Impact of leadership walkarounds on operational, cultural and clinical outcomes: a systematic review

Meagan Foster 1, Bret Shultz MHA, Lukasz Mazur 2

INTRODUCTION

High-reliability organisations, highly complex and technology-intensive organisations, have long recognised the value of engaging staff in identifying and resolving safety issues. For example, leaders in manufacturing industries take unplanned and unannounced walks to observe employees firsthand and to check on the status of ongoing work or equipment while the work is performed. This method is referred to as management-by-walking-around (MBWA). Similar methods followed, such as ‘Gemba Walks’ developed at Toyota and popularised by Lean management programmes. In healthcare, patient safety leadership walkarounds (PSLWs) were introduced to increase clinicians’ awareness of safety hazards, demonstrate senior leaders’ engagement with safety and educate employees on patient safety concepts and active or impending safety hazards. PSLWs engage senior leaders and frontline healthcare workers in discussion on work area hazards, at the place where the hazards occur. In this review, focused on the healthcare industry, we refer to leadership walkarounds (LWs) as inclusive of these approaches and similar approaches such as executive walkarounds (EWRs), positive LWs and safety walkarounds.

Most hazards identified or spoken about during LWs can be described as ‘accidents waiting to happen’. LWs remove the ineffectual, layered and indirect communication flows that commonly exist between senior leaders and front-line workers. In conducting LWs, front-line workers are encouraged to openly share patient safety issues. As a result, senior leaders, who have the organisation-level insight and authority to make decisions and enforce change, are equipped to quickly respond to these issues. In theory, if effective, LWs can improve patient safety and organisational outcomes by promoting trust and shared accountability among leaders and front-line workers, empowering front-line workers to share their experiences and quickly addressing imminent hazards. Singer and Tucker analysed the literature on the association between PSLWs and outcomes. They found methodological limitations among studies that reported positive associations. Limitations include a lack of control groups or objective performance measures to evaluate the effectiveness of PSLW programmes. Overall, many studies confirm that LWs are generally effective in informing leaders on safety issues impacting front-line staff and patients, and several case studies have offered insight into implementation factors associated with successfully conducting LWs. Other studies on LWs collectively establish patterns regarding the most or least common type of issues found. Leadership perspectives of LWs and leadership engagement styles have also been studied. However, to date, no studies have specifically evaluated the impact of LWs on operational/cultural and clinical outcomes. Therefore, this review aims to provide this knowledge.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Leadership walkarounds (LWs) have been promoted in practice as means to drive operational, cultural and safety outcomes. However, to date, no studies have specifically evaluated the impact of LWs on these outcomes in healthcare industry.

WHAT THIS STUDY ADDS

⇒ Our systematic review found only positive association of LWs with operational and perception of cultural outcomes.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ More evidence is needed to establish the positive association between LWs and clinical outcomes and affect policy and practice.

To cite: Foster M, MHA BS, Mazur L. Impact of leadership walkarounds on operational, cultural and clinical outcomes: a systematic review. BMJ Open Quality 2023;12:e002284. doi:10.1136/bmjoq-2023-002284

Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjoq-2023-002284).

Received 27 January 2023
Accepted 26 September 2023

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METHODS
Eligibility criteria
Included studies explicitly denoted the act of engaging leadership teams and front-line employees at the actual site where patient safety events occur. Studies were included if they provided formal quantitative data or qualitative data regarding operational/cultural and clinical outcomes at the organisation, service line, department or unit level. Studies were excluded if they did not explicitly denote front-line workers, senior leaders, executives, vice presidents, directors, managers or informal front-line leaders as LWs attendees. Studies with less than a 3-month follow-up period were excluded.

Only English studies were assessed. Book chapters, literature reviews and studies where full text could not be accessed (such as conference abstracts) were excluded. Studies were excluded if more than one intervention were being used and the influence of LWs on patient safety and outcomes could not be unilaterally extracted.

