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Evaluation Safety Knowledge and identifying the reality of some labs for safety attitudes

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Abstract- Safety is the continuing process for improving knowledge level including the process of learning and acquiring information. This mean that constant exposer with new thoughts and ideas would make people skills better and better workers, it well increases the thinking level and ability of understanding the importance of human safety. The purpose of this research is to study the reality of labs in University of Samarra, Iraq, and evaluate the levels of student knowledge about how avoiding the hazards. It also shows that there is a need to reevaluate the safety issue in all labs. For this reason, there was two questionnaires used to collect data and were analyzed using descriptive statistics. The cross-sectional survey was conducted at three colleges with a sample size 86 teachers and 120 students. As an example, the result showed that 68% were can't deal with waste hazards. The overall, analysis outcome refers to enhance labs of the university, staff development and lab safety should be taught as a course in the study.

Keywords : Safety Knowledge, Attitudes, questionnaire, Safety in labs.

1. Introduction

Safety issue in scientific research faculties have become increasingly interested field, Due to the safety related perception and behavior of employees and researchers [1]. In addition, the vast majority of laboratories weather biological or chemical that maybe hazards or become hazards because of chronic symptoms, chemical reactions, and electric shock. Therefor its necessary to identify hazards and asses and control potential risks in order to provide safe environmental work place for employees and researchers [2]. Research and educational labs conduct experiments for the research purposes and training in which chemical of different nature and properties are used. In most cases this labs compost of deferent categories of people such as technicians, academic

staff, student, administrative staff. Making west management of particular importance for the protection of human health [3]. In general a wide risk may arise from a chemical and biological laboratories in the course of conducting experiment EHSC environmental and safety [4]. increasing the level of safety knowledge lead to more labs safety; following the labs accident records and emergence response actions sweeping the changes in university's lab safety program to occupies an advanced position in laboratory safety among colleges [5].

Risk as well as diversification of risk types in academic research increase concurrently with its development. Research activities become more complex and interconnected; the new technologies are introducing new risks, indeed experiments in research have not always been made without accidents [6]. It is well-accepted in the aviation, energy and manufacturing industries that effective and engaged senior leadership to play role in institutional safety culture changes [7]. Safety in labs is not just an outcome of a strict of adherence to regulation, it's also the result of an overall attitude and commitment. Often, limited knowledge is not the cause of accidents, the safety producers became a routine may cause some accidents, and individuals lenience their precautions [2]. The potential risks of environmental contamination and human exposure associated with chemical waste from educational activities and researches are not well defined. Researches and educational laboratories conduct experiments for different purposes in which chemicals of different are used. In most cases, these labs are composed of different categories of people even guests or visitors who making waste particular which very important for protection of human health [8]. The practical classes helps student to pursuing science as part of their education. The experiments help examine the theory part of learning and it can improve skills. The daily chemical use have benefits to improve interest in subject area; otherwise it have hazardous, physical and environmental hazards. properties included corrosive, Easley oxidizing, Flammable, Explosive, Harmful, Toxic, may Radioactive or pollute the environment [13]. While chemicals used daily have many benefits they can also be hazardous and present health [14]. The Most of safety training is only introduced at first day of work especially for employees and workers. The safety behavior changes (theories and models) periodically. Developing safety knowledge and safety culture suggested by most researchers ; acquiring safety practice as early as possible for development. The concept of exposing safety at education level compared the beginning of working environment would lead to a better safety practice among young workers weather Academic Staff or Researchers or even Students.[15]. Moreover how many universities or high schools have integrated risk learning program or safety culture in their educational curricula? [6].

The purpose of this article is to assess the labs of some colleges, comparison the quality, publishing the culture of safety in labs, increase the concuss how it is important to be safe in labs. Determine the attitudes pursing safety in labs courses to have safety knowledge. For this purposes questionnaire was handled to the student as well as academic staff.

2. Work details

This preliminary assess study was held in three deferent colleges (Civil Engineering, Applied Science, Education for pure Science) according to questionnaire distributed randomly. The targeted group was divided into two groups; first group was Academic staff including

(Researchers, Lab Supervisors, Technicians) were marked as (G1), the second group was students were marked as (G2). The Data was collected from 86 from the first group and 150 students. The questionnaire is simple and consist of a list of close-ended questions due to gain simple answers and easy statistical analysis [9]. The questionnaire was presented to experts and approved its content. The 29 questions for G1 was distributed into four parts. The first part was 3 open questions (college name, Department, Type of job). The second part were 5 close-ended questions about self-knowledge. The third section consist of 7 close-ended questions for documentation and records. The last part included 14 close-ended questions about infrastructures.

