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EXTENT OF AWARENESS OF SAFETY RULES AND REGULATIONS IN SCIENCE LABORATORIES IN SECONDARY SCHOOLS IN EBONYI STATE

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ABSTRACT

The research study investigated the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State. It investigated the extent science students in rural and urban secondary schools in Ebonyi State are aware of safety rules and regulations in science laboratories. The researchers used 45 secondary schools selected through stratified random sampling technique, SS3 classes selected using purposive sampling technique and 900 students selected through random sampling. The researchers adopted a descriptive survey design. A 23-item, four-point scale structured questionnaire was developed by the researchers to enable them collect data for the study. Mean and standard deviation were used to answer the research questions while t-test was used to test the hypothesis at 0.05 alpha level of significance. Results of data analysis showed that the extent to which science students in secondary schools in the rural areas are aware of safety rules and regulations in the laboratory is high, while the extent to which the students in secondary schools in urban areas are aware of safety rules and regulations in science laboratory is very high. Based on the findings of the study, the researchers recommended that science students should ensure that they observe safety rules and regulations, that school authorities should put machineries in motion to enforce the observance of safety rules and regulations and that the state government should enact laws on the observance of safety rules and regulations in science laboratories in the state. Ebonyi State government should ensure that science teachers are posted proportionally to all secondary schools in the State.

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INTRODUCTION

The study of science according to Okeke (2007), involves systematic process of investigation that employs observation and experimentation as tools. Nwana, Bajah and Obioha (2000), stated that without science education, it is impossible to develop such professions as agriculture, architecture, dentistry, medicine, engineering, astronomy, space exploration, geology, pharmacy, etc. To achieve these, a method of teaching science which ensures a high degree of student participation is advocated. According to Adigun (1999), students have to be actively involved in science and technology lessons to acquire skills in their various fields of studies.

These science lessons (activities) take place in school science laboratories. Ali (1998:84), defined laboratory as "a place where experiments in science are carried out with chemicals, specimens, materials and equipment." It explained school laboratory as any place in the school vicinity where students learn about the world around them, employing their different senses of perception and generating knowledge of their own; it is building or defined area for verification of truth and confirmation of workability and utility of scientific theories. According to Ibam, Ibrahim and Idoko (2008), laboratories are most often prone to hazards, due to the presence of dangerous chemicals and equipment not carefully handled by the users.

Nkwegu (2008), reported that laboratory danger, hazards and risks are many and varied and may include exposure to infections, burns, explosion, injuries and stains. Adigun (1999), maintained that many fatal accidents in the history of scientific and technological development occurred as a result of not observing safety rules and regulations associated with the operation being carried out. Bullon (2005:215), defined accident as “a situation in which someone is injured or something is damaged without anyone intending or planning for it”. Laboratory accident can be minimized or completely avoided if users follow appropriate safety rules and regulations. According to Ezeliiora (2001), laboratory safety rules and regulations should be known and adopted by users; they should know in advance hazards associated with each phase of experiment to be carried out and what action to take if accident occurs.

Allen, Henry. Albert and Donald (2003:710), defined safety as “the state or condition of freedom from danger, risks, harm or injuries.” Okorie (2000), opined that safety practice is the repeated exercise of precautions aimed at preventing accidents when performing practicals in the laboratory. Archenhold, Jekins and Robinson (1978), stressed the need for students to memorize various routine safety rules and regulations in science laboratories. Flinn Chemical Catalogue (2006), put forward a model of contract agreement which teachers should present to students and parents of students in secondary schools to sign before the commencement of practical activities by the students. Igwe (2003), reported that cases of accidents abound during experiments in science laboratories in secondary schools in Nigeria. Nwanuma (2005), also reported that science laboratory of Ikwo High School of Ebonyi State was once partially burnt because of careless and improper lighting of the Bunsen burner and the absence of functioning fire blankets or extinguishers to quench the fire. She reported that eating and other casual activities go on in the laboratory unchecked. Nkwegu, (2008) reported similar behaviours by students of Community Secondary School, Ebiem Ekpomaka also in Ebonyi State and that students of the school carry out experiments without wearing laboratory coats, safety goggles or hand gloves.

