

Using a Mixed Method Approach to Tailor the Implementation of a Participatory Total Worker Health® Program in Public Healthcare Facilities

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Abstract

Background: The Total Worker Health program represents a holistic approach to advancing worker well-being that combines occupational safety and health practices with other workplace policies and programs that are not traditionally linked. Total Worker Health requires new types of interdisciplinary collaboration and programmatic coordination. Pre-implementation assessment is thus important to plan for successful organizational “fit” when the program is introduced. This study prospectively identified potential implementation facilitators and barriers among five public healthcare facilities that had already agreed to participate in a study to implement and evaluate the Healthy Workplace Participatory Program.

Methods: A mixed methods baseline assessment comprised an online survey and follow-up interviews. Key organizational and labor leaders were asked to identify resources and skills available for successful program implementation; potential barriers inside or outside the organization; and key performance indicators. Findings were presented to implementation stakeholders in study sites and used for planning how to tailor implementation to fit the organizational context and to provide the resources needed for success.

Results: Potential facilitators included leaders’ willingness and commitment to develop interventions addressing a broad range of occupational safety and well-being health priorities (consistent with Total Worker Health); existing staff expertise in occupational safety and health; favorable attitudes regarding expected program outcomes; and positive alignment between the program and organizational mission and values. Potential implementation barriers included limited staff time to attend meetings, limited resources to support locally designed interventions, and poor management communication systems. Examples of tailoring strategies included extending time and effort to recruit leaders and workers while gaining their trust and securing program resources; developing sample program communication templates to strength health and safety communication efforts; and providing detailed training around issue selection procedures, communication, local intervention development, and change management.

Conclusions: The prospective identification of potential facilitators and barriers represents a useful strategy for tailoring the implementation of a participatory, Total Worker Health program.

Trial Registration: ClinicalTrials.gov NCT 04251429. Registered January 31, 2020 – Retrospectively registered. <https://clinicaltrials.gov/ct2/show/record/NCT04251429>.

Contributions To The Literature

- This paper addresses a gap in implementation research related to measuring and responding to facilitators and barriers before an intervention is implemented.
- Participants are organizations, not individuals, so facilitators and barriers must be assessed at an organizational level, necessitating multiple sources with potentially differing perspectives.

- We provide examples of how to tailor a participatory Total Worker Health intervention using a baseline formative assessment to leverage facilitators and overcome barriers during program implementation.
- The results add to the intervention research literature about facilitating the introduction of Total Worker Health programs in the workplace.

Background

Occupational health and safety practice in the United States has been undergoing a paradigm shift to meet the challenges of rapidly evolving changes in the nature of working conditions such as more contingent work, expansion of the services sector, increasing numbers of older workers, low-wage workers, and workers with chronic conditions (1). In the United States, six in ten adults have at least one chronic health condition, and four in ten adults have multiple chronic health conditions (2). Within the U.S. workforce, more than one-third of adults have at least one chronic health condition, including diabetes, asthma, or depression (3), and the labor force participation rate for workers 65-years-and-older has consistently increased since 1996 (4). These trends have necessitated expanding traditional occupational safety and health focus to include more attention to workplace psychosocial stressors, and to consider the impact of the organization of work on health conditions such as cardiovascular disease, anxiety and depression, and obesity that previously were thought to be unrelated to working conditions (5). To respond to these challenges, the National Institute for Occupational Safety and Health (NIOSH) began promoting a comprehensive, interdisciplinary approach called the Total Worker Health® (TWH) program (6, 7).

TWH promotes the integration of policies, programs, and practices of occupational safety and health (OSH) with other efforts to advance worker well-being (7, 8). Core indicators of integrated programs that follow a TWH approach include the coordination and interaction of OSH with other workplace activities to advance worker well-being; assessment of both work and non-work hazards that affect employees; emphasis on mitigating workplace contributors to poor health, safety and wellbeing; and meaningful involvement of workers throughout the intervention development process (5). The integration of OSH with other workforce health activities calls for systematic linkages among multiple organizational units to advance workers' well-being (9).

The comprehensive nature of TWH programs necessarily make the intervention development and implementation an organizational effort, requiring multiple actors from different work units and different levels of the organizational hierarchy to communicate, conduct planning, make decisions, and provide support for meaningful front-line worker involvement. Furthermore, TWH workplace interventions often call for multi-level change strategies, targeting individual workers, work groups, the physical and psychosocial work environment, and organizational-level policies, decisions and structures (10, 11). Taken together, TWH workplace programs require a range of competencies in site leadership, communication, technical OSH expertise, and worker participation to be successful (12). Therefore, screening for these competencies aids in identifying gaps that can be addressed to support program

implementation. The challenges and complexity of organizational interventions have been documented (13-16).

Implementation science highlights the importance of assessing the fit of an intervention to the local context and needs, and to the skills, competencies, and mental models of the target audience (17-19). Contextual fit is especially relevant for organization level interventions that require involvement of multiple actors and new organizational processes to support front line worker engagement. Conducting a baseline assessment of the organizational context and implementation stakeholders' attitudes would inform the implementation process by leveraging conditions that are conducive and overcoming barriers (10, 20). Tailoring an intervention represents a plan to adapt the intervention to a specific situation, such as the study setting, and can take place at multiple stages of the research spectrum (21). A good intervention fit promotes intervention adoption (22, 23), targets priority issues perceived by organizational members (18), and fosters a feeling of ownership among the intended participants (22, 24).

