Pharmaceutica Analytica Acta

Purohit, Pharm Anal Acta 2018, 9:10
DOI: 10.4172/2153-2435.1000e195

Editorial Open Access

Implementing Laboratory Safety in the Academic Settings

Purohit SS*

RTI Laboratories, Michigan, USA

***Corresponding author:** Sudhaunshu S Purohit, RTI Laboratories, Michigan, USA, Tel: (248) 885-2370; E-mail: sspbtd@mail.umkc.edu

Received date: October 03, 2018; **Accepted date:** September 06, 2018; **Published date:** September 13, 2018

Editorial

Safety in the chemistry laboratory is undoubtedly a primary concern as safe environment at any workplace ensures the better quality and productivity. The death of Marie Curie due to aplastic anemia brought on by exposure to radiation while carrying test tubes of radium in her pockets during her research is a well- known example that proves the importance of safety in the field of chemistry. Fatal accidents occurred in the academic laboratories in the recent past have drawn the attention of federal authorities and media and have thus highlighting the importance of teaching and implementation of laboratory safety in the academic settings [1-8]. It is crucial to develop a genuine safety culture in research and teaching laboratories in the academic institutions. Hence, formalized safety training must be enforced not just to the students but also to the faculty and non-teaching staff personnel.

A need to build, reinforce and enhance the elements of strong safety culture has been intensely recognized. As an effort to raise the bar for laboratory safety in academia, an increase in emphasis on laboratory safety at national and regional conferences has been observed. Also in response, ACS Committee on Chemical Safety (CCS) has established a 'Safety Culture Task Force' as collaborative effort with ACS Society Committee on Education, Committee on Professional Training, Younger Chemists Committee and Division of Chemical Health and Safety (CHAS) [9-12]. In the academic settings it is essential to pay close attention over the factors responsible for the accidents. Practices such as, presentation of a safety video at the beginning of laboratory course (never to be presented again) should be reconsidered. Devaluating the importance of laboratory safety over teaching the fundamentals of chemistry by many instructors is also observed to be a general trend that needs to be abandoned. The least discussed case is of physically disabled students who have proven ability and interest to pursue career in chemistry but are the most unattended ones. Students, specifically with visual disabilities face a tremendous discouraging environment in the field of chemistry [10] have brought this fact to the attention and have suggested certain excellent ways that would aid visually impaired students learning chemistry plausible, one of being great emphasis on the training of competent sighted assistants [13,14]. I personally found this particular research remarkably positive and helpful as it makes efforts in providing advices to physically challenged students, an equal opportunity to progress in STEM area in a true sense. Reviewing campus policies, upgradation of guidance and resource materials, emphasizing safety training, strengthening laboratory inspection program and working with safety committees on regular basis, firming up collaborative relationships with the researchers, and interacting with peers at other academic institutions are some of the ways to mitigate the danger of accidents. It is a shared responsibility of both principal investigator and an academic institution to understand and provide safe laboratory environment to their students. Good safety practices such as wearing appropriate personal protective equipment should also be supplemented with keeping up to date safety data sheets, chemical inventories, chemical hygiene plan and standard operating procedures. People working in the laboratory should be aware of emergency procedures in the time of trouble that includes knowledge of the location and use of fire extinguisher, spill kit, emergency shower, eye wash, first-aid kit, emergency exit routes etc [15,16].

The overall alleviation of the possible accident problem in both research and teaching chemistry laboratories can be found in the invention and implementation of completely new experimental procedures that would reduce the use of traditional hazardous chemicals and would embrace more of a "Green" approach. In order to apply Green Chemistry, it is rather crucial to discover and improve a strategy that would either decrees or completely eliminate the amount of solvent being used in the synthesis. This in turn results in reducing and/or expelling the potential hazard caused by the solvent and also the amount of waste generated, thus, provides much safer work place along with lessened atmospheric pollution, have invented and discussed an alternative reaction media that employs Green Chemistry to demonstrate successful syntheses of organic products that involve well-known reactions such as Aldol condensation, Diels-Alder reaction and methods like liquid CO_2 extraction etc. These experiments are primarily designed for undergraduate chemistry laboratory courses. Nevertheless, these green reactions being more convenient, less expensive, and with proven increase in the rate of reaction can certainly be used in the graduate level research laboratories [7,8].