It appears that there are a lot of unsafe practices in the science laboratories in secondary schools in Ebonyi State and that science students may not be aware of safety rules and regulations in science laboratories. It is possible that students in some of the laboratories carry out experiments without wearing laboratory coats, hand gloves or safety goggles. They may possibly move in and out of the laboratory on their own and even indulge in eating of groundnuts and other edibles in the laboratories. The researchers presume that science students are not aware of safety rules and regulations in science laboratories in secondary schools in Ebonyi State. The users of these laboratories, the laboratories themselves and the materials there in could therefore be exposed to danger, risks and accidents. It is uncertain whether there are empirical data on the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State. It is in the light of the above, that this research is set out to investigate the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.

Statement of the Problem

Various chemistry documents contain a wealth of information on safety rules and regulations required in science laboratories. In spite of this, science students in secondary schools in Ebonyi State seem not aware of the precautionary measures in science laboratories in secondary schools. The extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State is uncertain. This research is therefore designed to ascertain the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.

Purpose of the Study

The main objective of the study is to ascertain the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State. Specifically, the research seeks to:

- Ascertain the extent science students in the rural areas are aware of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.
- Assess the extent science students in urban areas are aware of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.
- Determine the extent science students in secondary schools in Ebonyi State are aware of safety rules and regulations in science.

Significance of the Study

The result of this study will be of great importance to the State government, the school authorities, the science teachers and students. The findings would guide the government and the school proprietors in enacting safety rules and regulations in the use of science laboratory in Ebonyi State. The findings might guide the school authorities in ensuring that science students are adequately aware of safety rules and regulations in science laboratories. The outcome of the study would make science students in secondary schools in Ebonyi State aware of safety rules and regulations in science laboratories in order not to expose them to risks, danger and accidents.

Research Questions

To ensure the attainment of the objectives of the study and to guide the researchers in the research work, the following research questions were posed:

- To what extent are science students in the rural areas aware of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.
- To what extent are science students in urban areas aware of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.
- To what extent are science students in secondary schools in Ebonyi State aware of safety rules and regulations in science laboratories.

Scope of the Study

The study is centred on secondary schools in rural and urban areas that have existing science laboratories. It covered the extent science students are aware of safety rules and regulations in science laboratories in secondary schools in Ebonyi State.

Hypothesis

The following null hypothesis has been formulated at 0.05 level of significance to guide the study:

HO There is no significant difference in the mean responses of science students in rural and urban areas on the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State

RESEARCH METHOD

The specific method used for the study is presented in this chapter. The design of the study, area of the study, the population of the study, sample and sampling techniques, the instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection, and method of data analysis are described in the chapter.

Design of the Study

A descriptive survey design was used for the study. A survey design according to Ali (2006), is a descriptive study which seeks or uses the sample data of an investigation to document, describe and explain what is existent or nonexistent of the present status of a phenomenon being investigated. The researchers collected data from a sample of science students in rural and urban secondary schools in Ebonyi State. The responses from these sampled students were collected and used to document, describe and explain the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State. The design is thus quite appropriate for this study.

Area of the Study

This study covered science laboratories in rural and urban secondary schools in Ebonyi State of Nigeria. Secondary schools in the urban areas and those in the rural areas of the three education zones of Abakaliki, Onueke and Afikpo were covered in the study. It was restricted to senior secondary school science laboratories. The choice of senior secondary school science laboratories was predicated on the fact that the science students being used for the study include those of Biology, Chemistry, and Physics all of which are senior secondary school science students. The students used for the study are drawn from senior secondary class 3.

Population of the Study

The population of this study made up of all science students in the 243 secondary schools of Ebonyi State. (Source: SEB, Ebonyi State)

Sample and Sampling Techniques

The sample consists of 45 secondary schools selected from the rural and urban areas of the three education zones of the State. The secondary schools were selected using stratified random sampling technique. Stratified random sampling technique was used to ensure that the survey was spread across the secondary schools in the three education zones of the State. 15 secondary schools (10 from rural schools and 5 from urban schools) were selected from each of the three education zones in the state

using simple random (balloting) technique. 20 science students were selected for the study from each of the schools using simple random sampling technique. A total of 900 SS3 students were also selected for the study. Purposive sampling was used to select the class (SS3 class) with the highest experiences in science laboratory activities.

