NOTE

Impact of a chemotherapy workload and productivity dashboard on pharmacy technician turnover

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Purpose. To describe the methods used in the development of an intravenous chemotherapy workload and productivity dashboard and its impact on symptoms of burnout and technician turnover.

Summary. In February 2017, chemotherapy sterile preparation pharmacy technicians reported symptoms of burnout as a result of perceived increase in workload. In response, an i.v. chemotherapy workload and productivity dashboard was developed at an academic medical center to validate workload in comparison to the reported job stress of pharmacy technicians. The dashboard provided pharmacy leadership objective data to validate staff concerns and leveraged lean principles to level-load the work prior to requesting additional full-time equivalents (FTEs) to senior leadership. The rate of turnover of i.v. chemotherapy technicians was assessed before (December 2016–June 2017) and after (July 2017–January 2018) dashboard implementation and approval of an additional i.v. chemotherapy technician FTE. The addition of the new FTE resulted in a decrease in productivity from an average of 106% (range 67%–151%) to 84% (range 65%–110%). The interventions allowed for the ability to leverage a staffing-to-demand model, resulting in the observed improvement in technician symptoms of burnout and a notable decrease in the overall turnover rate of i.v. chemotherapy technicians.

Conclusion. The i.v. chemotherapy workload and productivity dashboard confirmed frontline staff perception and provided data to support the addition of labor resource and an opportunity to leverage a staffing-to-demand model to decrease symptoms of burnout and technician turnover.

Keywords: burnout, chemotherapy, dashboard, productivity, technician, turnover

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The Triple Aim initiative to enhance population health and improve patient experience, while reducing costs does not acknowledge the impact on the healthcare workforce as it relates to burnout and dissatisfaction.[1] Health-system leaders should consider adding a fourth dimension (Quadruple Aim Theory)—improving the work life of those who deliver care. To achieve the Quadruple Aim, lean principles may be leveraged by health systems to eliminate waste with the goal of increasing efficiencies in the healthcare delivery process. Nevertheless, one of the consequences is operating a business that is too lean, where the institution may underestimate labor resource needs as workload continues to rise overtime.[2]

Oregon Health & Science University (OHSU) pharmacy technicians expressed symptoms of burnout and job stress related to increased workload while working in the chemotherapy sterile preparation area. Symptoms of burnout and job stress include detachment from one's work and exhaustion, defined as the harmful, physical, and emotional responses

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that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker.[3,4] Oftentimes, burnout and job stress are misconstrued as challenges presented to employees that must be individually overcome. A challenge can energize and motivate employees to learn new skills and master their jobs. But far too often, challenges are turned into job demands that cannot be attained with the allocated resources and/or workflows. Research findings have illustrated that stressful working conditions are directly correlated with increased absenteeism, tardiness, and deliberate intentions by workers to quit their jobs. Over time, persistent job stress may lead to a higher prevalence of burnout among healthcare workers that negatively impacts quality, safety, and health-system performance.[5]

Burnout is an organizational issue, in which, efforts to reduce symptoms of burnout require the recognition that it is not an individual problem in order to build a resilient workforce.[4] Employee burnout is a complex problem, and to address it, one must deconstruct the sources of burnout. Sources of burnout include stress (e.g., excessive workload, demands for increased productivity, and inefficiencies in processes) and reward (e.g., compensation and recognition) factors. The combination of stressor and reward factors encompasses the employee's experience and must be balanced to mitigate burnout. Simply increasing reward factors such as compensation does not alter the employee's emotional symptoms of burnout. Workload and productivity stressors must also be assessed to ensure employees are not working in an environment where workload consistently exceeds allocated labor resources.

Productivity refers to the level of a firm's output (products or services) relative to the inputs (employees, equipment, materials), whereas workload refers to a time standard (e.g., mean time required to prepare an i.v. compound) or volume indicator (e.g., the mean frequency of a reported task).[6] After gathering workload and productivity metrics, pharmacy leaders can transform the data into an operational dashboard that provides a visual tool to support objective business decisions, and in the process, also improves employee resilience and decreases symptoms of burnout.[7,8]

Although data exist in the literature on workload, productivity, and operational dashboards, there is a lack of literature describing an i.v. chemotherapy workload and productivity dashboard. The objective of this case study is to describe the methodology to develop and implement an i.v. chemotherapy workload and productivity dashboard to validate staff perception and manage symptoms of burnout and technician turnover.

