

Use of PDCA Cycle in Improving Compliance to Universal Safety Precautions in a Medical College Laboratory

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Abstract

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Introduction: We studied effectiveness of PDCA cycle in improving compliance of laboratory staff with respect to universal safety precautions. *Material and Methods:* We noted compliance of staff to safety precautions like wearing apron, gloves, hand wash, avoiding eating and drinking in the lab before and after the institution of PDCA cycle for a period of 1 month. The significance of difference was calculated using Chi squared test. *Results:* We found significant improvement in avoiding eating and drinking in lab ($p < 0.0001$), wearing apron ($p < 0.012$), wearing hand gloves ($p < 0.000423$), hand wash ($p < 0.001$). *Conclusion:* PDCA technique is effective in improving compliance to universal safety precautions and can be applied in bigger scale for other problems.

Keywords: PDCA; Universal safety precautions.

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Introduction

Universal safety precaution is the first thing that is taught to a medical laboratory technologist, when they enter the MLT course, but many people still cut the corners while carrying out the routine work in our laboratory which is accredited with NABL since 2011. Repeated training regarding safety has been given to the laboratory staff, still we observe that once in a while staff are seen without gloves or without apron.

So we decided to investigate the magnitude of this problem and to understand the root cause behind it and apply the management technique of PDCA cycle

which was said successful in industrial activity [1,2].

PDCA cycle consist of four stages PLAN, DO, CHECK, ACT.

PLAN stage consists identifying the problem areas in the working set up.

In DO stage we have to take action against the problems in small scale like in small unit of hospital and tabulate the results, a sort of pilot study.

In CHECK stage with help of statistical tools we have to measure effect of the actions taken on small scale.

In ACT stage if the measures are effective we can implement it on large scale.

Though PDCA cycle is well established and commonly used in most other industries [1,2]. Health care industry is also getting familiar with such processes.

In a study by Liu Yanhong author studied effect of PDCA cycle on Hand hygiene of medical staff in community Hospitals [3]. Taking inspiration from this paper, we decided to study the effect of PDCA cycle in improving compliance of laboratory staff with respect to laboratory safety precautions and to check whether we can implement it on large scale.

Materials and Methods

Employees of central lab were observed for compliance with standard laboratory safety procedures like wearing apron, wearing gloves, six steps of hand wash and avoiding eating and drinking in laboratory on daily basis for one month. Data was entered in excel sheet for compliance and non compliance from 1st August to 1st September, 2018.

After taking baseline data of one month we initiated awareness and training programme for laboratory personnel safety. Multipronged approach to training was applied. There were formal lectures, demonstrations of proper hand wash technique and whats app based flyers were sent to the employee group.

After a period of 15 days again data of regarding compliance with laboratory safety procedure was collected on daily basis and findings were tabulated in excel sheet. Whether the compliance improved significantly or not was checked by using chi square test.

Results

As can be seen from Table 1 compliance for avoiding eating and drinking habits increased from 154 times to 286 times which is statistically significant with p value <0.0001.

As can be seen from Table 3, compliance for wearing hand gloves increased from 259 times to 310 times which is statistically significant with p value 0.000423.

As can be seen from Table 4, compliance for 6 steps of hand wash increased from 207 times to 308 times which is statistically significant with p value < 0.001.

As can be seen from Table 5, compliance for all personal protective habits increased from 892 times to 1212 times which is statistically significant with p value is < 0.001. The observed increase in compliance is statistically significant because p is <0.05.

Table 1:

	Compliant for Avoiding Drinking and eating in lab	Non compliant for Avoid drinking and eating	Marginal Row Totals
Before PDCA	154	296	450
After PDCA	286	164	450
Marginal Column Totals	440	460	900 (Grand Total)

Table 2:

	Compliant for wearing Apron	Non compliant for Wearing Apron	Marginal Row Totals
Before PDCA	272	178	450
After PDCA	308	142	450
Marginal Column Totals	580	320	900 (Grand Total)

Table 3:

	Compliant for Wearing Hand Gloves	Non compliant for Wearing Hand Gloves	Marginal Row Totals
Before PDCA	259	191	450
After PDCA	310	140	450
Marginal Column Totals	569	331	900 (Grand Total)

Table 4:

	Compliant for Following 6 step hand wash	Non compliant for Following 6 steps hand wash	Marginal Row Totals
Before PDCA	207	243	450
After PDCA	308	142	450
Marginal Column Totals	515	385	900 (Grand Total)

Table 5:

	Compliant for personal protective habits	Non compliant for personal protective habits	Marginal Row Totals
Before PDCA	892	908	1800
After PDCA	1212	588	1800
Marginal Column Totals	2104	1496	3600 (Grand Total)

Discussion

We found that non compliance of employees was more with drinking and eating habits, before intervention. We think that, It was due to Indian practice of taking tea during working hours.

Initial compliance was more for apron wearing due to strict uniform policy of hospital. Also with central Air conditioner it is quite comfortable with apron.

We found that, there is lot of improvement in all universal safety precautions. This is due to efforts taken to make them understand the importance of safety precautions.

Probably staff took more precaution after consequences of HBV and hepatocellular carcinoma were explained.

These findings are comparable to study by Liu Yanhong who found PDCA lead to improvement in hand hygiene practices [3]. In another study by Suo-Wel Wu PDCA cycle is effective in improving management of panic value in hospital [4]. Manfrendi SR and colleague has used PDCA in successful resolution of hepatitis B outbreak in Brazillian hemodialysis population [5]. Jing Song Li and colleague has developed EMR (Electronic Medical Record) system for improving Medical services and reducing errors [6]. While Coury and colleague used PDCA cycle to optimize research implementation automated colon cancer outreach programme in intervention clinic [7].

All these studies are comparable with our study.

Conclusion

To conclude PDCA cycle is significantly effective in improving compliance to hospital policies, and procedures; and hence can be applied to bigger medical setups, having bigger issues.

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