Information sources
Search strategy
We searched PubMed, CINAHL (Current Index of Nursing and Allied Health Literature), Scopus, Web of Science, Embase and the Healthcare Administration Database for studies published from 2000 to the present date. Studies in languages other than English were excluded from the search. The following search terms were included: (“leaders” OR “executives” OR “managers” OR “managers”) AND (“staff” OR “employees” OR “frontline” OR “front-line”) AND (“walks” OR “visits” OR “Gemba” OR “walkarounds” OR “walkaround” OR “walkabout” OR “safety rounds” OR “ward rounds” OR “interdisciplinary rounds” OR “multidisciplinary rounds” OR “management by walking around” OR “management by wandering around”). Keywords and phrases were mapped to Medical Subject Headings for each database and included. The search query used in the PubMed database is shown in table 1 (see online supplemental appendix A for other database search queries). Returned search results were screened for duplicates.

Data collection process
Two authors (MF and BS) independently screened titles and abstracts. Studies that did not meet the inclusion criteria were excluded. Studies remained in a queue for full-text review if the title and abstract did not provide enough information to determine eligibility. Full-text reviews were conducted independently by each author who provided a determination on the eligibility of each article. The two authors reviewed the final list of studies to confirm which studies should remain in the review. When discrepancies occurred, a third reviewer (LM) made the final decision.

Data extraction and analysis of included studies
Table 2 shows the extracted data variables and classification by category, variable and classification method.

Quality assessment
We used the Newcastle-Ottawa Quality Scale (NOS) to assess the quality of each study. The NOS is designed to evaluate non-randomised studies, including case-control and cohort studies, and assess studies based on the selection of the study groups, the comparability of the groups, and the method of exposure or outcome of interest. The NOS is the most frequently used tool for assessing the quality of non-randomised control trials and is the most used tool when a single risk-of-bias tool is needed to perform a standard assessment across varying study designs. Studies with an NOS score of less than 5 were excluded. Studies that omitted evidence for the NOS subscales, specifically assessing the representativeness of...
the exposed cohort or assessment of outcome, were also excluded from the study. Studies that met ≥7 subscales (out of 8) were considered high quality and studies that met ≥5 subscales were considered moderate quality. Two researchers (MF and LM) independently evaluated the studies and assigned NOS scores, followed by a discussion to arrive at consensus for any discrepancies.

DATA SYNTHESIS
Study characteristics

Of the 1457 studies identified, 497 duplicates were removed, and 960 studies remained for screening. Twelve studies met the inclusion criteria after the full-text review (figure 1). Included studies were published from 2005 to 2018. 83% of studies (n=10) were conducted in the USA.15 19 20 22 26–32 Other studies were conducted in Singapore20 and Nigeria.33 Fifty per cent (n=6) are case reports,19 20 22 26 27 34 33% (n=4) are cross-sectional survey studies28–30 and 17% (n=2) were randomised control trials.31 32 Fifty per cent (n=6) of studies specified the department or unit where the study was conducted including inpatient units,26 intensive or critical care units,26 27 32 paediatric emergency department28 32 or multiple departments.20 29 31 32 Length of exposure was reported in 75% (n=9) of studies ranging from 3 months to 84 months.19 20 22 26 27 30–32 34 Fifty per cent (n=6) of studies reported the frequency with which LWs were conducted which ranged from biweekly to monthly.19 20 22 27 30 31 Twenty-five per cent of studies (n=3) reported the number of LWs completed,19 20 31 which ranged from 18 to 105. Eighty-three per cent (n=10) studies reported the sample size of LW attendees19 20 22 27 31 33 which ranged from 81 to 19 053.34 Fifty per cent of studies (n=6) used subjective measures including the use of validated tools such as the Safety Attitudes Questionnaire (SAQ).20 27 29 34 the Safety Climate Survey31 and the People Pulse Survey.19 LWs frameworks used included MBWA (16%),32 PSLW (33%)11 19 20 22 and executive or LWs (50%).26–31

Outcomes
One study provided evidence on clinical outcomes26 and 11 (92%) of studies provided evidence on operational