There has been little attention in the literature to the assessment of intervention fit or potential facilitators and barriers of implementation *prior* to the start of participatory workforce health interventions (19, 22). TWH intervention research has retrospectively identified facilitators to program implementation such as perceived program feasibility (25), employee engagement (25, 26), and building dedicated roles such as on-site champions (26). Similarly, retrospective evaluations reported barriers to participatory TWH interventions including staffing issues (25), difficulty to secure time for intervention activities (26), lack of communication (26), hierarchical decision-making structure (26), and struggle to sustain leadership support (27, 28). However, it is unclear how readily these obstacles could be observed *prior* to engaging the workplaces in the intervention process.

TWH is a relatively young practice approach in the OSH field, and is not yet widely adopted (6, 9, 29). While a participatory approach in TWH research has promising benefits (30, 31), implementation guidance and tools are few and research on the process is sparse. The Center for the Promotion of Health in the New England Workplace previously developed the Healthy Workplace Participatory Program (HWPP) to provide tools and instructions to guide employers and occupational health professionals interested in implementing a participatory TWH program (32). In this paper, we present a method for tailoring HWPP program implementation based on baseline organizational assessment of implementation facilitators and barriers conducted with organizational and worker leaders in five public healthcare facilities who had previously agreed to participate in a research study to implement and evaluate the HWPP. We report on the process we used to conduct a baseline assessment, present the results to key implementers, and align resources that support the implementation of the HWPP. Advance assessment of workforce safety and well-being concerns and organizational features can provide useful diagnostic data to address strengths and weaknesses before or during a participatory program. We anticipate that this strategy will promote effective organizational communication and other aspects of organizational readiness that are vital for HWPP implementation success.

Methods

2.1. Program implementation context

The protocol for the “Safety and Health through Integrated Facilitated Teams” (SHIFT) study has been described (33). The HWPP engages front-line employees in the development of locally generated TWH interventions; the program structure promotes a sustainable engagement process for continuous improvement of worker well-being. The core components are a two-committee structure and a step-by-step design process (the IDEAS Toolkit) to select and analyze problems and generate and evaluate potential solutions (34, 35). The two-committee structure comprises a Design Team (DT), which in SHIFT is composed of equal numbers of front-line employees and mid-level managers, and a Steering Committee (SC), which is the facility’s senior management team. Two co-facilitators are trained to lead the DT, one front-line and one managerial, and a champion is identified within the SC to oversee and support the HWPP implementation.

2.1. Study population and sample

This study involved five public health care facilities in the New England region that agreed to implement a participatory TWH program. Two provide in-patient behavioral health care to civilian patients; two provide long-term and assistive living services to veterans; and one provides long-term and in- and out-patient medical care to veterans. The facilities ranged in size from small to large in workforce and patient capacity (Table 1). The majority of the workforce at each one comprises direct patient caregivers, either nursing assistants at the veteran care facilities or mental health workers at the behavioral health care facilities.

2.2. Data Collection

The participants in this study were key stakeholders from each of the five participating facilities, including executive and mid-level managers, clinical care leaders, union leaders, and selected members of the facility’s safety and health or Environment of Care committee. Participants were recruited based on their knowledge of the facility’s occupational health activities and needs, and their strategic importance as prospective HWPP DT and SC members. Invitations were sent to each individual for the survey and the interview separately.

2.2.1. Survey of Organizational Readiness

Questionnaires were administered using Qualtrics (36) to assess opinions about the organization’s resources, management engagement, and ability to commit time necessary for a participatory program. This Organizational Readiness Tool (ORT) (37) includes 51 questions in eight domains (Table 2). The first section includes programmatic questions, and the remaining seven sections use a four-point Likert scale ranging from strongly disagree to strongly agree. The ORT took respondents approximately 10-15 minutes to complete.

2.2.2. Key Leader Interviews

Qualitative data were collected from in-person interviews with the same key facility personnel that participated in the ORT, to the extent possible. A semi-structured script invited participants to share their perceptions about priority employee safety and health issues; the performance, strengths and challenges of the existing safety and health or Environment of Care committee; and their expectations of the HWPP including anticipated outcomes, potential implementation barriers, and alignment between program goals and their facility's mission. The interviews were recorded with the consent of the participant, and a research assistant took detailed notes. Interviews were completed in 30 to 45 minutes. Following each interview, the interview notes were merged with details from the audio recording and this document served as the transcript to be coded.

2.3. Data analysis

2.3.1. ORT survey analysis

Descriptive statistics were generated for the quantitative organizational readiness data. For each facility, mean scores for each domain were computed by averaging the scores of all items within the domain. Analysis of variance (ANOVA) was conducted to explore significant differences in mean domain scores among facilities. All analyses were executed using SPSS version 25.0 (38). The research team also inspected the results to identify high-scoring (facilitator) and low-scoring (barrier) domains along with specific individual items that were observed to be highly skewed.

2.3.2. Interview data analysis

Interview transcripts were imported into NVivo version 12 for analysis (39). Structured themes defined in the interview served as the primary nodes in the node structure. Secondary nodes representing specific subthemes of the primary nodes were established after reading interview notes. Qualitative data were coded by two research team members independently. Once the independent coding process was complete, coders met to review the coding consistency and reconcile discrepancies. A third member of the research team helped to resolve discrepancies when the two team members could not reach an agreement. After reconciling discrepancies, the kappa statistic for inter-rater reliability was 0.790, satisfying the threshold standard of 0.75 (40). Qualitative data in each node were then summarized by facility based on frequency and relevance. The summaries included data reported by more than half of the participants in each facility. Themes were coded as positive (enabling implementation) or negative (impeding implementation).

2.4. Identification of implementation facilitators and barriers

Facilitators and barriers to the implementation of this study were identified from the organizational readiness surveys and the thematic content analysis of the interviews.

For each facility, the ORT results were compiled into a customized report that was shared with the corresponding facility. Each report displayed scores for the overall domains and bar charts for all items

within a domain expressed in dichotomous form (e.g. % respondents who agree or strongly agree versus % respondents who disagree or strongly disagree).

