

" Quality Improvement of Compliance to hazard material safety program to ensure laboratory safety in Suez Canal Authority Port Said Primary healthcare center "

Authors

Sara Eldweny¹; Heba Elsayed²; Ashraf Anwar Eissa³; Noha zakaria Abbas zakaria Abbas⁴; Soad Ragab Darwish⁵; Ghada Elsayed Abotaleb⁶; Taghreed Salah Mohammed⁷; Elham Mohamed Hamdy⁸; WafaaMohsen Elsayed⁹

1Bachelor of clinical pharmacy Suze canal University

2Port-SaidUniversity.

3Head of dental department - Suez Canal Authority hospitals.

4Pharmacist- quality coordinator in Suez Canal Authority Port Said primary health care center.

5Nurse supervisor - Suez Canal Authority Port Fouad primary health care center.

6Nurse supervisor in intensive care unit - Suez Canal Authority Altwarii hospital.

7Nurse – Suez Canal Authority Altwarii hospital.

8Nurse- Suez Canal Authority Altwarii hospital.

9Nurse supervisor in emergency department - Suez Canal Authority Altwarii hospital.

Abstract:

Chemical substances used in laboratory are potentially hazard which is determined by the chemical and physical properties of the materials.

To minimize the danger from exposure to hazard material we must know how to store, transport and handle these chemicals, and also the proper action taken if accidentally exposed to hazardous materials. [4]

Hazardous chemicals have risks of damage to lungs through inhalation, skin through contact to skin, eyes through eye penetration and mucous membrane through ingestion which may occur after short or long term exposure. [4]

According to the national safety requirement of the Egyptian standard the primary health care center must has plans for handling, storage, usage and transportation of hazardous materials and waste disposal.

Hazardous materials and waste management plan includes material safety data sheet should be available and include information such as physical data, hazardous material type, safe storage, handling, spill management and exposure, first aid, and disposal.

To improve the employee compliance to hazard material safety program we use quality tools to determine the problem and solve it as follow checklist, FOCUS-PDCA, Pareto chart and Fishbone which help us to implement the hazard material safety program.

Key words

Laboratory safety, chemical hazard material, material safety data sheet and quality tools.

Introduction

According to the occupational safety and health administration (OSHA'S) define the hazard material as any substance or chemicals which is a health hazard or physical hazard.

Information about chemicals and the hazards must be available in the primary health care center and understandable to employees.

All hazardous material required material safety data sheet (MSDS) understandable to employees which include the physical and chemical properties of the material, way of protection and first aid when accidentally exposed to the hazardous material.

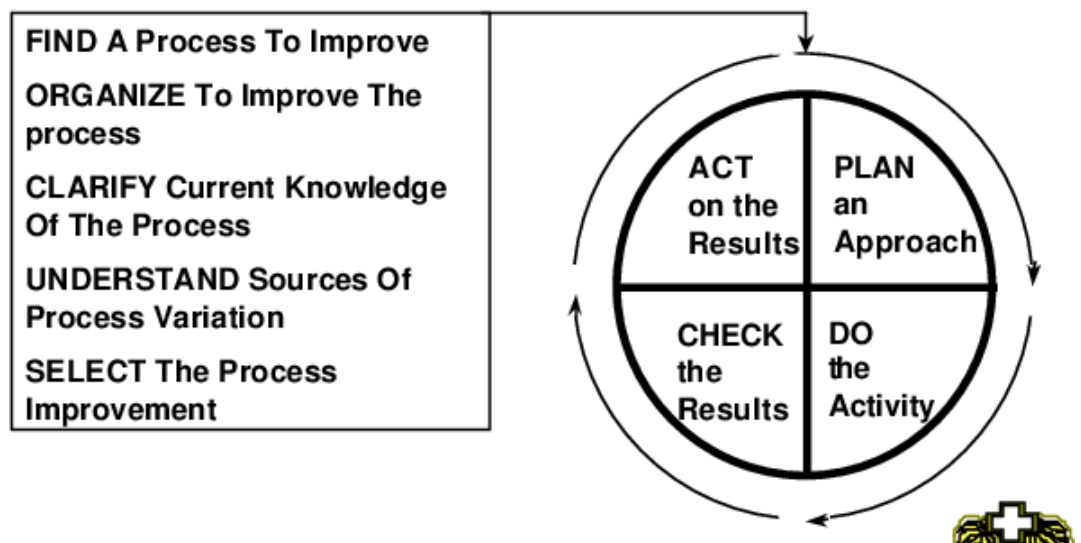
We implement hazardous material safety plan which include the inventory, proper use, transportation, handling and storage of hazardous material to ensure safe environment and decrease risk of exposure to hazards.