Table 2 Data extraction variables and classification methods

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Classification method</th>
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<tbody>
<tr>
<td>Study attributes</td>
<td>Year</td>
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<tr>
<td></td>
<td>Country</td>
<td>Metadata</td>
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<td></td>
<td>Study aim</td>
<td>Manual</td>
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<td></td>
<td>Study design</td>
<td>Manual</td>
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<td></td>
<td>Setting (department or unit)</td>
<td>Manual</td>
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<td></td>
<td>Measures</td>
<td>Manual</td>
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<td></td>
<td>Length of exposure (in months)</td>
<td>Manual, numeric</td>
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<td></td>
<td>Frequency</td>
<td>Manual</td>
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<td></td>
<td>No of rounds completed</td>
<td>Manual, numeric</td>
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<td></td>
<td>Sample size</td>
<td>Manual</td>
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<td></td>
<td>Validated or non-validated instruments</td>
<td>Binary; yes or no</td>
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<td></td>
<td>Intervention description and framework</td>
<td>Manual</td>
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<tr>
<td>Outcomes</td>
<td>Operational/cultural outcomes, clinical outcomes</td>
<td>Manual</td>
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<tr>
<td></td>
<td>Outcomes summary</td>
<td>Manual</td>
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<td></td>
<td>Evidence of improvement</td>
<td>Manual</td>
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Fifty-eight per cent of the studies reporting operational outcomes examine cultural outcomes like the safety attitudes or safety climate. Please see figure 2 for a longitudinal summary of evidence by outcome type. Table 3 offers a description of the outcomes.

Operational/cultural outcomes

Thomas et al conducted a randomised control trial measuring the impact of LWs on provider attitudes regarding patient safety. LWs were conducted monthly over 3 months in multiple departments and units such as radiology, pharmacy, respiratory therapy, physical therapy and occupational therapy. Using an adapted safety climate survey from the aviation industry, the authors found that nurses in the control group who did not participate in LWs (n=198) had lower safety climate scores than nurses in the intervention group who did participate in an LWs session (n=85). Compared with nurses who did not participate, nurses in the experimental group who reported participating in LWs also responded more favourably to majority of items on the survey.

Feitelberg assessed the effectiveness of the LWs programme on improvements in patient safety, the impact on safety culture and staff perceptions of the LW programme. The study was conducted for 15 months during which 105 LWs were conducted, the highest number of rounds reported among the studies included in this review. Using the People Pulse Survey, the authors showed an increase in perceived effort among team members in departments or units reporting to ensure safety. This result ranked in the top 30% for teamwork. Most (86%) executives reported that they had taken actions as a result of feedback received on the LWs.

Shaw et al conducted a 9-month cross-sectional study to describe the creation, implementation and evaluation of a unit-based LW programme. Authors reported that the number of medication-related ‘near-miss’ incident reports during this period increased by 44% compared with the 24 months before beginning this programme.

Zimmerman et al evaluated the process of conducting LWs for 12 months where 1351 patient safety issues were identified, of which 64%-80% have been resolved or have active improvement work in progress. A total of 500 staff were invited to complete a process evaluation regarding the effectiveness of the current process of LWs. A total of 341 surveys were returned (68%). Ninety-three per cent survey respondents agreed that LWs enhanced their awareness of patient safety hazards, and felt comfortable openly and honestly discussing issues, 91% of leaders felt comfortable leading LWs, and 70% of LW participants felt heard.

Frankel et al conducted an 18-month case study in two hospitals and reported mixed results regarding safety attitudes among LW participants. SAQ administrations with a 50% or higher response rate were completed in 9 of 20 patient care areas in hospital A, and 12 of 24 patient care areas in hospital B; 21 units in total with ample response rates. In the 21 patient care areas, surveys were received from 790 of 1265 (62%) at baseline, and 741 of 1256 (60%) post-LWs. Perceptions of safety attitudes among registered nurses improved from 57% to 70% post-LWs, while nurse managers and charge nurses decreased from 85% to 75% post-LWs. Overall, study participants reported improvements in learning from LWs, colleague-to-colleague encouragement to share concerns, and an understanding of how to report patient safety issues as a result of LWs. The safety attitudes across all studied clinical areas increased from 0% to 76% pre-LWs to 32% to 83% post-LWs.