The themes from qualitative analysis of the leader interviews were summarized according the four main interview topic areas: priority health and safety concerns; strengths and weaknesses of the current safety program; degree of alignment between the HWPP and the organizational mission and goals; and outcome expectancies of the study. A one-page summary of these findings was incorporated into the report presented to the facility.

The research team arranged an in-person meeting with leaders from each facility to present the facility's customized report. In these meetings, the research team and facility stakeholders discussed the facility strengths and resource or skill areas that needed to be strengthened early in the implementation phase. In addition, the research team offered recommendations on how best to leverage the implementation facilitators and address implementation barriers (e.g. tailoring actions to enable successful HWPP implementation). Figure 1 depicts the HWPP implementation strategy and highlights the time points in the process when the baseline data were collected, and the tailoring efforts began.

The reporting of methods in this paper is consistent with the guidelines provided in the Template for Intervention Description and Replication (TIDieR) (21). See the completed TIDieR checklist in the Additional File 1.

Results

3.1. Characteristics of study participants

A total of 78 participants completed a leadership interview ($n=59$) and/or an organizational readiness survey ($n=56$) between September 2017 and August 2018. The demographics of participants were observed to be similar across both instruments (Table 3). Study participants mostly were White (89.9%), non-Hispanic/Latino (95.6%), working as supervisors or higher rank (68.5%), providing clinical services (46.6%), and with an average tenure of 9.7 years (SD: 9.3). One quarter of participants held a union leadership role.

3.2. Survey of Organizational Readiness

The ORT survey response rate in four facilities ranged from 63% to 76% of invitees; in Facility 5, the response rate was 26%. As presented in Table 4, participants reported high recognition of OSH activities (except for facility 3) and low recognition of activities to advance worker health and well-being (except for facility 5). Across all facilities there was very low reporting of OSH and workforce health and well-being activities occurring together.

Across all five health care facilities, highest rated domains were Teamwork in Your Work Group (mean: 3.1; SD: 0.5) and Resources Available for Safety, Health and Well-Being (mean: 2.9; SD: 0.6). The lowest rated domain was Management Communication About Safety, Health and Well-Being (mean: 2.2; SD:

0.7). As shown in Table 5, the ANOVA test showed no significant differences in ratings between facilities, except in the domain of management communication in which Facility 1 scored higher than the other sites (mean: 2.7; SD: 0.4).

Looking within each ORT domain, we observed patterns in the participants' responses to individual items that suggested common areas for improvement or further exploration. These items represented the domains of resources available for safety and health (domain 3), change initiatives (domain 4), and use of teams (domain 5, see Additional File 2). In four of five sites, most survey participants disagreed that management provides sufficient budget for safety and health training (item 4f). Most respondents in two sites reported unfavorable ratings about past history with success introducing new health and safety programs (item 4a). In four sites, the majority of respondents indicated concerns about staff time availability to meet regularly in teams. For instance, most respondents in facilities 1, 2, and 5 disagreed that staff time was available to meet bi-weekly (items 5c and 5d), and in facilities 2 and 3, most respondents disagreed with the statement related to employees having time available to work together on safety and health initiatives (item 3c).

3.3. Leadership interviews

Leaders from all facilities showed openness to addressing concerns beyond the traditional scope of physical occupational safety hazards. For example, respondents consistently reported employees' workload and its impact on burnout and stress as a priority issue (Table 6). Interviewees from most facilities identified the leadership of the existing safety and health or Environment of Care committee as a strength. Participants reported that leaders were engaged, committed, and knowledgeable about safety and health. A majority of interviewees across facilities perceived alignment between the study goals and their facility's mission. In addition, respondents from all facilities expressed that the planned health and safety assessment activities would yield valuable information about priority focus areas for safety and health improvement.

Across most facilities, participants reported that the main anticipated challenges to implementing HWPP was the limited resources that the facility could offer, including time available for meetings, having sufficient staff to participate in the study, and funding to implement changes (Table 7). Other reported potential obstacles included concerns about whether workers would participate in study-related activities and whether the large size of the facility and workforce would be a challenge for staff monitoring and communication. In addition, most leaders in three of the facilities reported prior difficulties in reaching agreement on which safety and health priorities should be the primary focus of the safety program. In one facility, researchers learned from the interviewees there was no functional safety committee and this perspective was stated again during in-person meetings with research team members. This was relevant based on the premise that HWPP would be introduced in the context of facilities' existing safety and health committees.

3.4. Tailoring the implementation based on the baseline data findings

The research team, in partnership with stakeholders, carried out a number of actions where relevant to leverage facilitators and overcome potential barriers to the HWPP. A summary of tailoring actions is provided in Table 8.

3.4.1. Integration approach to OSH and workforce health and well-being

Leaders' willingness to address an expanded set of concerns in their safety program (Table 6) was interpreted as a program implementation facilitator because it would give the Design Team freedom to select from a broad range of concerns as they designed local TWH interventions. The research team reinforced the leaders' willingness to adopt TWH concepts in the messaging to the facility stakeholders at key stages in HWPP implementation. For example, during the in-person meetings with facility leaders to report baseline results; in the course of coaching DTs to develop intervention activities; and in the meeting in which the DT presents the intervention proposal to the SC.