The G2 questionnaire consist of total 15 questions which included both open and close-ended questions were divided into 3 sections. The first section was about basic information such as college name and the department and sex of student. The second section comprised of six close-ended questions about personal skills and impressions. The final part were consist of 6 close-ended questions about labs infrastructure.

3. Methodology

The research plan was to involve two universities and compare the results between. After contact one university had some issue that prevent to manipulate the questionnaire. Therefor the research fulfillment in one university and the comparison mad of three colleges.

A 220 hard copy printed out and distributed 200 for academic staff during a lecture of general education quality and management; after the end of the lecture we gain 86 questionnaire. In addition 150 copy handled randomly to students in three colleges and later collected only 120 copy. The collected data were coded and entered into Microsoft excel in order to analyzed by simple descriptive statistics such as (Sum, Means and Standard deviation) and correlation analysis by using the statistical package SPSS version 23 computer software.

4. Results and Discussion

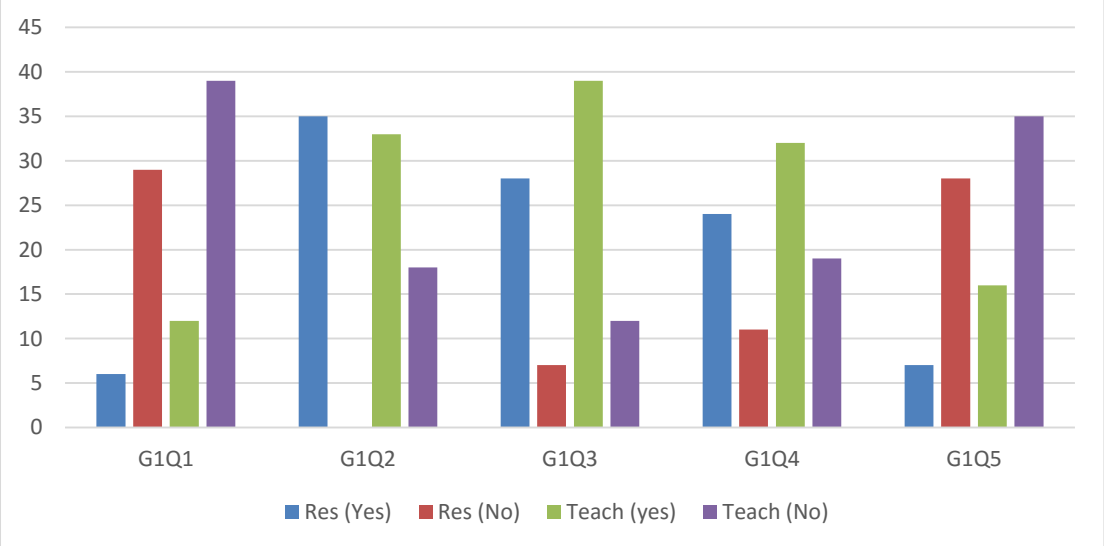

Figure (1) Percentages of G1 Responses for Section 1

Figure (1) presents the percentage of responses for G1 (Researchers vs. Supervisors and Technicians), Were first section about safety personal skills which shows a good answers of the first fourth questions(G1Q1, G1Q2, G1Q3, G1Q4) but the last question(G1Q5) shows that there was a gap of misunderstanding about the term MSDS; the percentage was 82.9% from Researchers don't know about, while 76.5% of academic staff don't have any information about MSDS.

17	34	20	15	G1Q6
14	37	13	22	G1Q7
31	20	23	12	G1Q8
9	42	10	25	G1Q9
14	37	6	29	G1Q10
12	39	5	30	G1Q11
12	39	7	28	G1Q12
8	43	10	25	G1Q13
39	12	21	14	G1Q14
22	29	25	10	G1Q15
24	27	19	16	G1Q16
16	35	15	20	G1Q17
27	24	9	26	G1Q18
3	48	7	28	G1Q19
17.7	33.2	13.5	21.4	
9.4	9.4	6.6	6.6	

Table (1) Responses of G1 Section 2

The results in table (1) shows many deference's between the academic staff and the researchers answers. G1Q6 answers shows that the academic staff were carful wearing the safety equipment's compared to researchers which according to the policy of the universities of providing the academic staff with. The two answers of G1Q7 and G1Q8 were good enough to provide a good indicator for both two groups. This three questions about personal protective equipment (PPE) indicated that they always not used if unavailable which differs from global standards of manual safety. But all answers of (G1Q9, G1Q10, G1Q11, G1Q12 and G1Q13) were safety tools was in bad conditions according to less periodically maintained or the old design of buildings which not allowing to provide them. The G1Q14 shows a very good results (76% of Researchers, 60% of Academic) that they able to deal with hazards carefully and store it and keep in good places and conditions [11]. The rest four answers shows bad results according to management have no experience in safety and haven't enough resources to maintain the issue faced. Result of dealing with waste indicate that although most of technicians were not formally trained on waste management. The assessment of waste handling practice revealed that more than half did not keep proper records of the waste and had no waste collection yearly plan [12].