In conclusion, being acquired chemistry as a field of occupation; it is in our best interest to thoroughly understand, practice and improve the personal, behavioral and environmental factors of safety culture to elude painful incidences of accidents in chemistry laboratory [17-21].

References

1. Martin CB, Schmidt M, Soniat M (2011) A survey of the practices, procedures, and techniques in undergraduate organic chemistry teaching laboratories. J Chem Educ 88: 1630-1638.
2. McGarry KA, Hurley KR, Volp KA, Hill IM, Merritt BA, et al. (2013) Student involvement in improving the culture of safety in academic laboratories. J Chem Educ 90: 1414-1417.
3. Stuart RB, McEwen LR (2015) The safety "Use Case": Co-developing chemical information management and laboratory safety skills. J Chem Educ 93: 516-526.
4. Staehle IO, Chung TS, Stopin, A, Vadehra GS, Hsieh SI, et al. (2015) An approach to enhance the safety culture of an academic chemistry research laboratory by addressing behavioral factors. J Chem Educ 93: 217-222.
5. Alaimo PJ, Langenhan JM, Tanner MJ, Ferrenberg SM (2010) Safety teams: 'An approach to engage students in laboratory safety. J Chem Educ 87: 856-861.
6. Ray B, Li E, Barnett SM (2003) Pollution prevention guideline for academic laboratories. J Chem Educ 80: 45-49.

7. McKenzie LC, Huffman LM, Hutchison JE, Rogers CE, Goodwin TE, et al. (2009) Greener solutions for the organic chemistry teaching lab: Exploring the advantages of alternative reaction media. J Chem Educ 86: 488-493.
8. McKenzie LC, Thompson JE, Sullivan R, Hutchison JE (2004) Green chemical processing in the teaching laboratory: A convenient liquid CO2 extraction of natural products. Green Chem 6: 355-358.
9. Hill Jr RH, (2016) The impact of OSHA's laboratory standard on undergraduate safety education. J Chem Health Saf 23: 12-17.
10. Nepomuceno GM, Decker DM, Shaw JD, Boyes L, Tantillo DJ, et al. (2016) The value of safety and practicality: Recommendations for training disabled students in the sciences with a focus on blind and visually impaired students in chemistry laboratories. J Chem Health Saf 23: 5-11.
11. Schroder I, Huang DYQ, Ellis O, Gibson JH, Wayne NL (2016) Laboratory safety attitudes and practices: A comparison of academic, government, and industry researchers. J Chem Health Saf 23: 12-23.
12. Monz DJ, McDonough FM (2006) 'EPA's proposed academic laboratories rule: A more flexible approach to the management of hazardous waste. J Chem Health Saf 13: 5-8.
13. Marendaz JL, Suard JC, Meyer T (2013) A systematic tool for assessment and classification of hazards in laboratories (ACHiL). Safety Sci 53: 168-176.
14. Bourree F, Salmi LR, Garrigou A, Domecq S, Brochard P, et al. (2014) A comparison of three methods to identify chemicals hazards in French research laboratories. Safety Sci 68: 324-330.
15. Artdej R (2012) Investigating undergraduate students' scientific understanding of laboratory safety. Procedia Soc Behav Sci 46: 5058-5062.
16. Feszterova M (2015) Education for future teachers to OHS principles-safety in chemical laboratory. Procedia Soc Behav Sci 191: 890-895.
17. Karapantsios TD, Boutskou EI, Touliopoulou E, Mavros P (2008) Evaluation of chemical laboratory safety based on student comprehension of chemicals labeling. Educ Chem Eng 3: 66-73.
18. Meyer T (2017) Towards the implementation of a safety education program in a teaching and research institution. Educ Chem Eng 18: 2-10.
19. Kemsley J (2010) Assessing safety. Chem Eng 88: 33.
20. Johnson J, Kemsley J (2011) Academic lab safety under exam. Chem Eng 89: 25-27.
21. Hill RH (2007) The emergence of laboratory safety. J Chem Health Saf 14: 14-19.