3.4.2. Health and safety program resources

The research team used leaders' appraisals about strengths and gaps in safety leadership when recruiting program participants to serve on their facility's DT. For instance, in facilities where leaders reported highly favorable commitment and expertise among the safety committee leadership (Table 6), the research team involved safety specialists and managers as partners in recruiting appropriate personnel. In one site that did not discuss health and safety program strengths, the research team learned of historic difficulties in labor management relations which contributed to a lack of a functioning safety program. The research team identified this capacity gap as a serious barrier to the HWPP that needed attention in order to properly recruit employees willing to participate in the DT and the SC. Therefore, researchers met multiple times with representatives from each of the staff unions to discuss with them the relevance of their involvement for creating worker-driven interventions.

Resource limitations of funds, time, and staffing were frequently identified as potential barriers to the implementation of the HWPP (Table 7). These issues were prioritized for immediate discussion with the HWPP champion in order to secure the resources needed to implement the program. Similarly, the research team initiated discussions with the champion and other SC leaders early in the team formation phase to plan feasible strategies to provide staff release time and select DT members and co-facilitators who could fulfill those roles. In some cases, it took a period of time to arrive at a release time strategy that was successful. For example, in one facility, the champion and co-facilitators tested a meeting schedule of 30-minute meetings every 4 weeks, which proved infeasible for making progress, and they then switched to 90-minute meetings every 4 weeks, which the DT perceived as sufficient for advancing in the program.

3.4.3. Readiness and resources for teams and participation

In some facilities, leaders expressed previous difficulties with gaining consensus on priority safety issues and skepticism about whether workers would engage in the participatory program. (Table 7). The tailoring

approach to address these concerns included providing detailed training to the Champion, SC members, and DT members about their roles and clarifying the procedures for issue identification and selection. For example, in the HWPP, DT members generate ideas for prioritizing issues then discuss them with SC and key leaders for approval. The training provided opportunities for participants to discuss how decisions would be taken, and to acknowledge uncertainty regarding worker participation. In those training discussions, SC members expressed support of the participatory program goals and committed to facilitating the team formation process.

Concerns about a lack of participatory culture were expressed by leaders in some facilities during the interviews (Table 7) and through the ORT (items 7a, 7d, and 7e in Additional File 2). The research team interpreted low participatory culture at baseline as a potential barrier to successful HWPP implementation because it indicated front line and managerial personnel were not used to interacting and communicating together about safety and health topics. The research team worked with all program participants to help them understand their roles in the HWPP, positive communication methods, and trust-building in the participatory process. The research team and co-facilitators demonstrated reliability and commitment to the process over time consistently following through on tasks, adhering to strict privacy protocols, and promoting decision making within team meetings. Senior managers on the SC allowed the team to select issues to target for interventions. The leadership in this facility showed intention to improve their participatory culture by starting weekly rounds in the facility to receive feedback and opportunities for improvement from employees.

3.4.4. Readiness for change

The ORT measures for participants' "felt need for change" was consistently high across all facilities (item 4g in Additional File 2), as was leaders' hope that the HWPP would identify areas in need of improvement (Table 6). These results suggested the need for training in the areas of planning for change management. The research team explained to leaders what kinds of deliverables could be expected and how the program components would accomplish some of their desired outcomes. This messaging was incorporated in program start-up meetings and in meetings with leaders and DT members during the implementation phase. We undertook this strategy to promote enthusiasm, motivation, and assurance of the commitment of staff time and other resources needed by the DT to develop and implement integrated interventions.

3.4.5. Communication

ORT score in management communication about safety, health, and well-being was revealed to be the lowest scoring domain across most facilities (Table 5). Leader interviews from most facilities also reported a desire for the study to improve organizational communication (Table 6). When low communication scores were discussed in the feedback reporting meetings, leaders acknowledged the need for improved communication and, in some cases, they expressed a desire to take action to strengthen capacity in this area. The research team prioritized communication as an important potential barrier to address with sites during the HWPP implementation.

To support the facilities' communication efforts during the HWPP implementation, the research team developed and distributed sample program communication tools to help DT and SC members communicate with the workforce about the program. The intent was to raise employee awareness about the HWPP so that a broad range of workers would engage with and respond to the DT throughout the intervention design process. Examples of communications tools were sample HWPP program announcements and updates, and a template for constructing a poster board display to capture feedback from employees who were not part of the DT. The research team also initiated a monthly project newsletter for facility team members, including co-facilitators, SC, and DT members. The newsletter provided resource material on topics related to their intervention foci and personal stories from research team members to build relationships. The research team also added process evaluation instruments to the data collection protocol to monitor the quality, frequency, and the dynamics of organizational communication throughout the different phases of HWPP implementation.

Discussion

This study employed a mixed methods approach, with survey and interviews, to prospectively assess potential facilitators and barriers to a participatory, TWH program in public healthcare facilities. Our evaluation approach was grounded in frameworks discussed in the literature about participatory and organization level interventions (41, 42) and we used measures previously reported in implementation science literature (43, 44). We have attempted to address a gap in the literature related to the assessment of potential facilitators and barriers *prior* to the implementation of participatory interventions that address workforce health. Prospective assessment of potential implementation facilitators and barriers enabled the research team, in collaboration with internal program implementers, to respond to these baseline data by tailoring specific aspects of the implementation process. Examples included planning for staff participation in program meetings, providing training in essential skill sets and practices that were deemed to be weak (such as communication systems), investing time for relationship building during team formation, and creating messaging for team members to address areas of uncertainty.

The literature in organizational intervention research has documented the relevance of analyzing the organizational context to facilitate fitting the intervention to the organization (45) given the complex and dynamic social systems where organizational interventions take place (23). Organizational interventions should be responsive to the setting and the personal characteristics of key implementation agents, such as managers and supervisors (17, 46). We designed our baseline assessment instruments to identify aspects of the organizational context and attitudes of the implementation agents that would be relevant to the success of the intervention. This assessment informed the research team about the organization's degree of integration between OSH and other efforts to advance worker well-being, availability of health and safety program resources, participatory and teamwork culture, prior success with managing change efforts, quality of communication about safety and health, and leaders' expectations of HWPP outputs. Based on information provided by key stakeholders, we initiated discussions with leaders to establish sufficient resources (e.g. staff time, space, supplies) and to develop training to build on the

implementation agents' motivation and confidence regarding concerns such as management support, authentic participation, and outcome expectancies.