Saladino et al reported no statistical difference between pre-LWs and post-LWs SAQ subscale scores after conducting nursing-led LWs over a 24-month period in a...
Table 3  Summary of outcomes

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
<th>Outcome type</th>
<th>Outcomes summary</th>
<th>Evidence of improvement</th>
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</thead>
<tbody>
<tr>
<td>Thomas(^{31})</td>
<td>2005</td>
<td>Organisational or cultural</td>
<td>Nurses in the control group reported lower safety climate scores compared with nurses who participated in LWs. Nurses who participated responded more favourably to most items in the safety climate survey.</td>
<td>Results showed a statistically significant difference in safety climate scores among nurses in the control group who did not participate in LWs (n=198) and nurses in the intervention group who did participate in LWs session (n=85) (74.88 vs 81.01, p=0.02). Nurses who participated in LWs responding favourably 72.9% of the safety climate questionnaire items compared with 52.5% among nurses who did not participate.</td>
</tr>
<tr>
<td>Feitelberg(^{19})</td>
<td>2006</td>
<td>Organisational or cultural</td>
<td>LW participants reported improvements in the following areas: the perception of effort to ensure safety among department/unit teams, understanding of the LW programme and improvement initiatives, and patient safety awareness, and teamwork climate.</td>
<td>Results showed a 5% increase in overall perceptions of effort to ensure safety among department/unit teams. The high response for the survey revealed a meaningful increase among physicians (9%) in positive responses to the survey post-LW implementation. Front-line staff reported favourably to having a better understanding of patient safety and the safety programme aid indicated that reporting had increased since LW implementation at rates of 85% and 76% respectively. Unit managers reported having conversations with staff and clinicians regarding LWs (91%) and those changes had been made as a result of being identified during LWs (73%). 100% of executives considered LWs valuable and 86% reported taken action as a result of the LWs.</td>
</tr>
<tr>
<td>Shaw(^{30})</td>
<td>2006</td>
<td>Organisational or cultural</td>
<td>The no of ‘near-misses’ reported increased during the study period.</td>
<td>Results showed a 44% increase reporting near-misses in the second and third quarter of the fiscal year compared with the rate of reporting prior to implementation (1.14 per 1000 patients and 0.86 per 1000 patients vs 0.53 per 1000 patients vs).</td>
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<td>Zimmerman(^{22})</td>
<td>2008</td>
<td>Organisational or cultural</td>
<td>Favourable responses were reported regarding enhanced awareness of safety hazards, comfort with openly and honestly discussing issues during LWs, and feeling heard. Majority of leaders reported feeling comfortable leading discussions during LWs.</td>
<td>Results showed 93% of survey participants agreed LWs enhanced their awareness of patient safety hazards. 93% of survey participants reported feeling comfortable open and honestly discussing issues, and 70% felt heard. 91% of leaders felt comfortable leading LWs.</td>
</tr>
<tr>
<td>Frankel(^{15})</td>
<td>2008</td>
<td>Organisational or cultural</td>
<td>Safety climate scale scores increased after the implementation of LWs.</td>
<td>Safety climate scale scores increased post-LWs compared with baseline at both participating hospitals (62% vs 77%, t2.67, p=0.03 and 46% vs 56%, t2.06, p=0.06).</td>
</tr>
<tr>
<td>Saladino(^{27})</td>
<td>2013</td>
<td>Organisational or cultural</td>
<td>No statistical difference between pre-LWs and post-LWs SAQ subscale scores was found. However, the data showed a slight increase in the average score for stress recognition and decreased scores for the other SAQ subscales.</td>
<td>Statistical analysis using the Mann-Whitney U revealed no statistically significant differences pre-post LW implementation.</td>
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<tr>
<td>Schwendimann(^{28})</td>
<td>2013</td>
<td>Organisational or cultural</td>
<td>Majority of units reported a positive safety climate. However, few units reported reductions in patient safety risk reduction or to receiving feedback about actions taken as a result of LWs. Positive safety climate ratings, perceived safety risk reduction, and feedback on actions taken as a result of LWs revealed statistically significant associations with LW exposure.</td>
<td>Using the SAQ, results showed that 59% of the 706 clinical and non-clinical units surveyed rated the safety climate as positive (≥60%), 5.8% of units reported patient safety risk reduction at a rate of 60% or more as result of LWs exposure. 4.8% of units reported favourably (≥60%) to receiving feedback about actions taken as a result of LWs. Multilevel regression analysis testing showed statistically significant differences were found between unit exposure and safety climate (variance 55.02; 95% CI 29.14 to 103.91). Exposure to LWs were positively associated with perceived safety risk reduction (variance 38.58; 95% CI 21.36 to 69.67) and feedback on actions taken as a result of LWs (variance 24.26; 95% CI 12.21 to 48.18).</td>
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Continued
22 bedded critical care unit with 81 staff members. The results of the SAQ showed a slight increase in the average score for stress recognition, while all other SAQ subscale scores decrease. Staff also identified 77 safety issues during LWs and 57% were resolved during the study period.27

