Status of Safety Awareness among Senior Secondary School Science Students in Akwa Ibom State of Nigeria

Dr. Akpan Oko Udoh

Department of Educational Foundations, Guidance and Counselling,
University of Uyo, Uyo Akwa Ibom State, Nigeria.
e- mail akpanokoudoh@yahoo.com

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Abstract

The study aimed at determining the status of safety awareness of senior secondary school science students as well as examining how their safety awareness vary with gender and location of school. Three research questions, two of which were converted to null hypotheses.Descriptive survey research was employed in carrying out the study using 3906 science students selected using stratified random sampling method. Safety awareness questionnaire was used to collect data which were analyzed using mean, percentage and dependent t-test. The result showed that science students had just fair knowledge of their safety; their gender and location of schools not withstanding. It was recommended that enlightenment programme like seminar should be arranged for them by the school principals in order to safeguard their health.

1. Background to the Study

Human health is contingent upon our relationship with the environment. It is the desire of a sane human-being to be in good health which however is elusive as a resultant of our inability to completely mind our actions or inactions. Additionally, man possess unlimited power to dominate his environment and exploit the natural resources (Abam, 2001). Health and safety are closely related in terms of the desire for self-preservation.

Safety can be viewed as a state of being safe from danger or accident, injury, serious physical harm or some other forms of injury. It is a state which a sane human-being would strive to maintain at all costs and this evokes the applicability of certain rules and precautions in the public, home and industrial environments (Anijah-Obi, 2001).Whereas health implies the general physical conditions of the body especially in terms of presence or absence of illness or impairment. Essentially, there is an element of risk in every activity which man is associated with but man usually make some effort to avoid accident and prevent any hazard.

In secondary school situation, science students (those studying all or any of these subjects namely; Biology, Chemistry and Physics) are consistently been exposed to risk of accident or hazard. One of the goals of secondary education as enunciated in National Policy on Education (2004:21) clearly state in item C that it is to"provide trained manpower in the applied science, technology and commerce at sub-professionally grades". The activities of science students in pursuance of this goal expose them constantly to health hazard particularly during their practical which usually involved using national or artificial substances.

Students' practical in biology, chemistry or physics would require that they make use of some substances which can be detrimental to their health. For instance, Ken (2001) showed that lead and copper in water can cause many health problems some of which are interference with red blood cells chemistry; delays in normal physical and mental development in young children, deficits in their attention span, hearing and learning abilities of children, stroke, kidney diseases cancer, vomiting, nausea, stomach cramps and diarrhea and anaemia among others. Currently, our science students are still using these materials in the laboratory for one practical or the other. It will be un-ended discussion if we start discussing each material that exposes our science students to danger. However, this shows the risk students take by working with just these three materials namely; water, lead and copper.

The quest of our science students to attain the goals of secondary science education expose them to some health hazard. For them to be in good health, therefore, their safety awareness is very necessary. This will enable them cope with risk challenges which they are exposed to during their day-to-day activities as well as taking appropriate precautions.

The study therefore aimed at determining the status of safety awareness of our science students as well as examine the safety precautions they had been taken so far.

2. Research Questions

The understated research questions were raised to guide the investigation.

(1) What is the status of safety awareness of senior secondary school science students in Nigeria?
(2) How does science students' safety awareness vary with gender?
(3) How does the safety awareness of science students vary with location of school?
(4) What is the status of preventive measures science students had been taking to avoid hazard.

3. Method

Descriptive survey design was utilized in carrying out the study. The investigation was done in Akwa Ibom State of Nigeria. Akwa Ibom State is in the South-South of Nigeria. The population of science students in the State was 19,530 students. Science students in this case implies that the student has offered at least one of these science subjects – biology, chemistry and physics. Stratified random sampling method was used to select 20% of the population (19530) to form the sample. Therefore, the sample of the study was 3906. A break down of this number showed that 2015 boys and 1891 girls were in the sample and the number of students studying in urban schools was 1943 while their rural school counterparts was 1963.