The ORT results indicated a consistent gap in health and safety communication systems at all study sites. Organizational communication issues have been reported as a barrier in previous participatory TWH interventions (26, 47). In the HWPP, effective communication systems are needed to facilitate the flow of information between the DT and the SC, between the DT and co-workers to receive input on their work (bottom up), and between organizational leaders and the workforce (top down). In addition, employees need to be aware of those mechanisms to disseminate information and believe that using them will be effective. Our experience with these facilities showed the complexity of addressing organizational communication issues and the limited influence that the research team can have on improving systems of communications within an organization. Although the research team provided program communication tools and training during the early phases of program implementation, uptake of the tools and training was not immediately apparent. The research team site liaison continued to provide communication coaching during the interactions between the DT and SC as these were opportunities to model positive communication behavior between front-line workers and mid-level and senior leadership. We anticipate that workplace communication can be improved if all the recommended program communication elements are successfully implemented. Evaluation of this and other tailoring responses is ongoing in the SHIFT study.

The HWPP implementation requires management commitment to secure resources, including staff time and a physical space for the DT meetings, and access to subject matter experts who can manage and evaluate proposed DT initiatives. Our assessment identified funding and personnel time as potential threats to implementation of the HWPP. Previous TWH studies have also reported the limited availability of staff time to attend meetings and project activities as barriers to program implementation (14, 15, 25, 28). We addressed these issues by negotiating a commitment of personnel resources that management deemed feasible before commencing with participant recruitment, and then engaging management in troubleshooting as needed as the implementation proceeded. Beyond that, the HWPP intervention design protocol specifically addresses resource allocation for interventions generated by the DT. Each intervention proposed has an associated business case, which is reviewed by managers to make funding decisions and to create action plans for securing resources.

A strength of this study is the use of mixed methods to prospectively identify potential facilitators and barriers to program implementation (48, 49). We used a quantitative theory-based ORT to assess attitudes about organizational characteristics that are relevant to supporting a participatory TWH change effort. The qualitative data from interviews complemented ORT survey results by providing specific context and depth to the quantitative data (e.g., the size of the facility influencing communication challenges). Our results showed that using two assessment methods at baseline yielded complementary, practical information that was used for developing action plans to promote HWPP implementation. For example, while the ORT revealed resource limitations as a potential area of concern for some facilities, the leadership interviews revealed in-depth what some of the specific resource concerns might be in

implementing the HWPP. In another case, the ORT identified a shared perception that organizational communication was a readiness gap, whereas this issue was not highlighted during interviews.

This study has some limitations worth noting. First, our results may not be generalizable beyond publicly funded healthcare facilities because the regulatory and economic environment for these facilities creates more resource constraints than privately funded healthcare facilities. Although laws governing patient staffing ratios do not vary between publicly and privately funded healthcare facilities in Massachusetts, the lower reimbursement rates from public health insurance programs such as Medicare and Medicaid (used by the majority of patients in state-run hospitals) and bureaucratic personnel hiring procedures can translate to a more financially stressed care environment than privately run facilities. These staffing resource constraints, which can be acute in public healthcare settings (50, 51), may result in more barriers to implementing innovative programs such as the HWPP, than would be present in more resource rich private healthcare settings. Even so, staffing shortages and low time availability is widely experienced in the healthcare sector (52-54). Similarly, problems with organizational communication around employee health and safety are also reported in healthcare generally (55, 56). However, it is also true that the added financial stresses in public healthcare likely make it difficult to afford administrative personnel time to support communication efforts.

Another limitation was the use of self-reported data from a sample of leaders in each facility. We did not analyze objective data (such as meeting documents, injury data, etc.) to validate the findings from the baseline assessment. It is possible we would have learned of additional barriers and facilitators if we were able to speak with more people, and especially more representatives of middle managers and front-line employees. However, the report-back meetings with key facility leaders provided an opportunity to identify gaps and inaccuracies in our data and validate the findings with stakeholders. No new issues were identified at that time, suggesting there were no major gaps in the assessment. Again, a larger sample of employees in non-managerial positions might have yielded different perspectives and experiences.

We cannot rule out the effects of social desirability bias (57). Some leaders may have been more vocal when reporting strengths about the facility safety program and less vocal when reporting details of safety program challenges. Participants were told that providing candid information would provide an accurate baseline assessment to identify ways to help the implementation of the program. This was intended to encourage disclosure of authentic viewpoints, but there are also justifiable reasons to avoid being too vocal about sharing safety program challenges. Finally, it is possible that some participants did not have direct knowledge about organizational practices and policies that would have informed more accurate responses.

Looking to the future, the SHIFT study data collection protocol includes robust and comprehensive process evaluation methods to monitor the impact of the tailored strategies reported in this manuscript and to make timely adjustments in how the program is implemented. Plans are in place to further refine the ORT through additional psychometric testing across populations and settings, including factor

analysis, to examine whether the survey's dimensionality remains in the 8-factor structure as originally conceptualized. The ORT will be re-administered, and interviews repeated during the interim and completion phases of the study to gauge changes over time, and to provide continuous learning about new barriers and facilitators that arise over the course of the study period. We plan to assess changes in readiness domains over time and to examine their predictive value relative to successful implementation of a participatory, Total Worker Health program such as the HWPP.