Schwendimann et al conducted a 24-month cross-sectional study across 49 hospitals of a non-profit US healthcare system to evaluate the association between LWs and caregiver assessments regarding patient safety climate, patient safety risk reduction and feedback from LWs.26 Using the SAQ, the authors reported 59% of the 706 participating clinical and non-clinical units surveyed rated the safety climate as positive (≥60%). 5.8% of units reported a rate of ≥60% for patient safety risk reduction as a result of LWs exposure and 4.8% of units reported favourably (≥60%) to receiving feedback about actions taken as a result of LWs. Statistical significant differences were found between unit exposure and safety climate. Exposure to LWs were positively associated with perceived safety risk reduction and feedback on actions taken as a result of LWs.

Lim et al evaluated a programme that conducted 70 LW rounds over a period of 7 years with 324 participants.20 They use the SAQ to evaluate the effectiveness of LWs on patient safety culture. 94.8% of the participants reported an increased awareness in patient safety and 90.2% expressed comfort in openly and honestly discussing patient safety issues. Among the various categories of

<table>
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</tr>
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<tbody>
<tr>
<td>Lim20</td>
<td>2014</td>
<td>Organisational or cultural</td>
<td>Increased awareness of patient safety and comfort in openly and honestly discussing issues during LWs were reported at high rates. Work environment related issues were the most common type of issues raised and majority of issues across all issue types had not be identified through other error detection methods.</td>
<td>94.8% of respondents report increased awareness of safety culture. 90.2% expressed comfort in openly and honestly discussing patient safety issues. 45.2% of the issues raised were related to work environment. 72.9% of issues were not identified through alternative methods of error detection.</td>
</tr>
<tr>
<td>Tucker32</td>
<td>2014</td>
<td>Organisational or cultural</td>
<td>Increased perception of improvement in performance (PIP) was reported in units that participated in LWs. No significant association was found between resolving a higher percentage of high-impact hazards and safety-related improvements.</td>
<td>Results showed a 21% increase in PIP in units that participated in LWs. Resolving a higher percentage of high-impact hazards did not produce significant safety-related improvements compared with areas that resolved a smaller percentage of high-impact hazards.</td>
</tr>
<tr>
<td>Purvis26</td>
<td>2017</td>
<td>Patient</td>
<td>The no of CAUTIs decreased during the study period. Decreases in CAUTI rate per 1000 indwelling catheter-days and urinary catheter utilisation (catheter-days/patient-days) were shown.</td>
<td>Results showed a 65% decline in the no of CAUTI (2014=86, 2015=30) and a decline in CAUTI rate per 1000 in-dwelling catheter-days (2014=3.1, 2015=1.4). Current National Healthcare Safety Network definitions of CAUTI were used. In addition, urinary catheter utilisation (catheter-days/patient-days) likewise declined (2014=0.18, 2015=0.13). A measure reflecting performance against other institutions using the identical surveillance definitions, declined significantly from 1.62 in 2014 to 0.53 in 2015 (p=0.0074).</td>
</tr>
<tr>
<td>Sexton29</td>
<td>2018</td>
<td>Organisational or cultural</td>
<td>A strong association was found between receiving feedback after LWs and safety culture, staff participation in decision-making, improvement readiness, local leadership, and lower burnout. Safety attitudes improved post-LWs.</td>
<td>5497 (32.7% of total) reported that they had participated in LWs, and 4074 (24.3%) reported that they participated in LWs with feedback. Work settings reporting more LWs with feedback had substantially higher safety culture domain scores (first vs fourth quartile Cohen’s d range: 0.34–0.84; % increase range: 15–27) and significantly higher engagement scores for four of its six domains (first vs fourth quartile Cohen’s d range: 0.02–0.76; % increase range: 0.48–0.70).</td>
</tr>
<tr>
<td>Ugochukwu33</td>
<td>2018</td>
<td>Organisational or cultural</td>
<td>LWs have a positive effect on the provision of staff, particularly as managers offer advice and guidance immediately. LWs showed a positive effect on employees’ attitudes regarding their work.</td>
<td>The result showed that there is a positive effect of LWs on customer care (f(n=378)= 4332.659, p&lt;0.05); and on skill learning targets (f(n=378)= 9916.271, p&lt;0.05).</td>
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CAUTI, catheter-associated urinary tract infection; LWs, leadership walkarounds; SAQ, Safety Attitudes Questionnaire.
issues raised, issues related to work environment were the most common (45.2%). Of all the issues raised during the LWs, 72.9% were not identified through other conventional methods of error detection.

