bite	Frequently exposed	110 (30.6)
	Hardly exposed	250 (69.4)
Overcrowding	Frequently exposed	182 (50.6)
	Hardly exposed	178 (49.4)

Table 3: Availability, access, and usage of hazard control equipment (n=360)

Variables	Response	Frequency (%)
Do you have fire extinguisher on every floor of the school building	Yes	250 (69.4)
	No	110 (30.6)
If yes, are you permitted to use this tool	Yes	103 (41.2)
	No	147 (58.8)
Do you know how to use a fire extinguisher	Yes	136 (37.8)
	No	224 (62.2)
Do you have first aid box on every floor of the school building	Yes	78 (21.7)
	No	282 (78.3)
If yes, do you have access to it	Yes	57 (73.1)
	No	21(26.9)
Do you have functional smoke detectors on every floor of your school building	Yes	55 (15.3)
	No	305 (84.7)
If yes, can you operate it	Yes	20 (36.3)
	No	35 (63.7)
Can you identify the displayed equipment	Yes	294 (81.7)
	No	66 (18.3)
Kindly demonstrate the operation of the equipment	Able to demonstrate	95 (26.4)
	Unable to demonstrate	265 (73.6)

Table 4: Relationship between selected socio-demographic factors and level of awareness of respondents

Variables	Sub variables	Awareness		P-value
		Low level	High level	
Sex	Female	70 (37.6)	116 (62.4)	p=0.957
	Male	65 (37.4)	109 (62.6)	
Institution	Fountain Univ	76 (50.0)	76 (50.0)	p<0.001*
	Osun State Univ	59 (28.4)	149 (71.6)	
Program of study	Engineering	16 (26.2)	45 (73.8)	P=0.005*
	Sciences	41 (38.0)	67 (62.0)	
	Management	29 (47.7)	32 (52.5)	
	Social Sciences	21 (58.3)	15 (41.7)	
	Health Sciences	28 (29.8)	66 (70.2)	
Religion	Christianity	48 (31.2)	106 (68.8)	p=0.032*
	Islam	87 (42.2)	119 (57.8)	
Marital Status	Married	6 (75.0)	2 (25.0)	p=0.027*
	Not married	129 (36.6)	223 (63.4)	
Family type	Monogamous	92 (33.7)	181 (66.3)	P=0.008*
	Polygamous	43 (49.4)	44 (50.6)	

*Statistically significant at p<0.05

Table 5: Relationship between selected socio-demographic factors and level of preparedness of respondents

Variables	Sub variables	Awareness		P-value
		High level	Low level	
Sex	Male	108 (62.1)	66 (37.9)	0.073
	Female	132 (71.0)	54 (29.0)	
Family type	Monogamous	181 (66.3)	92 (33.7)	0.794
	Polygamous	59 (67.8)	28 (32.2)	
Program of study	Engineering	31 (50.8)	30 (49.2)	0.013*
	Sciences	72 (66.7)	36 (33.3)	
	Management	38 (62.3)	23 (37.7)	
	Social Sciences	27 (75.0)	9 (25.0)	
	Health Sciences	72 (76.6)	22 (23.4)	

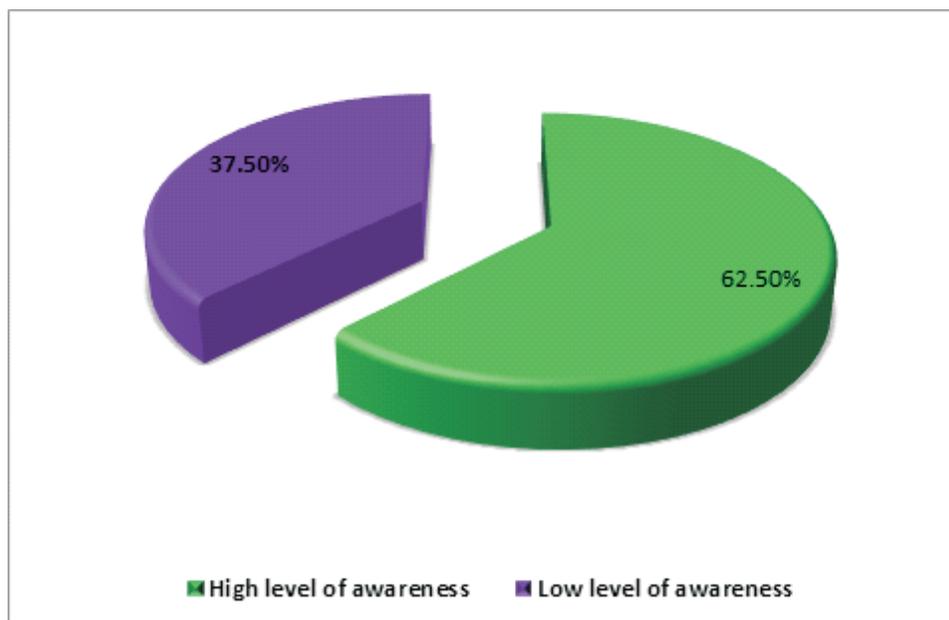


Figure 1: Categorized level of awareness of respondents on impact of disaster

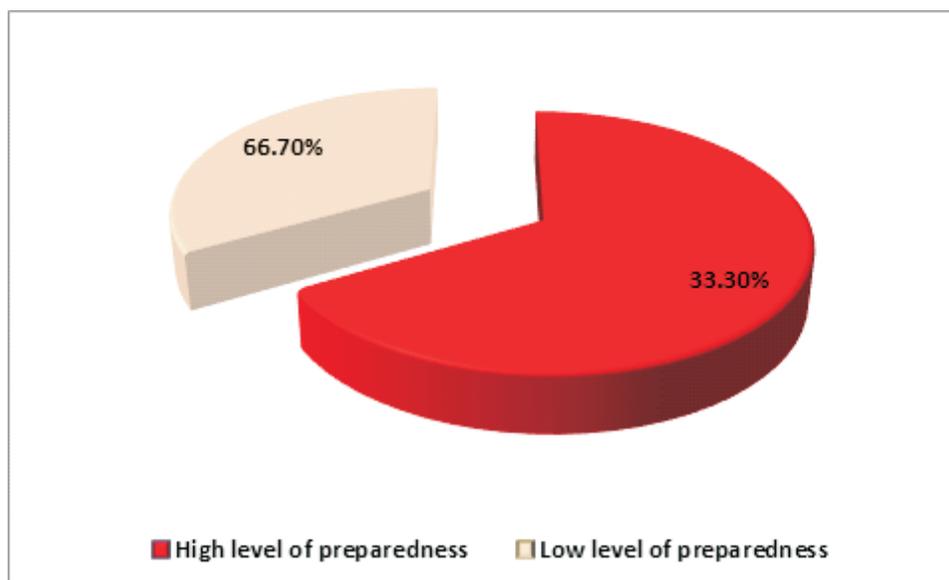


Figure 2: Categorized level of preparedness towards disaster control