Instrument for Data Collection

The instrument for the collection of data for this study was a structured questionnaire developed by the researchers. The instrument is titled Awareness of Safety Rules and Regulations Assessment Questionnaire (ASRRAQ). The questionnaire is organized into two sections. Section A sought background information of the respondents such as name of school and class of the student. Section B sought information on awareness of wide range of safety rules and regulations in science laboratories. The instrument is made up of 23 items. The instrument is a four-point scale developed by the researchers. The response scales for the instrument are as follows: 4= Very High Extent (VHE); 3 = High Extent (HE); 2 = Low Extent (LE) while 1 = Very Low Extent (VLE).

Validation of the Instrument

Two experts from the Department of Science Education from Ebonyi State University, Abakaliki face validated the instrument. They made corrections and amendments by restructuring some of the items. They also ensured content validity of the instrument by ensuring that the required safety regulations in science laboratories are contained in the instrument. The instrument has 23 items (see appendix I).

Reliability of the Instrument

The 23-item instrument was subjected to trial testing by administering it to 30 respondents who are not part of the sample. Cronbach Alpha statistics was used for the computation of reliability coefficient of the instrument and a coefficient of 0.79 was obtained. This means that the instrument is highly consistent. (See appendix II)

Methods of Data Collection

The researchers made use of a research assistant in the administration of the instrument. The research assistant was trained by the researchers to explain to the respondents what to do and the need for them to respond honestly to the items. The research assistant visited and administered the questionnaire to the respondents in Afikpo Education Zone, one researcher visited and administered the questionnaire to respondents in Abakaliki Education Zone while one researcher visited and administered the questionnaire to respondents in Onueke Education Zone.

Method of Data Analysis

The researchers used mean and standard deviation in making the analysis of the responses of the science students on each item of the questionnaire and in answering the research questions. The sample mean and the standard deviation of each scaling item were calculated for the science students. The values obtained were interpreted in relation to the scale code. A mean value between 3.50-4.00 was regarded as VHE; a mean value between 2.50-3.49 was regarded as HE while a

mean value between 1.50-2.49 was regarded as LE. On the other hand, a mean value between 1.00-1.49 was regarded as VLE. T-test was used to test each of the hypotheses, at 0.05 alpha level of significance.

RESULTS

This chapter presents the results of data analysis based on the three research questions and the null hypothesis. Results are presented in Tables according to the individual research questions and hypothesis.

Research Question 1

To what extent are science students in secondary schools in the rural areas aware of safety rules and regulations in science laboratories?

Data collected with respect to the instrument administered to students in the rural areas were used to answer this research question. The data were analysed descriptively on individual item basis. Summary of the data analysis is presented in Table 1.

Based on the result of data analysis shown in Table 1 above, awareness of safety rules and regulations by students in rural secondary schools in Ebonyi State is at either HE or VHE. The grand mean value of 3.22 and standard deviation of 0.56 also show that the extent awareness of safety rules and regulations is high.

Research Question 2

To what extent are science students in secondary schools in urban areas of Ebonyi State aware safety rules and regulations in science laboratories?

Table 1. Extent of awareness of safety rules and regulations in science laboratories in rural secondary schools in Ebonyi State

S/N	Items	\bar{x}	SD	Interpretation
1	Do not touch any equipment or material in the laboratory	3.18	0.62	HE
2	Perform only authorized experiment	3.66	0.52	VHE
3	Never eat, drink, chew gum or taste anything in the laboratory	3.25	0.51	HE
4	Keep hands away from face, eyes and mouth while working with materials in the laboratory	2.74	0.73	HE
5	Wear glasses or goggles when instructed	3.35	0.67	HE
6	Keep work area and science laboratory neat and clean	3.26	0.55	HE
7	Clean the laboratory and equipment at the end of experiment	3.65	0.49	VHE
8	Dispose waste according to instruction	3.23	0.52	HE
9	Report any accident, injury or hazardous condition	3.15	0.54	HE
10	Consider all chemicals in the laboratory as dangerous	3.22	0.53	HE
11	Never open storage cabinet/room without permission	3.18	0.48	HE
12	Don't remove any material from the laboratory	3.32	0.55	HE
13	Don't leave lit burner unattended to	3.05	0.67	HE
14	Do not wear long hair, dangling jewellery and loose clothing in the laboratory. Wear laboratory coat while in the laboratory	3.11	0.53	HE
15	Learn how to use safety instruments	3.21	0.57	HE
16	Always perform experiments according to direction	3.19	0.51	HE
17	Never leave experiment while in progress	3.16	0.58	HE
18	Never point open end of a test tube containing something to yourself or others	3.27	0.56	HE
19	Do not sit on the laboratory benches	3.24	0.52	HE
20	Do not work in the laboratory without the supervision of teachers	3.13	0.59	HE
21	Turn off all heating apparatus, gas valves and water facets when not in use	3.24	0.68	HE
22	Do not hold bottles by the neck or stopper but on the body	3.35	0.48	HE
23	Keep hands away from faces, eyes, mouth and body while using chemicals; wash hands before leaving the laboratory.	2.92	0.61	HE
	Grand Mean	3.22	0.56	HE