KEY POINTS

- Managers should consider validating staff perceptions of workload by deconstructing sources of burnout.
- Managers should leverage data to drive outcomes by, first, improving operational efficiency and, second, requesting additional full-time equivalents to meet workload demands.
- Workload and productivity operational dashboards provide objective insight to health-system administrators, assisting with the deconstruction of symptoms of burnout and job stress–related workload.

Background

OHSU is a 576-bed, tertiary care, academic health center that primarily operates in southwest Portland, Oregon, on the Marquam Hill Campus. Three main patient care facilities on the Marquam Hill Campus include OHSU Hospital, Peter O. Kohler Pavilion, and Doernbecher Children's Hospital. The inpatient pharmacy department that supports the 3 main patient care facilities has on average 75 technicians, 21 of which are trained to conduct chemotherapy sterile preparation. According to the 2015 National Pharmacy Technician Workforce Study, 5.5% of inpatient pharmacy technicians are looking to leave at first opportunity.[9] In 2015, OHSU raised $500 million in less than 2 years to earn a matching gift. With the $1 billion in new funding, the OHSU Knight Cancer Institute recruited the world's top researchers and physicians along with the construction of 2 buildings: a state-of-the-art cancer research center and treatment clinics. In December 2016, OHSU Knight Cancer Institute earned the National Cancer Institute's highest distinction, Comprehensive Cancer Center status.[10] Ever since garnering NCI's top accolade, cancer patients nationwide sought to receive cutting-edge research and quality care that resulted in increased workload to the chemotherapy sterile preparation area.

Analysis and resolution

Dashboard development and implementation. The inpatient pharmacy chemotherapy sterile preparation area operates 24 hours a day, but at the onset of the case study, was staffed by 2 chemotherapy technician shifts (0600–1430; 1430–2300). In June 2016, the inpatient pharmacy sterile preparation area (general admixture and chemotherapy) went live with an electronic preparation software within the integrated health record to leverage barcode-scanning capabilities to improve the accuracy of sterile preparations and safety. Because this barcode-scanning software requires pharmacy personnel to scan all products, the time required to compound sterile preparations increased.

In February 2017, pharmacy staff expressed concerns to inpatient pharmacy management regarding the pharmacy sterile preparation workload

Equation 1.

$$\text{Productivity} = \frac{\text{Productive work hours}}{\text{17 hours budgeted total}} \quad \left[\begin{array}{l}\text{2 full-time equivalent}\\ \text{(chemotherapy technicians)}\\ *\text{2.32 nonproductive work hours}\end{array}\right]$$

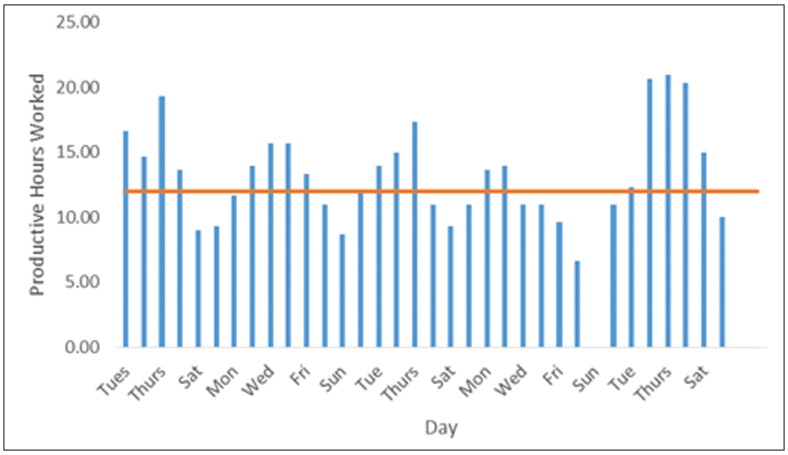
because of an increased demand in chemotherapy volume. This positive influx in workload resulted in missed/shortened breaks or lunches, frequent requests for overtime to meet the increased workload demand, patient safety incident reported because of delayed medication turnaround time, and turnover of i.v. chemotherapy technicians.