A researcher-developed questionnaire called "Safety Awareness and Precaution Questionnaire (SAPQ)" was used for data collection. The instrument has two sections: section A has 19 questions which examined risk they are aware of while section B has five items which appraised the precautions they had been taken. All questions had four options namely; Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD) which were score 4, 3, 2, and 1 respectively for positive items and reversed for negative items. The instrument was face validated with three experts and cronbach alpha analysis was used to establish the reliability using randomly selected 100 science students who had not taken part in the study. The Alpha value of the instrument was .829. The research questions were answered using mean, and percentage while independent t-test was used to test the hypothesis.

4. Results

In presenting the results, each research question was answered.

4.1 Research Question One

What is the status of safety awareness of senior secondary school science students in Nigeria?

Mean was used to answer the research question and summary data shown in Table 1. It is noteworthy to state that the item mean of above 2.5 was regarded as agreeing since in a four-point scale, 2.5 is the departure point from disagreement to agreement.

Table 1: Status of safety awareness of science students

S/N	Item	$\bar{X}$	SD
1.	Know that all activities in the laboratory have health risk	3.82	1.02
2.	Dust is dangerous to health	2.14	0.96
3.	Smoke is dangerous to health	2.82	0.46
4.	Hydrocarbon is dangerous to health	2.16	0.74
5.	Odours from decay substance is dangerous to health	2.64	0.25
6.	Gas emission is dangerous to health	2.54	0.23
7.	Chemical reactions can result in		
	(i) fire hazard	2.33	0.62
	(ii) poisonous gases	2.69	0.73

8.	Burning can result in hazard	3.43	1.04
9.	Explosion can take place in laboratory	2.19	0.73
10.	Simple experiment involving burning of metal can be hazardous	2.13	0.66
11.	Sudden increase of temperature in the laboratory is dangerous	2.03	0.53
12.	Fluorides in water in excess of say 1.5mg per litre is dangerous to health	2.18	0.51
13.	Most substance like		
	(i) Iron	1.84	0.22
	(ii) Copper	2.43	0.43
	(iii) nitrate	3.07	0.34
	(iv) magnesium	2.04	0.63
	(v) zinc	1.94	0.43
	(vi) chlorine	2.38	0.63
	are dangerous to health		
14.	pathogenic substances can be present in water stored in the laboratory	2.88	0.82
15.	Use of		
	(i) detergent	2.00	0.68
	(ii) insecticide	2.29	0.74
	(iii) pesticide	2.38	0.79
	can be dangerous to health		
16.	Present of noxious animals like		
	(i) Rodent	2.23	0.87
	(ii) Reptiles	3.43	1.03
	(iii) flies and	2.39	0.98
	(iv) mosquitoes in the laboratory	3.38	1.00
	are dangerous to health		
17.	loud noise while working with wood and metal in the laboratory is dangerous to health	2.28	0.53
18.	Excavation process is dangerous to health	2.43	0.91
19.	Not washing hands with soap after activity in the laboratory is dangerous	3.04	1.08

N = 3906

The data shown in Table 1 revealed that science students have varying degree of safety awareness as shown in their item mean. The overall item mean was 2.53 (the means of all the items.) This indicated that science students just have fair knowledge of their safety.

4.2 Research Question Two

How does science students' awareness vary with gender? To answer this question properly, null hypothesis was generated from it thus – male and female science students do not differ significantly in their safety awareness.

Independent t-test was used to test the hypothesis and summary data shown in Table 2.

Table 2: Boys and girls science students' safety awareness

Variable	n	$\bar{X}$	SD	df	t_{cal}	t_{cri}
Male	2015	70.43	4.98	3904	0.38*	1.96
Female	1891	68.53	5.11			

N = 3906 *Not significant P > .05

The results shown in Table 2 indicated that although male and female science students differed slightly in their mean on safety awareness, this difference was not significant. This is because the obtained t of 0.38 was less than the critical t of 1.96 at df of 3094 and .05 level of significant.

