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Short communication

Implementation of a Lean Board as a visual management tool for daily production monitoring in pharmaceutical manufacturing

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Introduction

Daily production monitoring in pharmaceutical manufacturing represents an important segment of the GMP system, as it enables timely monitoring of process flow, production plan realization, and identification of deviations that may affect operational efficiency and process continuity. In the production facility of Alkaloid doo Belgrade, a Lean board was introduced as a visual management tool aimed at improving process monitoring, more efficient problem identification, and support for continuous quality system improvement. Records that are not visually presented often make it difficult to quickly assess the current production status and may delay employee response in the event of downtime or deviations. The implementation of the Lean board enables a simple, transparent, and visually clear presentation of key data in real time. Using visual indicators and clearly defined parameters, employees are enabled to recognize problems more quickly, respond in a timely manner, and improve communication within the team. In addition, the application of visual management contributes to raising employee awareness regarding the importance of continuous process monitoring, responsibility for production plan realization, and active participation in strengthening GMP culture and continuous process improvement.

The aim of this study was the implementation of a Lean board for daily production monitoring in order to improve process control, planning efficiency, and timely identification of production-related problems.

Materials and methods

The Lean board was introduced as a visual management tool for daily monitoring of production activities and key process indicators. The system is based on visual management principles with colors, symbols, and clearly defined statuses that enable rapid identification of deviations and improved process transparency. The Lean board is organized through several thematic units covering key areas important for continuous process performance and compliance with GMP requirements, as well as ISO 9001:2015, ISO 14001:2015 and ISO 45001:2015 standards. Each monitoring area is presented through a dedicated visual display with clearly defined goals and status indicators, where green indicates compliance with the defined target, while red indicates deviation or the need for corrective action.

The occupational safety area is intended for daily monitoring of workplace injuries with the aim of maintaining a safe working environment and preventing employee injuries. Monitoring employee absences enables timely assessment of workforce

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availability and potential impact on production organization. The quality area includes monitoring of process nonconformities, enabling rapid recognition of deviations that may affect product quality and GMP compliance. The production realization area is intended for daily monitoring of production plan achievement and timely identification of deviations in planned production activities. Technical downtime is monitored through separate areas covering equipment failures and equipment adjustments, with the aim of identifying the causes of downtime and improving equipment availability. Monitoring downtime enables timely response of technical services and more efficient planning of corrective activities. The Ecology area includes monitoring events related to spills or leakage of hazardous waste, as well as improper waste disposal outside designated areas, with the aim of maintaining a safe and controlled working environment and compliance with environmental requirements.

Data is updated daily, enabling employees to quickly assess the current process status and respond promptly in the event of identified problems or deviations. The visual presentation of data contributes to more efficient team communication, increased employee awareness regarding quality and GMP principles, and encouragement of continuous process improvement.

Results and discussion

Before the implementation of the Lean board in the production facility of Alkaloid d.o.o. Belgrade, monitoring of production realization and key process indicators was mainly based on individual records and verbal communication between employees and supervisors, which made it difficult to quickly assess the current process status and respond promptly in the event of deviations or downtime. Information related to quality, technical downtime, employee absence, occupational safety, and ecology was not centralized in one place, although all these factors may directly affect production plan realization and the number of packaged units. After the implementation of the Lean board, centralized and visually transparent monitoring of production realization and all factors affecting the achievement of defined goals were enabled. The visual presentation of data allowed rapid identification of deviations and recognition of causes that could lead to reduced production realization, such as technical downtime, equipment adjustments, quality nonconformities, employee absence, or events related to safety and ecology. Clearly defined goals and visual indicators enabled employees and supervisors to monitor the number of completed packaged units more efficiently and respond promptly in cases of deviations from the production plan. Every identified deviation is documented together with the defined root cause and corresponding corrective actions, ensuring a systematic approach to problem solving and process improvement. To improve process management, daily team meetings were introduced to analyze the results of the previous day, production plan realization, identified deviations, and factors affecting performance. Based on the identified issues, corrective and preventive actions are defined with the aim of improving process efficiency, maintaining production continuity, and ensuring GMP and ISO compliance.

Conclusion

The Lean board represents a simple and effective visual management tool for monitoring daily production realization in pharmaceutical manufacturing. Its implementation contributes to improved process transparency, faster identification of deviations, enhancement of GMP culture and better control of production activities. Visual management principles can significantly contribute to continuous improvement activities and strengthening of quality culture in pharmaceutical manufacturing.

References

Imai, M., 1986. Kaizen: The Key to Japan’s Competitive Success. Random House, New York.

Liker, J.K., 2004. The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. McGraw-Hill, New York.

WHO, 2022. Good Manufacturing Practices for Pharmaceutical Products. World Health Organization. Lean Manufacturing Practice in a cGMP Environment, Pharmaceutical Technology Europe-10-01-2006, Volume 18, Issue 10.