Conclusions

In this study, we report on a prospective assessment method to identify facilitators and barriers prior to implementing a participatory TWH program in public healthcare facilities. Potential facilitators included willingness of leaders to address a holistic set of safety and health priorities, having internal occupational safety and health expertise, commitment of leaders, favorable expectancies for program outcomes, and alignment between the program and the organization's mission and values. Potential implementation barriers included limited resources for locally designed interventions, limited staff time to attend regular meetings, and management communication systems for safety, health, and well-being. Prospective assessment of potential implementation facilitators and barriers enabled the research team, in collaboration with internal program implementers, to respond to these baseline data by tailoring specific aspects of the implementation process. Examples included planning for staff participation in program meetings, providing tools and training in essential skill areas that were assessed as gap areas, investing time for relationship building during team formation, and creating messaging for team members to address areas of uncertainty.

A mixed methods prospective assessment approach is a feasible and useful mechanism to identify program implementation facilitators and barriers in the early stages of implementing a participatory, Total Worker Health program. These early data can be used to tailor the implementation process by building on organizational and personnel strengths and applying resources to fill gaps in skills and resources needed for successful program implementation. Future project evaluations will seek to determine whether or not the baseline assessments predicted later developments and the extent to which facilities adopted and sustained the intervention and tailoring supports provided by the research team.

List Of Abbreviations

NIOSH: National Institute for Occupational Safety and Health

TWH: Total Worker Health

OSH: Occupational Safety and Health

HWPP: Healthy Workplace Participatory Program

SHIFT: Safety and Health through Integrated Facilitated Teams

DT: Design Team

SC: Steering Committee

ORT: Organizational Readiness Tool

ANOVA: Analysis of variance

Declarations

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Availability of data and materials

Data collection forms are available from the research team at: cphnew@uml.edu. Data files are not publicly available due to privacy guarantees to study participants, many of whom could be identified from their roles and demographic characteristics even in de-identified data sets.

Authors' contributions

SN and CM conceived and drafted the paper. SN designed the leadership interview script, administered interviews, contributed to the design of the ORT employer feedback report, and led presentations of interview and ORT feedback reports in study sites. CM and SN analyzed leader interview data. CM analyzed the ORT survey results. MR contributed to the ORT and tailoring program implementation results sections. MR developed and validated the organizational readiness survey tool, contributed to the design of the employer feedback report, and led presentations of the ORT results in study sites. AK and SR administered interviews and, together with CM, led the implementation of the HWPP in study sites, including contributions to developing and communicating the tailored recommendations to facility personnel. LP is the SHIFT study Principal Investigator, responsible for the project conception,

development, and oversight of all study activities. She recruited study sites, assisted with refining all study instruments, participated in site feedback meetings and provided ongoing feedback on the implementation process. All co-authors contributed to editing this manuscript and approve of this version.

Ethics approval and consent to participate

This study has been approved by the Institutional Review Board of the University of Massachusetts Lowell (#16-131-PUN).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Tables

Table 1. Characteristics of facilities included in the study^a

	Facility 1	Facility 2	Facility 3	Facility 4	Facility 5
Size of workforce ^b	Small	Large	Mid-size	Mid-size	Large
Number of hospital beds	45	320	0	0	67
Number of assisted living beds	0	0	305	30	0
Number of long-term care beds	0	0	150	269	100
Services offered	Mental health and substance use rehabilitation support for civilian and (Facility 2 only) forensic patients		Skilled nursing care and long-term care	In-patient and outpatient services and long-term care	
Primary direct care staff	Mental Health Workers		Nursing Assistants		

^aData obtained from facility representatives and the facility websites.

^bSmall: 101-250 employees; mid-size: 251-750 employees; large: 751 or more employees.

Table 2. Domains in the Organizational Readiness Tool (ORT)*

Domain	Number of items per domain
1. Current programs to promote employee safety, health, and well-being	3
2. Current approaches to safety, health, and wellbeing in this organization	6
3. Resources available for safety, health, and well-being	4
4. Resources and readiness for change initiatives to improve safety, health, and well-being	11
5. Resources and readiness for use of teams	6
6. Teamwork in your work group	8
7. Resources and readiness for employee participation	6
8. Management communication about safety, health, and well-being	7

*ORT uses a 4-point Likert scale with range from 1=strongly disagree; 4=strongly agree.

Table 3. Demographic characteristics of study participants (n=78)^a

Variable	Leadership interviews (n=59)	Organizational readiness survey (n=56)	All combined (n=78)
	n (%) or mean(SD)	n (%) or mean(SD)	n (%) or mean(SD)
Gender			
Female	30 (50.8%)	28 (50.0%)	39 (50.0%)
Male	29 (49.2%)	28 (50.0%)	39 (50.0%)
Race			
White	53 (89.8%)	42 (89.4%)	62 (89.9%)
African American	3 (5.1%)	1 (2.1%)	3 (4.3%)
Two or more races	3 (5.1%)	4 (8.5%)	4 (5.8%)
Ethnicity			
Hispanic/Latino	2 (5.7%)	2 (5.7%)	2 (4.4%)
Not Hispanic/Latino	33 (94.3%)	33 (94.3%)	43 (95.6%)
Organizational position			
Director/Executive	25 (42.4%)	20 (39.2%)	28 (38.4%)
Supervisor/Manager	21 (35.6%)	15 (29.4%)	22 (30.1%)
Front-line staff	13 (22.0%)	16 (31.4%)	23 (31.5%)
Function			
Clinical services	27 (45.8%)	23 (45.1%)	34 (46.6%)
Administrative services	19 (32.2%)	12 (23.5%)	20 (27.4%)
Non-clinical services	8 (13.6%)	11 (21.6%)	11 (15.1%)
Safety and health services	5 (8.5%)	5 (9.8%)	8 (11.0%)
Union Membership			
Yes	19 (32.2%)	14 (25.0%)	20 (25.6%)
No	40 (67.8%)	42 (75.0%)	58 (74.4%)
Tenure	9.5 (9.8)	9.7 (9.1)	9.7 (9.3)

