Table 1. Ranked list of the adoption of lean tools

Rank	Lean Tool	Mean Score
1	SOPs	4.70
2	Root cause analysis	4.50
3	Downtime and performance	4.50
4	Visual management	4.45
5	Kaizen	4.40
6	5S	4.35
7	PDCA	4.25
8	Kanban	4.00
9	Value stream mapping	3.60

Table 1 presents a ranked list of lean tools in terms of mean score on the level of adoption of the tools. The study found out that the level of adoption of lean tools was largely moderate in most of the medical laboratories. More specifically, the study showed that the SOPs, key performance indicator, root cause analysis, downtime and performance, and visual management were the most adopted tools. Contrary to most of the studies in the literature (Joosten et al. 2009; Poksinska, 2010), value stream mapping and 5S methodology were not considered key lean tools, and were surprisingly moderately practised. Findings in past studies emphasize value stream mapping as the most implemented tool in healthcare, appearing in almost all papers on the lean healthcare (Poksinska, 2010).

4.2 Perceived importance of lean tools in the laboratories

Participants were asked to respond on a five-point scale to rate their level of understanding of the importance of each of the identified lean tools in their laboratories. Table 2 presents a rank analysis of the perceived importance of applying lean tools, in terms of mean score. It can be seen from this analysis that the most common perception is that adoption of lean tools is crucial for quality improvement with a mean score of 4.72. Furthermore, the analysis shows that other most important factors or drivers to lead adoption are for competitive advantage and for improving turnaround time. One other important factor is for improving operational performance. Finally, increasing staff motivation and cost reduction were found to be of moderate importance.

Table 2. Perceived importance of lean tools in medical industry

Rank	Perceived Importance	Mean Score
1	Quality improvement	4.72
2	Competitive advantage	4.65
3	Improve turnaround time	4.65
4	Improve operational performance	4.17
5	Increase staff motivation	3.61
6	For cost reduction	3.33

4.3 Major Findings

From the analysis of the level of adoption of lean tools and the perceived importance of lean tools in the medical laboratory industry, the following were identified as major findings from the study:

1. SOPs emerged as the most utilized lean tool in the Namibian medical laboratory industry. This is because each laboratory is required to have standard operating procedures, which are sets of documents that define practices which need to be strictly followed by all employees, without fail.
2. The most common understanding from this study is that adoption of lean tools is crucial for quality improvement, which is a positive road map to improving the quality of service.
3. One other finding was that internal motivation, 5S methodology, Kanban and continuous improvement were moderately applied in the industry. This indicates that medical laboratory services are trying their level best to apply the most advanced improvement tools in order to improve their quality of service, as also postulated by Gomez et al. (2013).

5. Conclusions

This research analyzed the usage and impact of lean tools, as well as the perceived importance of tools in the Namibian medical laboratory industry. Results of the study showed that standard operating procedure is the most adopted tool in the Namibian medical laboratories, contrary to most extant studies which show that value stream mapping as the most frequently used tool used in healthcare. Furthermore, results of the study indicated that lean is

commonly implemented for quality improvement in the industry, rather than for turnaround time improvement. Overall, lean is a useful tool for identifying and eliminating the wastes, defined in terms of transportation, defect, over-production, over-processing, inventory, motion and waiting. Further research may be essential to evaluate why lean tools are not fully utilised and incorporated into the laboratory day-to-day activities to influence the success and the sustainability of lean principles in the Namibian medical laboratory industry. Studies on the importance of value stream mapping is suggested as it the best tool for mapping and identifying loop holes in the process flow by identifying value adding and non-value adding activities, and allowing for corrective actions to be taken.

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