Inpatient pharmacy management developed the dashboard by defining productive and essential nonproductive work using the integrated health record and manual time stamps. Productive work included the average time it took a chemotherapy technician to prepare 1 chemotherapy. The average time to prepare 1 chemotherapy i.v. preparation was 20 minutes, which included the time when the technician first gathered his or her materials and ended when the product was compounded, labeled, and sent for checking by the pharmacist. Essential nonproductive work was validated using manual time stamp data for breaks/lunches (60 minutes), cleaning (20 minutes), restocking (20 minutes), break coverage (20 minutes), and miscellaneous tasks (e.g., quality assurance documentation to adhere to regulatory guidelines; 20 minutes).

Chemotherapy technician productivity was calculated using Equation 1.

At initial glance, workload appeared to be level-loaded when the data was averaged over 7 days. However, Saturday and Sunday had reduced workload and productivity compared to Monday through Friday (Figure 1). When Saturday and Sunday were omitted, it was apparent workload exceeded available labor resources Monday through Friday. Excluding the weekend volume, 1 chemotherapy technician performed on average at 106% productivity (range 67%–151%) and suggested current workload volume exceeded budgeted productive hours during the weekdays.

Figure 1. Chemotherapy technician workload (pre-intervention). Orange line (upper limit) indicates total productive hours budgeted for 2 chemotherapy i.v. technicians per day. Blue bar graph (daily workload) indicates the actual total productive hours needed for 2 chemotherapy i.v. technicians. Each day, 2 technicians are scheduled to mix chemotherapies and hazardous preparations. Total budgeted hours = 17; total budgeted productive hours = 12.36 hours; total budgeted nonproductive hours = 4.64 hours.



Figures 1 and 2 provide a visual summary of the chemotherapy technician workload (hours) and productivity (%) compared to budgeted labor resources.

An analysis of inpatient chemotherapy technician turnover was conducted to assess the outcome from the reported symptoms of burnout and job stress. From December 2016 to June 2017, 5 chemotherapy technicians requested to transition out of the health system or transferred to a different work area within the pharmacy enterprise. The turnover further exacerbated the situation by creating a work environment in which skilled chemotherapy workers would leave and new unskilled chemotherapy staff needed training. Because of this, medication turnaround times were delayed causing added stress to i.v. personnel and the individual workers being trained and increased patient safety incident reports related to medication turnaround time. Medication turnaround expectations are 2 hours for routine doses and 60 minutes for first and urgent doses. Recruitment and hiring of qualified chemotherapy technicians took significant time for our pharmacy technician operations manager. To fill vacant positions in a highly skilled work setting, recruitment efforts took an average of 40 days to fill, not including an average of 120 training days. Based on all these factors, pharmacy management needed to quickly validate perception of increased workload and gather objective data to share with senior leadership.

The i.v. chemotherapy workload and productivity dashboard validated staff-reported concerns, which confirmed there was an increase of nearly 400 sterile chemotherapy preparations per month during the period of June 2016 to January 2017. During this time frame, the increased workload was maintained with the same number of pharmacy technician labor resources. The data was presented to senior leadership to obtain approval for 1 FTE chemotherapy technician to support the increased workload observed during the weekday. The addition of the

Figure 2. Chemotherapy technician productivity (pre-intervention). Orange line (upper limit) indicates 1 chemotherapy i.v. technician performing at 100% productivity (factoring productive and essential nonproductive work). Blue bar graph (daily productivity performance) indicates productivity for 1 chemotherapy i.v. technician to complete the actual workload volume need to serve patients.