Aim of the project

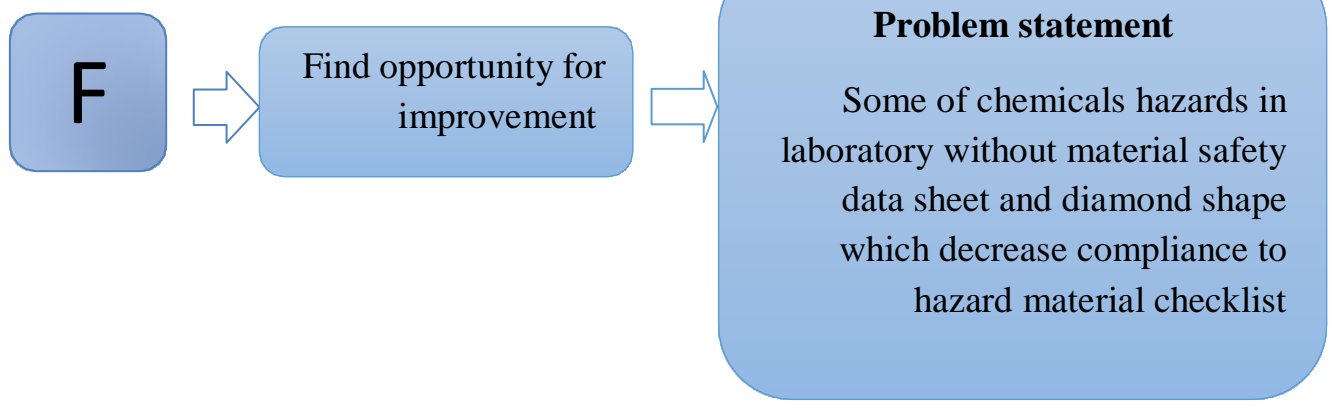
To improve compliance to hazard material safety program and ensure safety of employees, patients and visitors.

Methodology:

FOCUS PDCA (Shewhart Cycle)