^a Numbers may not add to 78 due to missing data

Table 4. Organizational programs to employee safety, health, and well-being by facility

Variable	Facility					All facilities combined (n=56)
	1 (n=13)	2 (n=19)	3 (n=9)	4 (n=10)	5 (n=5)	
	No (%)	No (%)	No (%)	No (%)	No (%)	
There are safety activities for employees	11 (84.6%)	18 (94.7%)	5 (55.6%)	9 (90.0%)	5 (100.0%)	48 (85.7%)
There are health and well-being activities for employees	0 (0.0%)	1 (5.3%)	1 (11.1%)	3 (30.0%)	4 (80.0%)	9 (16.1%)
Safety activities occur together with health and well-being activities	2 (15.4%)	0 (0.0%)	0 (0.0%)	1 (10.0%)	0 (0.0%)	3 (5.4%)

Table 5. Averaged organizational readiness scores in each survey domain by facility (n=56)^a

Organizational readiness domain	Facility 1	Facility 2	Facility 3	Facility 4	Facility 5	All facilities combined
	(n=13)	(n=19)	(n=9)	(n=10)	(n=5)	(n=56)
	mean(SD)	mean(SD)	mean(SD)	mean(SD)	mean(SD)	mean(SD)
Current approaches to safety, health, and wellbeing in this organization ^b	2.7 (0.6)	2.4 (0.5)	2.6 (0.3)	2.7 (0.4)	2.8 (1.0)	2.6 (0.6)
Resources available for safety, health, and well-being ^b	3.0 (0.6)	2.6 (0.7)	2.9 (0.5)	3.1 (0.5)	3.0 (0.8)	2.9 (0.6)
Resources and readiness for change initiatives to improve safety, health, and well-being ^b	2.6 (0.6)	2.4 (0.3)	2.5 (0.3)	2.5 (0.1)	2.5 (0.5)	2.5 (0.4)
Resources and readiness for use of teams ^b	2.5 (0.7)	2.5 (0.6)	2.6 (0.7)	2.9 (0.6)	2.1 (0.6)	2.5 (0.6)
Teamwork in your work group ^b	3.1 (0.5)	3.3 (0.5)	2.9 (0.3)	2.9 (0.2)	3.4 (1.0)	3.1 (0.5)
Resources and readiness for employee participation ^b	2.8 (0.6)	2.1 (0.8)	2.5 (0.8)	2.8 (0.6)	2.6 (1.4)	2.5 (0.8)
Management communication about safety, health, and well-being ^c	2.7 (0.4)	1.9 (0.5)	2.1 (0.7)	2.2 (1.0)	1.9 (0.7)	2.2 (0.7)

^a Lowest score: 1=strongly disagree, highest score: 4=strongly agree^b No differences in ratings were found between facilities for these domains ($P > .163$)^c Significant difference in ratings between facilities for this domain ($P=0.025$)

Table 6. Leader perspectives about potential implementation facilitators

Themes/ subthemes	Facility 1	Facility 2	Facility 3	Facility 4	Facility 5
	(n=11)	(n=11)	(n=10)	(n=16)	(n=11)
Priority safety, health, and well-being issues	Workload – burnout, stress	X	X		X
	Patient violence	X	X		
	Security – visitors, physical building		X	X	X
	Patient handling (back injuries)			X	X
	Slips, trips, and falls	X			X
Strengths of the facility's safety and health or Environment of Care committee	Leaders are engaged/committed	X	X		X
	Leaders are knowledgeable	X		X	X
	Multidisciplinary team	X		X	
	Good collaboration and support			X	X
	Continuous meetings and inspections			X	X
	Timely reporting of industrial accidents		X		
Alignment between the study goals and facility's mission	Agreement among most interviewees	X	X	X	X
Desired study outcomes for the organization	Identify areas in need of improvement	X	X	X	X
	Improve communication	X	X	X	
	Implement effective/practical solutions	X	X	X	

Engage front-line workers in safety	X	X		X
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Table 7. Leader perspectives about potential implementation barriers by facility

Themes/ subthemes	Facility 1 (n=11)	Facility 2 (n=11)	Facility 3 (n=10)	Facility 4 (n=16)	Facility 5 (n=11)
Obstacles to the study	Limited resources – time, staff, funding	X	X	X	X
	Lack of participation and engagement of front-line workers			X	X
	Large facility – difficulty in monitoring and communicating with all staff		X		X
Challenges of the facility's safety committee	Difficulty developing consensus on priorities because of competing demands	X	X	X	