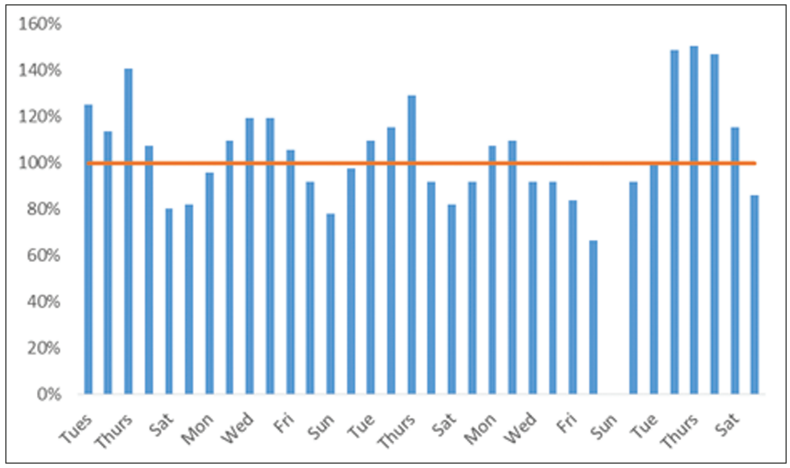
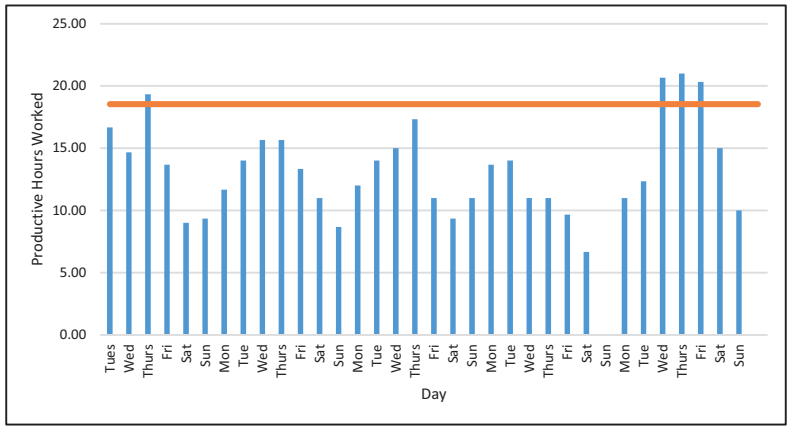


Figure 3. Chemotherapy technician workload (post-intervention). Orange line (upper limit) indicates total productive hours budgeted for 3 chemotherapy i.v. technicians per day. Blue bar graph (daily workload) indicates the actual total productive hours needed for 3 chemotherapy i.v. technicians. Each day, 3 technicians are scheduled to mix chemotherapies and hazardous preparations. Total budgeted hours = 25.5; total budgeted productive hours = 18.54 hours; total budgeted nonproductive hours = 6.96 hours.



new FTE resulted in 1 chemotherapy technician performing on average 84% productivity (range 65%–110%), which led to an observed improvement in technician symptoms of burnout and a notable decrease in the overall turnover rate to 1 i.v. chemotherapy technician assessed from July 2017 to January 2018. Figures 3 and 4 provide a visual of actual workload (hours) and productivity (%) compared to budgeted labor resource post-intervention.

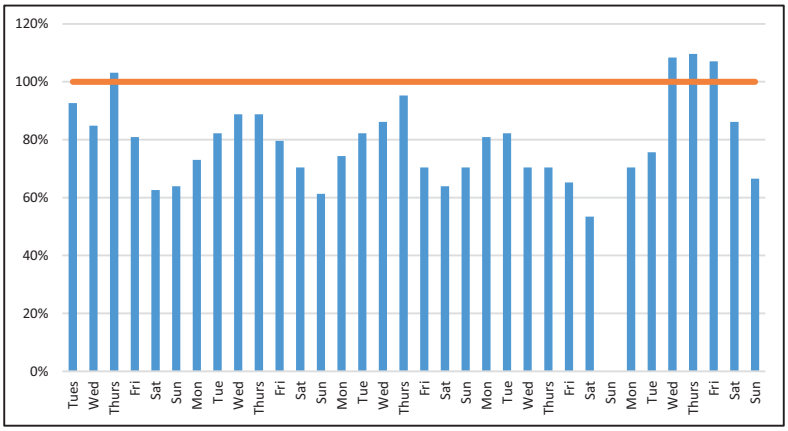
Discussion

Pharmacy operations managers often encounter feedback from staff regarding excessive workload. To mitigate symptoms of burnout and job stress resulting in technician turnover, managers must validate staff perception and deconstruct the sources of burnout. One approach to achieve this is by developing a workload and productivity dashboard that can be used to identify process improvement opportunities through lean principles, and/or request additional FTE after confirming work units consistently exceed current labor resources. In this study, the sources of the reported symptoms of burnout and job stress were due to increased workload and productivity stressors.

When employees consistently perform their duties with inadequate labor resource, stress is elevated. The stressors (e.g., increased workload and productivity) must be addressed by reducing them instead of trying to "outweigh" them by adding external rewards (e.g., verbal recognition, compensation).[4] The data provided by the i.v. chemotherapy workload and productivity dashboard justified the addition of a new 1.0 FTE chemotherapy technician worker to support the increased workload Monday through Friday.