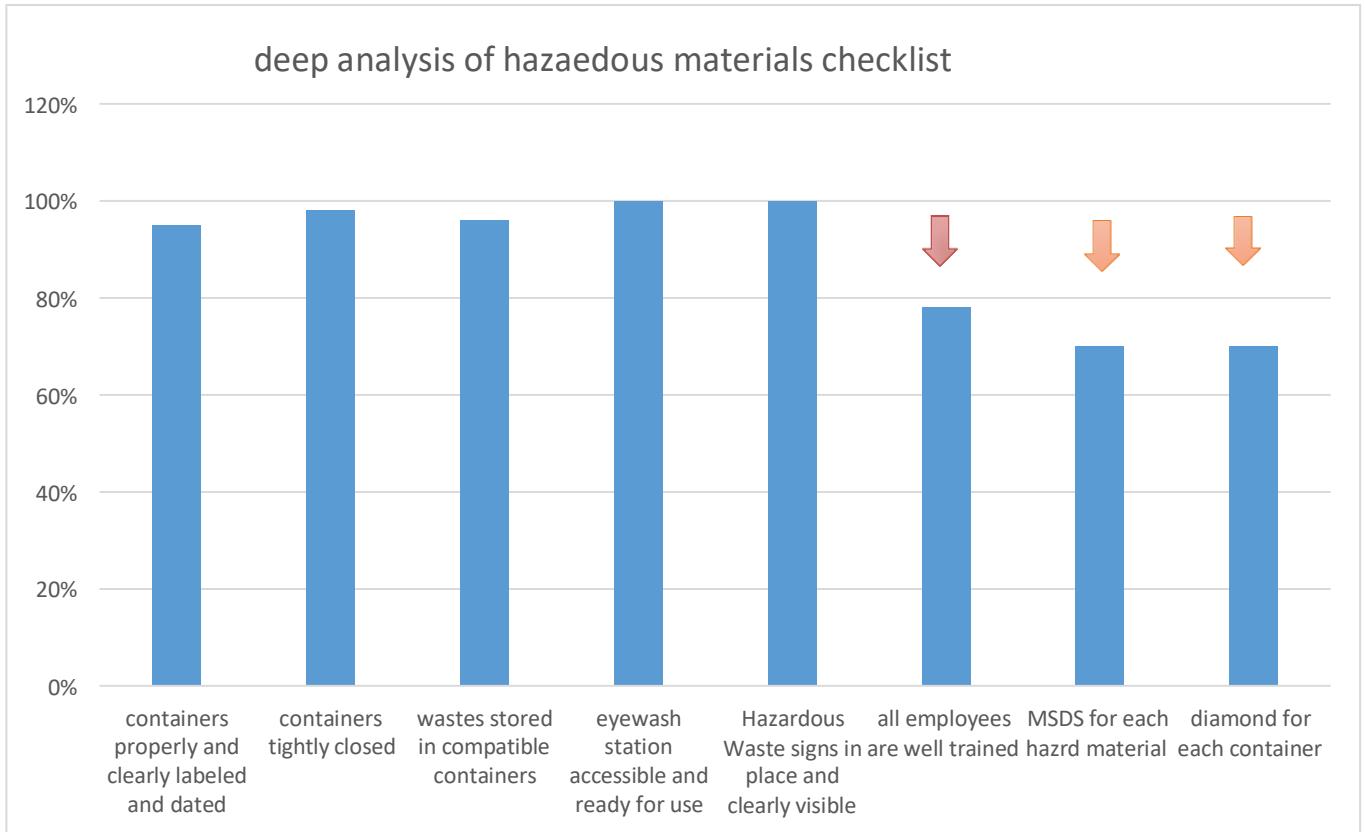


FOCUS PDCA

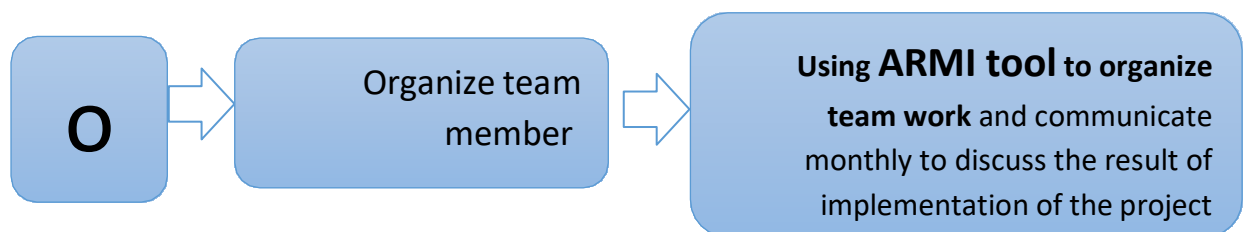


Inclusion criteria: all staff in laboratory.

Exclusion criteria: all staff in the primary health care center outside the laboratory.