Table 8. Response to perceived implementation facilitators and barriers

IMPLEMENTATION BARRIERS AND FACILITATORS		ACTIONS TO TAILOR HWPP IMPLEMENTATION
Integration approach to OSH and workforce health and well-being		
Barrier	Lack of integration of OSH and workforce health and well-being	<ul style="list-style-type: none"> -Training and education about TWH concepts and the benefits of integrated activities.
Barrier	Difficulty setting priorities	<ul style="list-style-type: none"> -Intervention targets are identified through a root cause analysis with workers and vetted with leaders. -Ranking and voting are included in the development of intervention activities.
Health and safety program resources		
Barrier	Limited financial resources	<ul style="list-style-type: none"> -SC commitment was obtained to secure financial resources for the DT work -DT is encouraged to identify intervention options at different resource levels. -DT is guided to develop a strong business case for their proposed intervention activities.
Barrier	Limited time for staff to participate in meetings	<ul style="list-style-type: none"> -Champion and SC commitment was obtained for securing release time for the DT work. -Co-facilitators are empowered to request help from Champion when needed.
Facilitator	Perceived strength of internal safety experts	<ul style="list-style-type: none"> -Some safety committee members joined the DT. Safety experts assisted with team recruitment. -Regular DT meetings fit within ongoing practices at the facility.
Facilitator	Perceived leadership commitment to safety	<ul style="list-style-type: none"> -Leadership is recruited to be part of the SC and a facility Champion is designated.
Readiness and resources for teams and participation		
Barrier	Concerns about front-line worker engagement	<ul style="list-style-type: none"> -DT includes front-line workers that develop interventions relevant to them. -DT is encouraged to reach out to coworkers to identify their concerns and address them in the proposed intervention activities.
Readiness for change		
Barrier	Lack of prior success with change initiatives	<ul style="list-style-type: none"> -Coaching and resource materials were provided to develop skills for change management
Facilitator	Perceived need for change	<ul style="list-style-type: none"> -Research team explained how program components would accomplish desired study outcomes and expected program

		deliverables.
Facilitator	Perceived alignment between study goals and facility's mission	-Developed messaging to reinforce mutual goals.
Communication		
Barrier	Poor management communication about safety, health, and well-being	<ul style="list-style-type: none"> -Communication tools were suggested to inform workforce about DT activities (newsletter, communication board). -Joint meetings between the DT and the SC take place at strategic time points of intervention formation and implementation. -Research team monitors the quality, frequency, and nature of communication within and between teams, and evaluates general safety communication with the workforce.

Abbreviations

OSH: Occupational safety and health; DT: Design Team; TWH: Total Worker Health®; SC: Steering Committee

Figures

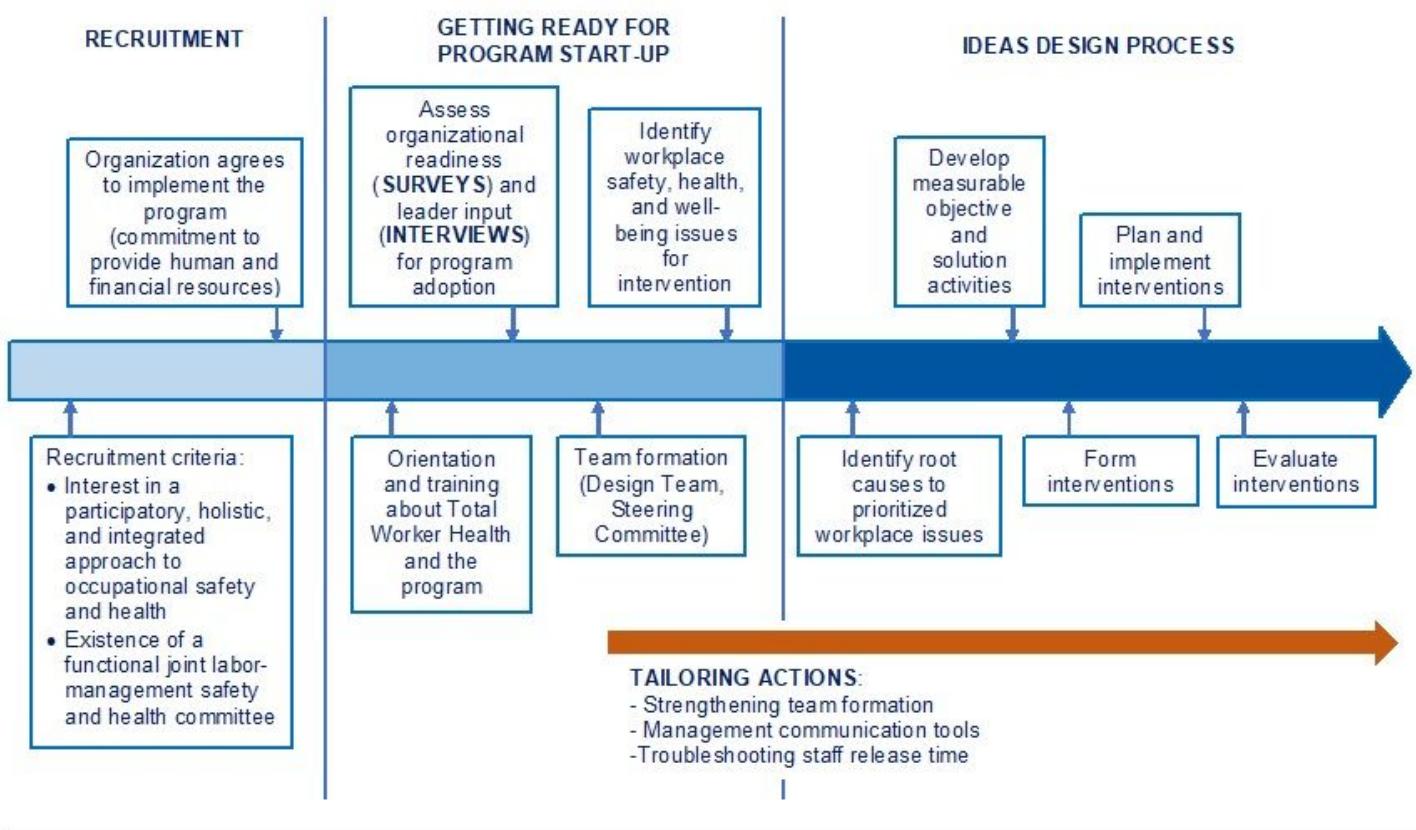


Figure 1

Implementation strategy of the Healthy Workplace Participatory Program

Supplementary Files

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