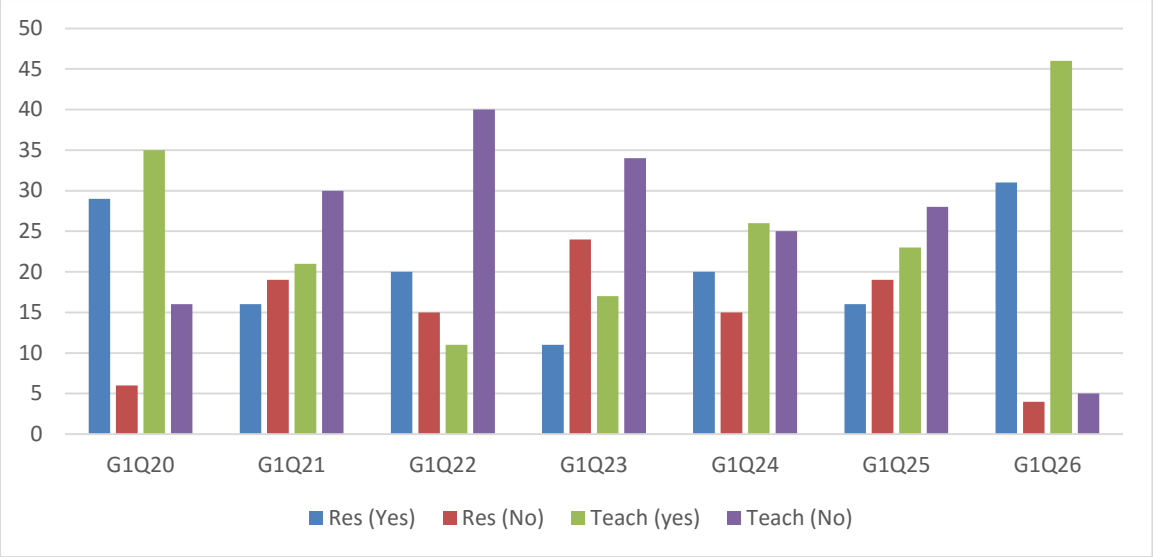

Figure (2) Percentages of G1 Responses for Section 3

The results shows that 58.8% from academic staff says that the guidelines of biosafety and chemical safety were not updated or announced periodically. In the other hand the researchers answers was too close about the guidelines which improve that is very important to take care about the guidelines and updated periodically. 78.4% from academic staff tend not to be documented the accidents. The responses presented by the first group showed a close approximation in the rates of not knowing how to deal with chemical waste which were recorded (66.7% for academic staff, 68.6% for researchers).

Q	Yes	No	Yes %	No %
G2Q1	81	39	67.5	32.5
G2Q2	69	51	57.5	42.5
G2Q3	33	87	27.5	72.5
G2Q4	17	103	14.2	85.8
G2Q5	23	97	19.2	80.8
G2Q6	16	104	13.3	86.7
G2Q7	80	40	66.7	33.3
G2Q8	89	31	74.2	25.8
G2Q9	11	109	9.2	90.8
G2Q10	65	55	54.2	45.8
G2Q11	74	46	61.7	38.3
G2Q12	26	94	21.7	78.3

Table (2) Results of Students G2

The results in Table (2) showed that the pre-safety information in labs registered 67% of students have these information which good indicator about safety knowledge. There was a good results registered about availability of safety signs in clear places at labs which is 57.5% of students say so. This mean that the students understood the meaning of almost all safety signs.

When we asked about the first aid kit the answer (Yes) were about 27.5%; this result come from unavailable first aid kit in the labs of one college, while other college the first aid kit in unreachable place in labs which cant seen by students. By talking about the early warning system in labs the percentage of Availability systems about 14% which mean there is no early warning systems in labs due to the high percentage of saying (No). The Emergency exits are available in one college only and in the second floor, this lead to decrease percentage of saying (Yes) to 81%. The answer of a question about if the teachers wearing the personal protective equipment (PPE) during work in labs is 66% yes; this almost agreed the answer of academic staff and researchers were the percentage was 88% that they wearing the safety equipment's in labs [11].

