Safety and Health Innovation in Preschools

A Total Worker Health Pilot Project

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Objective: The primary objective of this study was to evaluate quality of work life in early childhood education (ECE) centers and implement a total worker health (TWH) pilot project with a small sample of ECE teachers. **Methods:** An evidence-based strategic planning process to make policy, system, and environmental (PSE) changes related to TWH was implemented with six ECE centers. A pre-post design with mixed-methods was used to evaluate the impact. **Results:** Baseline findings suggest that there are significant disparities related to quality of work life among ECE teachers compared with the national population. After implementation of the pilot project, ECE centers averaged 4.7 PSE changes. Qualitative data informed facilitators and barriers to implementation of TWH-related changes. **Conclusions:** This pilot project reflects an evidence-based participatory approach to assessing and improving the well-being of ECE teachers.

Keywords: early childcare workforce, health disparities, quality of work life, total worker health

The early childhood years are a time of rapid growth and development for most fundamental skills. During these critical years children develop the cognitive, language, motor, and socio-emotional skills necessary to support a productive and happy life.[1,2] The early childhood workforce plays a key role in promoting the development of these skills by their interactions with the young children during these formative years and by constructing environments that foster the healthy development of children in early childcare education (ECE) settings.[3] Mental and physical health of ECE teachers can either enhance or limit the interpersonal and physical engagement that teachers have with the children in their care, which then impacts the children's overall development.[4] Despite the importance of the health and wellbeing of those responsible for providing safe, stable, and nurturing environments for children, it is often over-looked.

Working in ECE settings is stressful. The inherent challenges of the profession and the work conditions within ECE settings effect teachers' psychological, emotional and physical health, and well-being. Challenges of the early childcare workforce include: low pay (the average yearly salary for an early educator is $21,000 in the United States[5]); poor working conditions, including long hours, high job demands (especially among directors and administration), and low job control (with teachers and assistant teachers reporting the lowest levels of job control).[5] Additionally, ECE teachers are at increased risk of infectious diseases due to close proximity to children who have less developed immune systems; increased risk of injury and falls due to lifting and moving children regularly; and increased risk of encountering environmental hazards, such as toxic cleaning materials and art supplies.[6] A systematic review of 30 studies worldwide found that these challenging work conditions are related to a high risk for injuries and other occupational hazards, as well as adverse effects on teachers' psychological, emotional, and physical health.[7] The unfavorable work conditions in ECE settings play a role in the fact that ECE teachers are disproportionately impacted by chronic mental and physical health conditions. For example, the rates of depression with early childcare teachers is three times the national average (36% vs 12% clinically depressed)[5] and ECE teachers have a higher prevalence of overweight, obesity, heart disease, and diabetes compared with the general population.[5,8,9]

Implementing policy, system, and environmental (PSE) changes in ECE settings can play a key role in promotion strategies to improve ECE provider wellbeing because these features can be sustained over time.[10] The PSE Change Process is a strategic planning process that was developed as one of five components of the Culture of Wellness in Preschool (COWP) program, an early childhood obesity prevention program. The COWP program was developed by researchers at the University of Colorado in 2012. The goal of the multilevel multicomponent intervention is to increase fruit and vegetable consumption and physical activity of preschool-aged children and their families. As of 2019, the COWP program was being implemented in over 100 ECE centers throughout Colorado (publication pending). The primary objective of the COWP PSE Change Process is to implement sustainable PSE changes related to health and wellness in ECE settings. Since 2012, the tool has resulted in the implementation of an average of 4.7 PSE changes related to varied outcomes in ECE settings.[11] This planning tool is an adaptation of Intervention Mapping[12] and is aligned with community-based participatory research principles.[13]

The COWP PSE Change Process involves convening an ECE center-specific interdisciplinary wellness team comprised of an average of five members including ECE teachers, directors, education supervisors, and kitchen and human resources staff. The PSE facilitator, who is a trained University research assistant, leads the wellness team through 1-hour meetings on a monthly basis and utilizes three change-making strategies to implement PSE changes in ECE settings: (1) teachers conduct a strengths and needs assessment of their center related to evidence-based policies, environments, and practices, (2) teachers prioritize potential PSE changes based on importance and feasibility, and (3) teachers develop action plans with specific action steps for implementation and sustainability of their highest priority PSE changes. Table 1 shows a summary of the three key change-making strategies involved in the COWP PSE Change Process. Additional information about the COWP PSE Change Process has also been previously published.[11]