Prior to the approval of the additional chemotherapy worker, total budgeted hours was limited to approximately 12 hours for 2 technicians to perform productive work (not to exceed 36 chemotherapy compounds per day). (Figure 1) Since the addition of the new 1.0 FTE support, the average productivity of 1 chemotherapy technician decreased to 84% (range 65%–110%), which led to the observed improvement in symptoms of burnout in the chemotherapy workload area. The i.v. chemotherapy workload and productivity dashboard now provides managers the ability to assess active and anticipated i.v. chemotherapy orders on a daily basis. This ability allows the opportunity to leverage a staffing-to-demand model to reallocate labor resource based on workload, when volume is less than the productivity threshold (e.g., when volume in the sterile chemotherapy preparation area is less than 36 preparations, the additional 1.0 FTE labor resource can be reallocated to support nonchemotherapy sterile preparations).[11] This ability has also

Figure 4. Chemotherapy productivity technician (post-intervention). Orange line (upper limit) indicates 1 chemotherapy i.v. technician performing at 100% productivity (factoring productive and essential nonproductive work). Blue bar graph (daily productivity performance) indicates productivity for 1 chemotherapy i.v. technician to complete the actual workload volume need to serve patients.



been helpful to support the increased compounding and batching efforts required to mitigate the long-standing, unprecedented national shortages of small volume i.v. fluids and opioid injectables during September 2017–October 2018.

As medication preparations and workflows continue to increase in complexity, workload and productivity monitoring will serve as a useful tool for pharmacy managers to measure work capacity, job stress, and staffing-to-demand models. When workload and productivity levels do not exceed capacity, the likelihood of employees expressing symptoms of burnout or job stress are reduced.[4] As pharmacy managers, it is imperative to address the external stressors (e.g., increased workload and productivity) that contribute to burnout and/or job stress and offer solutions to help pharmacy technicians manage the challenges of their job. It will be important for pharmacy leaders to monitor the well-being and resiliency of the pharmacy workforce.[12]

The symptoms of burnout and job stress resulted in turnover of 5 chemotherapy technicians during December 2016 to June 2017. Since the development and implementation of the i.v. chemotherapy workload and productivity dashboard, and the addition of the new 1.0 FTE chemotherapy worker, symptoms of burnout and job stress were favorably mitigated. Additionally, patient safety incidents related to nonadherence to medication turnaround-time expectations of i.v. chemotherapies reduced to zero. Chemotherapy technician turnover reduced to 1 post-intervention assessed from July 2017 to January 2018. The decrease in technician turnover supported a work environment where employees can meet medication turnaround-time expectations and allowed for the cross-training of current employees by experienced technicians to be competent in sterile chemotherapy preparations. The cost of turnover among registered nurses is estimated 1.2 to 1.3 times their salary.[12] An opportunity for future research would be to assess the cost of 1 pharmacy technician turnover to an organization and impact when reward factors (e.g., recognition, compensation) of burnout are intervened.

This case study was not without limitations; inherently, manual time stamp data is often inefficient or error prone and current information management systems do not capture essential nonproductive tasks.[13] The dashboard incorporated manual time stamp data that used an average amount of time (20 minutes) for completion. Because of this, the dashboard was only as accurate as the assumptions made during the development and validation process. The assumption was that all chemotherapy preparations take 20 minutes to prepare, but individual skillset and time to prepare may have been variable. Institutions interested in implementing a chemotherapy workload and productivity dashboard should conduct internal time stamp estimates to validate the average time it takes to prepare i.v. chemotherapies prior to implementing a dashboard, to factor in unique workflow and technologies used. For example, select oncology centers may use image capture technologies or barcode scanning during the preparation process, which increase the average time to complete a preparation. When change occurs within the system, such as workflow, technological advancement, or addition/removal of FTE, it is imperative pharmacy management reviews initial workload and productivity calculations. An area of future research should look to identify an upper limit of productivity to produce work that is safe and efficient while minimizing the amount of job stress for the pharmacy workforce.

Conclusion

The i.v. chemotherapy workload and productivity dashboard confirmed frontline staff perception and provided data to support the addition of labor resource and an opportunity to leverage a staffing-to-demand model to decrease symptoms of burnout, job stress, and technician turnover.

Disclosures

The authors have declared no potential conflicts of interest.

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