Feeling safe at laboratories is important so we asked do you feel safe at labs while you in lessons?. There was misunderstanding of this question due to answers of students. The percentage of saying (yes) about 74.2%; the abscess of fire alarm or early warning systems mean that there is no evaluation of dangers it might been at labs. That mean the students don't understand how to evaluate the degree of danger at laboratories. The positive result of answering (Yes) was 90.8% that the students know the danger of carrying lighters which is good indicator of safety knowledge. According to students answers (61.7%) there was corporation with department to achieve safety rules and apply procedures. Participated in voluntary project that serves the safety and security of laboratories so weak side in students educational life. The percentage of participated student in voluntary projects was 21.7% only.

5. Conclusions

Periodically evaluation the safety knowledge in labs describe the reality and need to enhanced the quality and management. The analysis of the questionnaire reveled that there is low levels of knowledge about human safety and waste hazards and even evaluate the levels of danger in labs.

6. Recommendations

increases the thinking level and ability of understanding the importance of human safety and how to deal with waste hazards. There is a need to give more information to students to pay attention about the safety in laboratories and how to deal with dangers it may happened any time. There is a need for further researches to fined strategies of teaching and learning to promote safety knowledge and poor attitudes need improvements.

References

1- David M. DeJoy., Lindsay J, Della., Robert J. Vandenberg., Mark G. Wilson. Making Work Safer: Testing a Model of Social Exchange and Safety Management. Journal of Safety Research. (2010). 41: 163-171.
2- T. D. Karapantsios., E. I. Boutskou., E. Touliopoulou., P. Mavros. Evaluation of Chemical Laboratory Safety based on Student Comprehension of Chemicals Labeling. Education for Chemical Engineers. (2008). 3: 66-73.

3- Charles Kihampa, Harieth H. K. Environmental and Public Health Risks Associated with Chemical Waste from Research and Educational Laboratories in Dar Es Salaam, Tanzania. JCHAS. (2015). 797: 1–7.
4- EHSC. Environment, Health and Safety Committee Note on: The Safe Disposal of Waste from Chemical Laboratories; Royal Chemical Society: London, UK, 2012.
5- Mulchay, M. B.; Young, A.; Gibson, J.; Heldrith, C.; Ashbrook, P.; Izzo, R.; Backus, B. J. College and University Sector Response to the U. S. Chemical Safety Board Texas Tech Incident Report and UCLA Laboratory fatality . Chem Health Saf. (2013). 10 (1), 6 – 13.
6- Aristide Ouedraogo., Amela Groso., Thierry Meyer. Risk Analysis in Research Environment – Part 1 : Modeling Lab Critical Index Using Improved Risk Priority Number. Safety Science. (2011). 49: 778–784.
7- Cooper, M. D.; Philips, R. A. Exploratory analysis of the safety climate and safety behavior relationship. J Safe Res. (2004). 35(5), 497-512.
8- Charles, Kihampa.; Harieth, H. K. Environmental and Public Health Risks Associated with Chemical Waste from Research and Educational Laboratories in Dar es Salaam, Tanzania. Journal of Chemical Health &Safety, March \ April. (2015). Pp:1-7.
9- Marendaz, J.-L., Suard, J.-C., Meyer, Th., 2013. A systematic toolfor assessment and classification of hazards in laboratories(ACHiL). Saf. Sci. 53, 168–176. http://dx.doi.org/10.1016/j.ssci.2012.10.001.
10- James, H. G.; Imke, S.; Nancy, L. W. A Research University's Rapid Response to a Fatal Chemistry Accident: Safety Changes and Outcomes. Journal of Chemical Health & Safety, July. (2014). Pp: 18-26.
11- Ayana, U. C.; Walters, Wendy Laurence, Nigel K. Jalsa. Chemical Laboratory Safety Awareness, Attitudes and practices of Tertiary Students. Safety Science. (2017). 96. Pp: 161-171.
12- Reniers, G. L. L.; Ponnet, K.; Kempeneers, A. Higher Education Chemical lab Safety interventions: Efficacious of Ineffective? J Chem Health Safe. (2014). 21(1). Pp: 4-8.
13- Adane, Legesse.; Abeje. Asmamaw. Assessment of Familiarity and Understanding of Chemical Hazard Warning signs among University Students Majoring Chemistry and Biology: A Case study at Jimma University, Southwestern Ethiopia, World Appl. Sci. J. (2012). 16(2). Pp: 290-299.
14- Ryder, Guy. ILO Director-General: Curbing Chemical Risks in the Workplace. Statement mad for World Day for Safety and Health in Work. Geneva, Switzerland. April (2014).
15- Keen Eng Koo, M. D. Ahma Nurulazam, M. Z. Siti Rhoaida, Tang Ghee Teo, Zulhisyam Salleh. Examining the potential of Safety Knowledge as Extension Construct for Theory of Planned Behaviour: Explaining Safety Practices of Young Adults at Engineering Laboratories and Workshops. Procedia -Social and Behavioral Sciences. (2014). 116. Pp: 1513-1518.