4.3 Research Question Three

How does the safety awareness of science students vary with locations of school?

To answer this question properly, a null hypothesis was generated from the research question thus:- urban and rural science students do not differ in their safety awareness. The hypothesis was tested using independent t-test and summary data shown in Table 3.

Table 3: Variation of urban and rural science students safety awareness

Variable	n	$\bar{X}$	SD	df	t_{cal}	t_{cri}
Urban	1943	71.34	5.34	3904	0.36*	1.96
Rural	1963	69.28	6.17			

N = 3906 *Not significant P > .05

The results in Table 3 showed that even though urban and rural science students differed in their safety awareness slightly as shown by the mean, in which the urban students were more aware than rural students. This difference in mean was not significant since the obtained t of 0.3904 was less than the critical of 1.96 at df. of 3904 and at .o5 level of significant

4.4 Research Question Four

What is the status of preventive measures science students had been taking to avoid hazard?

Percentage was used to answer the research question and summary data shown in Table 4.

Table 4: Preventive measures

S/N	Item	Yes %	No %
1.	I have personal protective equipment like:		
	(i) Glove	63.12	30.88
	(ii)Shores	0.00	100.00
	(iii) Overall which I use while in experiment	100.00	0.00
2.	I use protective equipment to protect my ears from Load noise	93.00	7.00
3.	I avoid exposing myself to excessive heat while doing experiment	81.00	19.00
4.	I avoid exposing myself to some radiation frequently while doing experiment	78.00	22.00
5.	I have personal protective equipment which I use to prevent direct exposure to harmful chemicals	24.63	75.37

N = 3906

The results shown in Table 4 revealed that science students had just been avoiding situations which can expose them to danger as shown the high percentage different in items 3 and 4.

5. Discussion

The result that science students have just a fair knowledge of their safety, their gender and location of school not withstanding is not a welcome development. The findings revealed the risk science students exposed themselves to as they go about doing their work particularly in the laboratory. The need for the students to be fully aware of the risk was emphasized by Anijah-Obi (2001) who opined that awareness would make science students be sensitive to their environment.

Science students need to be aware of the risk they took when they exposed themselves to various danger. For instance,they need to know that exposing themselves to polluted air can lead to respiratory problems, irritation of eyes and nasal, interfere with oxygen up take into the blood and can result in heart and brain damage as well as kidney diseases (Verla, 2003).

Anijah-Obi (2001) added that air pollution can cause skin cancer and severe sun burn. Science students need to be aware that water kept in the laboratory can be contaminated as a resultant of huge discharge of effluents by industries. These can affect the quality of the water and cause water pollution which can contain viruses, bacteria and

protozoa. These can cause so many water borne disease especially if drank by science students (NEST 1992). The students need to be fully aware that noise annoy, confuse, conversation and cause psychiatric disorder (Menkiti, 1996). Ajaegbu (1985) added that noise can cause high blood pressure. Verla (2003) opined that noise pollution can lead to hearing loss, headache, sleeplessness and lack of concentration.

From the forgoing discussion, it is clear that our science students do exposed themselves to some risk of hazard or diseases which could work against their health. This can also affect their capacity to study. Obinaju (2012) opined that environment do affect students behaviour. This could account for the result shown in Table 4 which revealed that many science students do not have appropriate materials to protect themselves from danger but instead rely on avoidance of risky activities. But risk taking is the backbone of advancement in science and technology. Avoidance tendency shown by students is likely to affect the technological development of Nigeria negatively.

6. Conclusion

It is concluded that safety awareness of science students is just fair and this situation need to be improved in order to make our science students fully aware of the risk they take while working in the laboratories and decide on appropriate preventive measures. This will keep them in good health a necessary element in effective learning.

7. Recommendations

It was recommended that seminars should be organized to science students by principals of school in conjunction with the Ministry of Education on safety awareness.

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