Table 2. Extent of awareness of safety rules and regulations in science laboratories in urban secondary schools

S/N	Items	\bar{x}	SD	Interpretation
1	Do not touch any equipment or material in the laboratory	3.49	0.66	HE
2	Perform only authorized experiment	3.65	0.52	VHE
3	Never eat, drink, chew gum or taste anything in the laboratory	3.34	0.54	HE
4	Keep hands away from face, eyes and mouth while working with materials in the laboratory	3.43	0.51	HE
5	Wear glasses or goggles when instructed	3.83	0.50	VHE
6	Keep work area and science laboratory neat and clean	3.68	0.74	VHE
7	Clean the laboratory and equipment at the end of experiment	3.68	0.55	VHE
8	Dispose waste according to instruction	3.64	0.65	VHE
9	Report any accident, injury or hazardous condition	3.71	0.55	VHE
10	Consider all chemicals in the laboratory as dangerous	3.44	0.64	HE
11	Never open storage cabinet/room without permission	3.82	0.53	VHE
12	Don't remove any material from the laboratory	2.98	0.55	HE
13	Don't leave lit burner unattended to	3.17	0.57	HE
14	Do not wear long hair, dangling jewellery and loose clothing in the laboratory. Wear laboratory coat while in the laboratory	3.22	0.57	HE
15	Learn how to use safety instruments	3.52	0.56	VHE
16	Always perform experiments according to direction	3.19	0.49	HE
17	Never leave experiment while in progress	3.75	0.74	VHE
18	Never point open end of a test tube containing something to yourself or others	3.88	0.54	VHE
19	Do not sit on the laboratory benches	3.71	0.55	VHE
20	Do not work in the laboratory without the supervision of teachers	3.77	0.57	VHE
21	Turn off all heating apparatus, gas valves and water facets when not in use	3.51	0.66	VHE
22	Do not hold bottles by the neck or stopper but on the body	3.73	0.48	VHE
23	Keep hands away from faces, eyes, mouth and body while using chemicals; wash hands before leaving the laboratory.	3.64	0.59	VHE
	Grand Mean	3.55	0.57	VHE

Table 3: Extent to which science students in secondary schools in Ebonyi State are aware of safety rules and regulations in science laboratories

S/N	Items	X	SD	Interpretation
1	Do not touch any equipment or material in the laboratory	3.32	0.64	HE
2	Perform only authorized experiment	3.65	0.52	VHE
3	Never eat, drink, chew gum or taste anything in the laboratory	3.28	0.53	HE
4	Keep hands away from face, eyes and mouth while working with materials in the laboratory	3.08	0.62	HE
5	Wear glasses or goggles when instructed	3.59	0.59	VHE
6	Keep work area and science laboratory neat and clean	3.47	0.64	HE
7	Clean the laboratory and equipment at the end of experiment	3.66	0.52	VHE
8	Dispose waste according to instruction	3.43	0.58	HE
9	Report any accident, injury or hazardous condition	3.43	0.54	HE
10	Consider all chemicals in the laboratory as dangerous	3.33	0.58	HE
11	Never open storage cabinet/room without permission	3.50	0.50	VHE
12	Don't remove any material from the laboratory	3.15	0.55	HE
13	Don't leave lit burner unattended to	3.11	0.62	HE
14	Do not wear long hair, dangling jewellery and loose clothing in the laboratory. Wear laboratory coat while in the laboratory	3.16	0.55	HE
15	Learn how to use safety instruments	3.36	0.57	HE
16	Always perform experiments according to direction	3.19	0.50	HE
17	Never leave experiment while in progress	3.46	0.66	HE
18	Never point open end of a test tube containing something to yourself or others	3.57	0.55	VHE
19	Do not sit on the laboratory benches	3.48	0.53	HE
20	Do not work in the laboratory without the supervision of teachers	3.45	0.58	HE
21	Turn off all heating apparatus, gas valves and water facets when not in use	3.38	0.67	HE
22	Do not hold bottles by the neck or stopper but on the body	3.55	0.48	VHE
23	Keep hands away from faces, eyes, mouth and body while using chemicals; wash hands before leaving the laboratory.	3.28	0.60	HE
	Grand Mean	3.39	0.57	HE