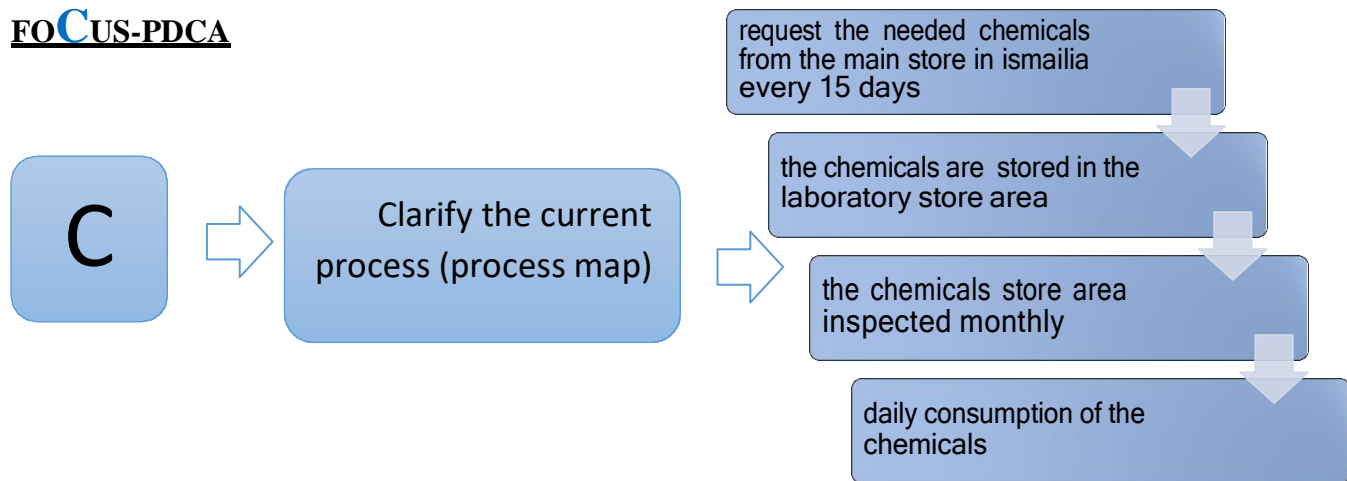


FOCUS-PDCA

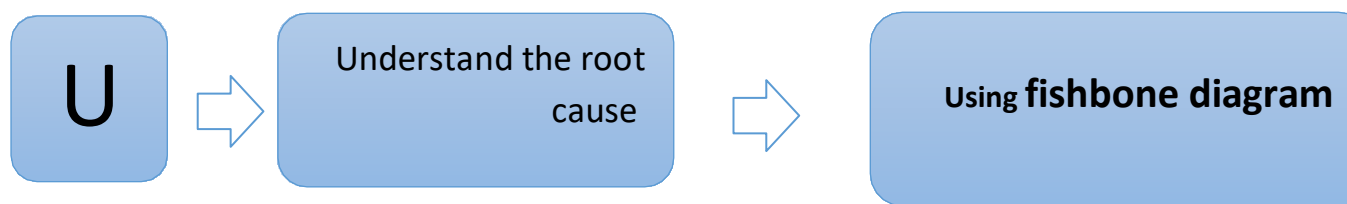


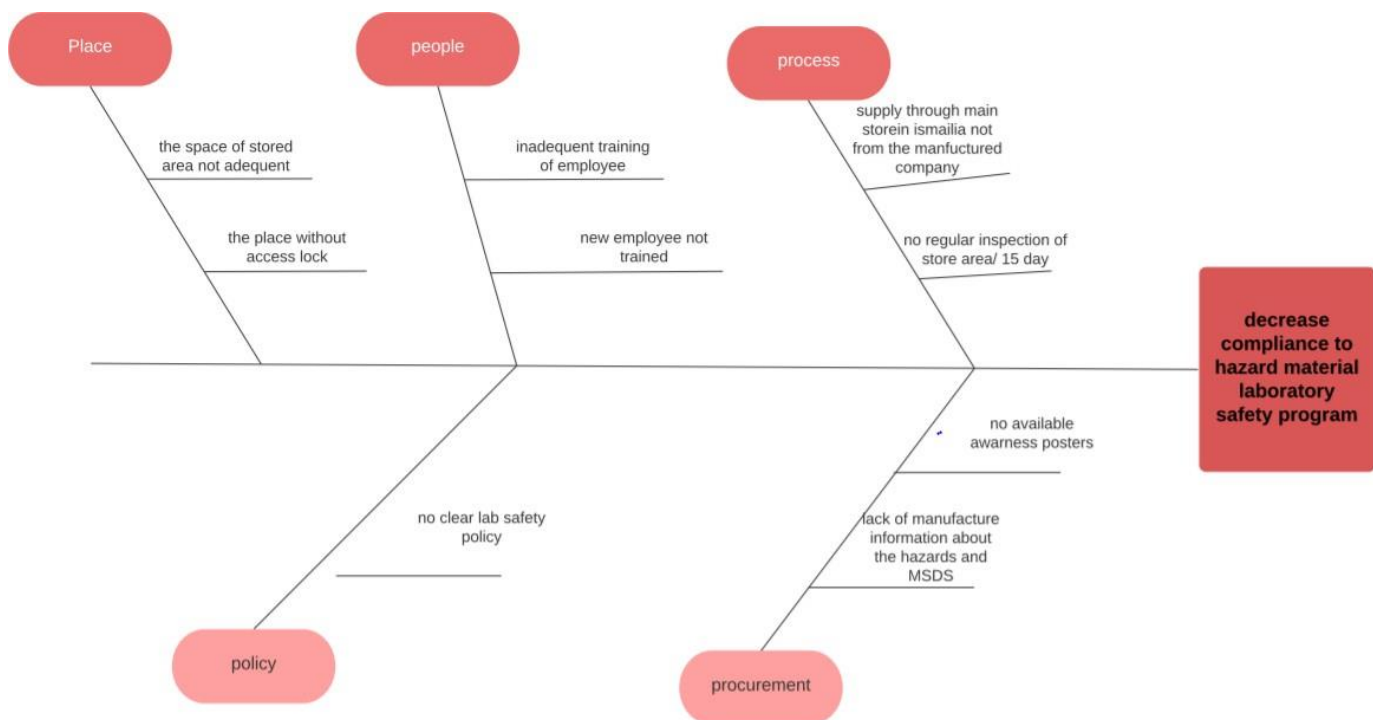
Member	Approver	Resource	Member	Other interested
Center manager	✓			
Laboratory manger		✓		
Laboratory staff		✓		
Supply chain representative		✓		
Health and safety environmental coordinator		✓		
Quality coordinator		✓		
Housekeeping supervisor			✓	
Infection control senior			✓	