Tucker et al conducted an 18-month randomised control trial to examine the impact of problem-solving approaches on organisational performance. Perception of improvements in performance (PIP) was quantified using four questions from validated survey instruments designed to measure the effectiveness of quality improvement efforts. The results of regression analysis suggest a negative association with LWs implementation and performance (−0.17, p<0.05) which they attribute to failures to implement recommended activities in work areas. They found that prioritising hazards that are easy to solve appeared to increase perceived safety-related performance. Conversely, this study found that resolving a higher percentage of high-impact hazards did not produce significant safety-related improvements compared with areas that resolved a smaller percentage of high-impact hazards. This study also reported a 21% increase in the PIP in units that participated in LWs when compared with similar work units in control hospitals. No statistical tests were reported to assess the significance of the postintervention results.

Sexton used the SAQ in a cross-sectional study involving 829 work settings to evaluate the impact of providing feedback after LWs on safety attitudes. A total of 16797 of 23853 administered surveys were returned (70.4%). A total of 5497 (32.7% of total) reported that they had participated in LWs, and 4074 (24.3%) reported that they participated in LWs with feedback. Work settings reporting more LWs with feedback had substantially higher safety culture domain scores and significantly higher engagement scores for teamwork, safety, leadership, growth opportunities, participation in decision-making and the emotional exhaustion component of burn-out. The survey responses were representative of staff, nurses and physicians.

Ugochukwu et al conducted a cross-sectional study over 60 months in a public teaching hospital to evaluate the impact of LWs on customer care and achieve skills learning targets. Using the SAQ administered to 378 staff members (with 95% response rate; 360 completed surveys), they found that LWs have a positive effect on employees’ attitudes regarding their work and are useful in assessing the competency and capabilities of individual staff. They reported a 95% increase in patient safety awareness following the implementation of LWs. They also reported that 99% of participants felt senior leaders took their feedback seriously during the LWs.

Clinical outcomes

Only one study (8%) evaluated clinical outcomes. Purvis et al evaluated the impact of LWs on catheter-associated urinary tract infections (CAUTI) risk in inpatient units, including intensive care units (ICUs). They reported a 65% decline in the number of CAUTI, as well as declines in dwelling catheter-days and urinary catheter utilisation in both general and intermediate care locations and in ICUs which commonly struggle with this CAUTI.