Table 4. T-test results based on the extent of awareness of safety rules and regulations in science laboratories

SN	Variable	No.	X	SD	DF	T. Cal	T. Crit	Decision
1	Urban Students	300	3.49	0.66	898	2.74	1.96	Reject
	Rural students	600	3.18	0.62				
2	Urban students	300	3.65	0.52	898	1.91	1.96	Accept
	Rural students	600	3.66	0.62				
3	Urban students	300	3.25	0.51	898	1.84	1.96	Accept
	Students	600	3.34	0.54				
4	Urban students	300	3.43	0.51	898	3.84	1.96	Reject
	Rural students	600	2.74	0.73				
5	Urban students	300	3.83	0.51	898	3.17	1.96	Reject
	Rural students	600	3.35	0.67				
6	Urban students	300	3.68	0.74	898	3.21	1.96	Reject
	Rural students	600	3.26	0.55				
7	Urban students	300	3.68	0.55	898	1.79	1.96	Accept
	Rural students	600	3.65	0.65				
8	Urban students	300	3.64	0.52	898	3.23	1.96	Reject
	Rural students	600	3.23	0.65				
9	Urban students	300	3.71	0.55	898	2.78	1.96	Reject
	Rural students	600	3.15	0.54				
10	Urban students	300	3.44	0.64	898	1.67	1.96	Accept
	Rural students	600	3.22	0.53				
11	Urban students	300	3.82	0.53	898	2.89	1.96	Reject
	Rural students	600	3.18	0.48				
12	Urban students	300	3.32	0.55	898	2.12	1.96	Reject
	Rural students	600	2.98	0.55				
13	Urban students	300	3.17	0.57	898	1.65	1.96	Accept
	Rural students	600	3.05	0.67				
14	Urban students	300	3.22	0.57	898	1.73	1.96	Accept
	Rural students	600	3.11	0.53				
15	Urban students	300	3.52	0.56	898	2.46	1.96	Reject
	Rural students	600	3.21	0.57				
16	Urban students	300	3.19	0.49	898	0.00	1.96	Accept
	Rural students	600	3.19	0.51				
17	Urban students	300	3.75	0.74	898	3.31	1.96	Reject
	Rural students	600	3.16	0.58				
18	Urban students	300	3.88	0.54	898	2.76	1.96	Reject
	Rural students	600	3.27	0.56				
19	Urban students	300	3.71	0.55	898	3.18	1.96	Reject
	Rural students	600	3.24	0.52				
20	Urban students	300	3.77	0.91	898	3.21	1.96	Reject
	Rural students	600	3.13	0.59				
21	Urban students	300	3.51	0.66	898	1.91	1.96	Accept
	Rural students	600	3.24	0.68				
22	Urban students	300	3.73	0.48	898	2.93	1.96	Reject
	Rural students	600	3.35	0.49				
23	Urban students	300	3.64	0.59	898	3.48	1.96	Reject
	Rural students	600	2.92	0.61				
	T. Value					2.51	1.96	Reject

Data collected with respect to the instrument administered to science students in the urban areas were used to answer the research question. The data were analysed descriptively on individual item basis. Summary of the data analysis is presented in Table 2. Based on the results presented in Table 2 above, science students are aware of items 1, 3, 4, 10, 12, 13, 14 and 16 to a high extent while they are aware of items 2, 5, 7, 8, 9, 11, 17, 18, 19, 20, 22, and 23 to a very high extent. The grand mean value of 3.55 and standard deviation of 0.57 show that the extent of awareness of safety rules and regulations in science laboratories in secondary schools in the urban areas of Ebonyi State is very high

Research Question 3

To what extent are science students in secondary schools in Ebonyi State aware of safety rules and regulations in science laboratories?