FOCUS-PDCA

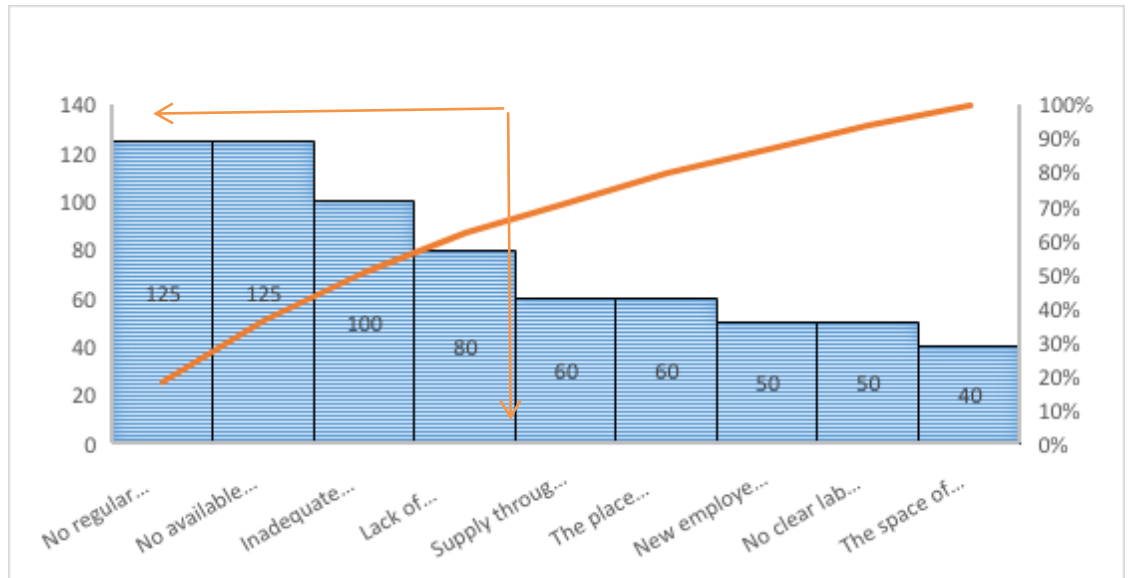


FOCUS-PDCA



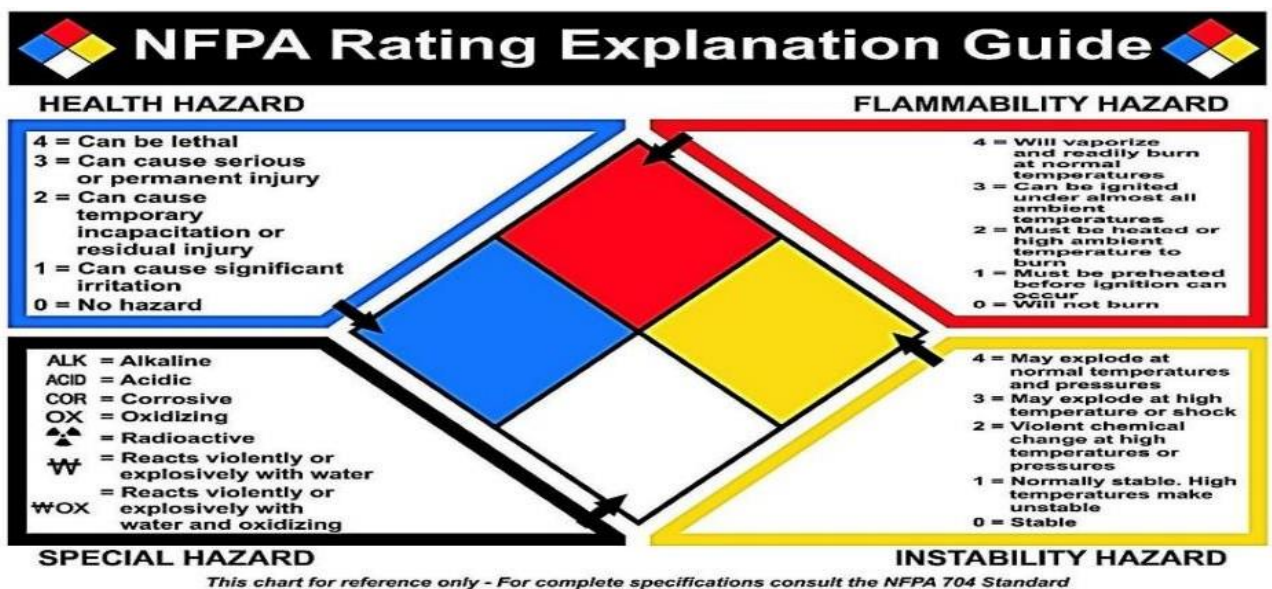


Criteria root cause	High risk (1-5)	High volume (1-5)	Problem prone (1-5)	Score sum	Rank
1- Supply through the main store in Ismailia not directly from the manufactured company	3	5	4	60	No 2
2- No regular inspection every 15 days	5	5	5	125	No 8
3- Inadequate training employee	5	4	5	100	No 3
4- New employee not trained	5	2	5	50	No 9
5- The space of stored area not adequate	5	2	4	40	No 6
6- The place without access lock	4	5	3	60	No 6
7- No clear lab safety policy	5	2	5	50	No 7
8- No available awarness posters	5	5	5	125	No 4
9- Lack of manufacture information about MSDS	5	4	4	80	No 4



Problem list

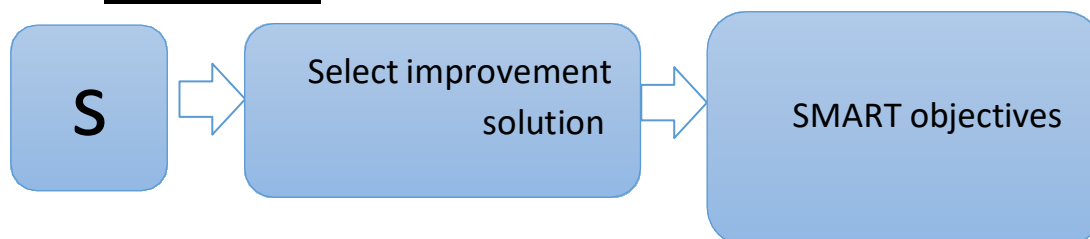
- 1- No regular inspection of stored area every 15 days.
- 2- No available awareness posters about precaution and diamond shape.
- 3- Inadequate staff training.
- 4- Lack of manufacture data about material safety data sheet.