Quality assessment

Based on the NOS results, 33% of studies (n=4) were identified as high quality, and 67% moderate quality (n=8). Please refer to online supplemental appendix B for the summary of the NOS assessment.

DISCUSSION

Interpretation of results and implications for practice and policy changes

Fundamentally, LWs show to help staff, nurses and physicians feel psychologically safer to report, discuss and learn from errors. Our analysis suggests that longer exposure to LWs combined with feedback mechanisms appears to be associated with a more definitive and positive impact of LWs on operational and cultural outcomes. The manifestation of such positive association could be viewed as an early warning system of potential system latent failures.

There were a few mechanisms that seem important for successful LWs. First, successful LWs were well organised and coordinated creating a feeling of an organisational programme and not ad hoc leadership visits. Second, leaders used a form of humble inquiry to spearhead conversations and provide feedback to staff, nurses and physicians. Third, LWs promoted the vision of culture of patient safety where no-blame culture and learning from errors were valued and supported. Practically speaking, when conducted ‘optimally’ LWs seems quite effective in the areas with lower perception of culture of patient safety as these areas were already subjected to more scepticism that organisational leaders truly stand behind patient safety efforts. More research is needed to identify effective methods for identifying units with lower perception of culture of patient safety and contextually interpret the results. There is still lack of clear evidence on when LWs are perhaps the best choice to improve the culture of patient safety. One possible explanation could be drawn based on the organisational maturity with their quality and patient safety philosophies and programmes. For example, organisations with leaders that are experienced with specific methods and tools (eg, Just Culture, Lean), as means to engage with local teams, can appear more cohesive and effective in their LWs. In such case, LWs seems like a great tool to drive organisational change towards culture of patient safety. On the contrary, if organisations and leaders are less familiar with improvement-based philosophies and programmes, a more centralised and leaders are less familiar with improvement-based philosophies and programmes, a more centralised
clinical outcomes that could affect organisational policies. This systematic review also denotes that more rigorous evidence is needed to understand the implementation characteristics (eg, frequency, dosage, intervention strategy) association between LWs and clinical outcomes.

LIMITATIONS
Data were derived from studies with assorted study designs such as case reports (n=6), cross-sectional studies and randomised control trials and assessment instruments (eg, safety climate questionnaire, safety attitudes questionnaire and other tools). This made it challenging to establish a progression on the evidence of the effectiveness of LWs on operational/cultural and clinical outcomes. Additionally, this review focused only on aggregated published data from peer-reviewed literature and did not consider non-peer-reviewed data sources; the exclusion of unpublished and grey literature might have introduced selection bias to this analysis.

Limitations to the generalisability of our findings include small sample sizes, and low participation rates among non-nursing groups, and night shift workers. Key implementation factors, such as preparation steps, materials used and feedback processes, are inconsistently described or omitted. Demographic characteristics of study participants, such as race, age, gender and sexual orientation are minimally discussed or omitted. Thus, our findings may underemphasise important nuances affecting individuals from minority or marginalised populations who often struggle to achieve psychological safety in their work environments.

CONCLUSION
This systematic review offers the current evidence on the effectiveness of LWs in driving operational/cultural and clinical outcomes. Overall, evidence exists to suggest a positive association of LWs on operational and cultural outcomes. More evidence is needed to establish the positive association between LWs and clinical outcomes. Our analysis also suggests that longer exposure to LWs combined with feedback mechanisms appear to be associated with a more definitive and positive impact of LWs on operational and cultural outcomes. This systematic review denotes that more rigorous evidence is needed to understand the implementation characteristics (eg, frequency, dosage, intervention strategy) association between LWs and clinical outcomes.

Contributors MF helped with conceptualisation, formal analysis, methodology, writing the original draft, review and editing. BS helped with study conceptualization and formal analysis. LM provided overall supervision for conceptualisation, formal analysis, methodology and writing, reviewing and editing of the manuscript. LM can serve a role as a guarantor.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Ethical approval was not required for this review.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The data that support the findings of this study are available on request from the corresponding author, [LM].

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REFERENCES