Data collected with respect to the instrument administered to all the sampled students were analysed descriptively as shown in Table 3. Based on the results of data analysis shown on Table 3 above, the science students are aware of items 1, 3, 4, 6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 19, 20, 21, and 23 to a high extent while they are aware of items 2, 5, 7, 11, 18, and 22 to a very high extent. The grand mean value of 3.39 and standard deviation of 0.57 show that the science students in secondary schools in Ebonyi State are aware of safety rules and regulations in science laboratories to a high extent

HO: There is no significant difference in the mean responses of science students in the rural and urban secondary schools on the extent of awareness of safety rules and regulations in the science laboratories in Ebonyi State. The result of the data analysis in Table 4 above showed that the results of items 1, 4, 5, 6, 8, 9, 11, 12, 15, 17, 18, 19, 20, 22 and 23 were rejected because their t-calculated were more than t-critical of 1.96. The results of items 2, 3, 7, 10, 13, 14, 16 and 21 were accepted because their t-calculated were less than t-critical. The grand t-value of 2.51 is also greater than 1.96. This shows that HO is rejected, implying that there is significant difference in the mean responses of science students in the urban and rural secondary schools of Ebonyi State on the extent awareness of safety rules and regulations in science laboratories.

DISCUSSION

The researchers discussed the findings of the study based on three research questions and the hypothesis that guided the study. Results were discussed according to the three variables of the study as follows. Extent to which science students in rural areas are aware of safety rules and regulations:

Results of data analysis as shown in Table 1 indicate that the extent to which science students in rural secondary schools in Ebonyi State are aware of safety rules and regulations in science laboratories is high. This means that science students in secondary schools in the rural areas of Ebonyi State are quite aware of safety rules and regulations required in science laboratories.

Extent to which science students in urban areas are aware of safety rules and regulations:

Results of data analysis on Table 2 indicated that the extent to which science students in secondary schools in urban areas of Ebonyi State are aware of safety rules and regulations in science laboratories is very high. This means that science students in secondary schools in urban areas of Ebonyi State are very much aware of safety rules and regulations required in science laboratories. Extent to which science students in secondary schools in Ebonyi State are aware of safety rules and regulations. Results of data analysis in Table 3 showed that science students in secondary schools in Ebonyi State in general are aware of safety rules and regulations to a high extent. This means that they are quite aware of safety rules and regulations they need to observe while carrying experiments in science laboratories. The findings are in line with Ezeliiora (2001), that laboratory safety practices should be known and adopted by users and that they should be aware of the hazards associated with each phase of experiment to be carried out and the proper precautions to take. The research also explored the extent to which the mean responses of science students in urban and rural secondary schools differ with respect to the extent of awareness of safety rules and regulations in science laboratories. The result in Table 4 indicated that the grand t-value of 2.51 is greater than critical value of 1.96. H_0 is therefore rejected. This implies that there is significant difference in the mean responses of science students in urban and rural secondary schools with respect to the extent of awareness of safety rules and regulations in science laboratories. The difference could be as a result of the fact that science teachers prefer to stay in secondary schools in urban areas than the schools in the rural areas. This would have made the students in urban areas more aware of safety rules and regulations than those students in the rural areas.

Conclusion

Based on the results obtained on the extent of awareness of safety rules and regulations in science laboratories in secondary schools in Ebonyi State, the following conclusions were drawn by the researchers: In Ebonyi State secondary school science laboratories, science students in secondary schools are quite aware of safety rules and regulations in science laboratories. However, the science students in urban areas are aware of rules and regulations to a very high extent while their counterpart in the rural areas are aware of safety rules and regulations to a high extent.

Recommendation

Based on the findings of the study the researchers recommend as follows:

- Science students in secondary schools in Ebonyi State should observe safety rules and regulations in science laboratories while working in the laboratories to minimise accidents.
- The school authorities of secondary schools in the State should put machinery in motion to ensure the observance of safety rules and regulations in the science laboratories.
- The government of Ebonyi State should enact a law on the observance of safety rules and regulations in school laboratories in the State.
- Ebonyi State government should ensure that science teachers are posted proportionally to all secondary schools in the s

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