Diamond shape is NEPA system

In our hazardous material safety program, all materials should be labelled with the National Fire Protection Association hazard identification system (HIS) symbol. The HIS symbol is diamond shape consist of four small square diamond color coded to indicate a specific hazard and numerical rating from 0-4 shows the severity of the hazard.[6]

FOCUS-PDCA



- ✓ The goal is to improve compliance to hazards material safety program to 95% in 3 months by increase staff awareness and all hazards are labeled with diamond shape and all MSDS are documented in easy way to use when needed and regular inspection for implementation of the safety program.

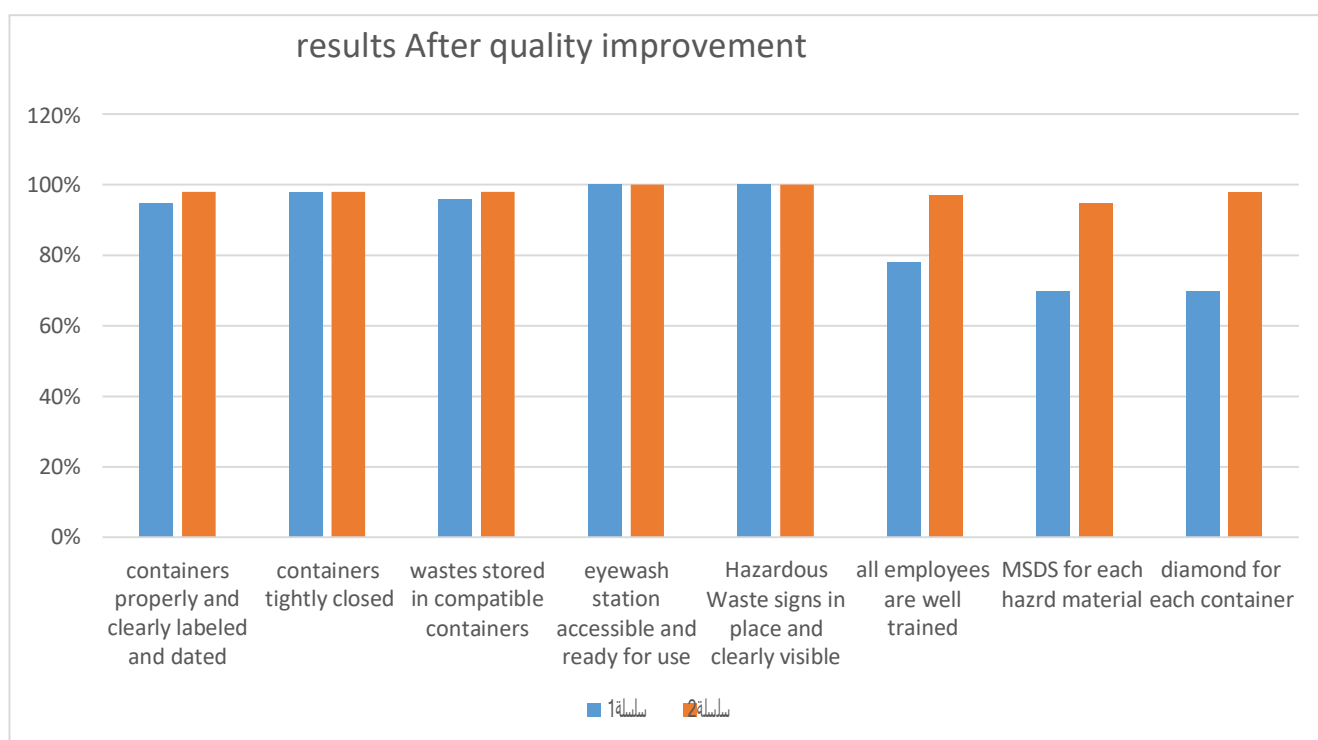
Project	Root causes	Proposed solution	Cost 1-5	Effectiveness 1-5	Achievable 1-5	Score
Improve compliance to hazard chemicals laboratory safety program	No regular inspection of stored area every 15 days.	Regular inspection of stored area every 15 days.	2	5	4	40
	No available awareness posters about precaution and diamond shape.	Supply posters and diamond shape	5	5	4	100
	In adequate staff training	Training program	3	5	4	60
	Lack of manufacture data about material safety data sheet	Asking the manufactured company about the mandatory supply all material with the safety data sheet	3	5	3	45

Action plan

	Recommended task	Responsibility	Time frame	Status update/note
1	Supply posters and diamond shapes	Supply manager	22/6/2021	-Communicate with the printer press of Suez Canal Authority.
2	Staff training	Health and safety environmental coordinator and quality coordinator	1/8/2021	-training program for all employee to improve awareness -pre and post training exam
3	Communicate with the manufactured company of each chemical to supply the material safety data sheet	Supply manager and health and environmental safety coordinator	30/8/2021	-complete safety data about all chemicals in the laboratory -review the literature and collect data about the safety of the laboratory chemical
4	Regular inspection of stored area every 15 days.	Health and safety environmental responsible	15/6/2021	-Using check list to ensure environmental safety of store area

Results

The compliance to laboratory safety program improved and reach target



Discussion

Through using quality tools, we can improve compliance to laboratory safety program which protect all staff, patients and visitors.

The Occupational Safety and Health Administration (OSHA) put rules and guidance to make the laboratories environment safe because the laboratory workers are exposed to a lot of hazardous including chemicals, physical, biological, radioactive hazards and musculoskeletal stresses. [1]

According to the Hazard Communication Standard (29 CFR 1910.1200) which set by OSHA we must evaluate the potential hazard of chemicals and communicating information about those hazards and appropriate protective measure to employees. The standard includes developing and maintaining a written hazardous communication program for the work place, including list of the all hazardous materials, labelling of them, prepare and distribute material safety data sheet to employees and development of training to all employee about the hazardous material and the protective measures. [5]

Employees training must include:

- Observational methods to determine the presence or release of hazardous materials.
- Protective procedure to protect employees from exposure to hazards such as appropriate work practice, emergency procedure, and personal protective equipment to be used. [2]

Labelling of chemicals

We must ensure that all containers used in the work place labeled by permanent container label which include the following: -

- Identify the chemical.
- Appropriate hazard warning shown in the label as HIS symbol (diamond shape).
- The name of the manufacturer.

- Written in understandable language to all employees.

Recommendation

From our quality improvement project we recommend:

- Implementation of health and environmental safety culture in health care organization safety program includes policies and procedure.
- Risk assessment and improvement projects proactively make the environment safe.
- Commitment to implement health and environmental safety standards provides high quality healthcare services to patients, staff and visitors.
- Implementation of quality standards provides effective and efficient health care service.
- Effective training of staff to reach goal.
- Good documentation has a great impact in improvement.

Summary

In this project use quality tools to improvement of compliance to chemicals hazards laboratory safety program.

Check list used to trace the process of hazard chemical storage and safety program.

FOCUS –PDCA tool used to find the problem and organize a team and describe the current process then understand the root cause then the solutions.

Fish bone used to determine the most influential cause from sub causes of the problem.

Pareto chart (80/20 rule), is a diagram which determine the states, the frequency of defects and their cumulative effect. Which beneficial to find the defects to prioritize and observe the greatest common improvement and indicate that 80% of the results are determined by 20% of the reasons.

PDCA (the Deming cycle) plan, do, check and act to create a plan for continuous improvement project.

The result of using quality tools we can reach goal and improve the compliance to chemical hazards material safety program to more than 95%.

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