TABLE 1. The Three Key Strategies that Comprise the COWP PSE Change Process

Strategy	Purpose	Agenda Items
1	Conduct a strengths and needs assessment	Identify strengths and areas of improvement related to healthy eating and physical activity PSE's currently in place Review best practices Identify possible PSE changes
2	Prioritize PSE changes based on importance and feasibility	Rate changes based on importance and feasibility Select and finalize PSE changes
3	Plan for action and develop sustainability plans	Develop an action plan for each PSE change Discuss dissemination of PSE changes Create a sustainability plan

PSE, policy, system, and environmental.

Although the COWP PSE Change Process was originally developed to implement child-focused healthy eating- and physical activity-related best practice PSE changes in ECE settings, the COWP team developed and piloted the Safety and Health Innovation in Preschools (SHIP) project, which involved adapting the process to implement PSE changes specifically related to total worker health (TWH) (SHIP PSE Change Process). Implementation of SHIP PSE changes may translate to ECE provider health, safety, and wellbeing by protecting and advancing health and productivity.[14] While traditional occupational health focuses on workers' safety, TWH emphasizes the importance of making integrated systems-level improvements to address job-related factors that contribute to poor health outcomes and the overall wellbeing of the workforce.[15]

To the best of the authors' knowledge, no intervention studies have used a TWH approach in ECE settings to improve the health and well-being of ECE teachers, to date. However, past studies suggest that TWH-based interventions can significantly impact quality of work life (QWL) in diverse workplace settings.[15,16] For example, one TWH study focused on sedentary office workers found that the implementation of a TWH intervention, including active workstations, resulting in a decrease in sedentary behaviors compared with a similar group that received only a health protection intervention.[17] Another TWH study implemented a 14-week intervention of team-building, work life balance, and specific health behaviors among construction workers and found improvements in on-site family supports, as well as frequency of exercise and healthy diets.[18] Although the authors recognize that these contexts are quite different than work in ECE settings, the SHIP PSE Change Process incorporates TWH-related best practices specifically tailored to ECE settings (eg, environmental change: relaxation corner in staff lounge). Since the intervention was specifically developed for this community, TWH-focused interventions in ECE settings may similarly result in the promotion of healthy behaviors in the workplace.

The national staff turnover rate for early educators is between 24% and 40% annually in the United States.[19] Although poor compensation and lack of benefits have been cited as reasons for high turnover among ECE teachers, studies have found that compensation alone is not an indicator of turnover and job satisfaction.[20,21] Rather, poor compensation coupled with external factors relating directly to the work environment (stressful demands and poor working conditions) may be predictors of job dissatisfaction and turnover rates.[20] The SHIP project reflects a participatory, integrated approach to assessing, and improving the well-being of early educators. There were three primary objectives of the SHIP pilot project: (1) to pilot the SHIP PSE Change Process in ECE settings, (2) to compare the quality of work life (QHL) of a small pilot sample of ECE teachers to a national sample, and (3) to examine factors related to the successful dissemination and implementation of the SHIP PSE Change Process to inform scalability to diverse ECE settings.

METHODS

Participants

The target population for the SHIP project was ECE teachers employed in Head Start-funded ECE settings in a large urban county in Colorado. The authors partnered with one delegate within a large Head Start agency to pilot the SHIP project in six ECE centers. The delegate employs approximately 100 staff and serves 364 children. In the 2017 to 2018 school year, 90% of children enrolled were from families with income below 100% of the federal poverty level and 60% of families identified as Hispanic.[22] Children served by these Head Start programs generally live in areas of highest socioeconomic disadvantage, which often confers additional challenges for the ECE workforce.[23] The final sample of ECE teachers who participated in the study included 83 ECE teachers and approximately 1/3 of participants reported being in a supervisory role.

Procedures

Two University research assistants (RAs) who were trained by the SHIP research team and had experience over 5 years of experience working in ECE settings met with the directors of the six ECE settings in December of 2018 to discuss the SHIP Project and formation of their center-specific wellness teams. Prior to receiving funding, the university researchers had met with the ECE directors to discuss the project and obtain letters of support. The directors of the ECE centers were eager to participate in the SHIP project and recognized the need for promoting the health and well-being of their staff. Four directors oversaw six independent ECE centers (one director oversaw three centers). This director chose to organize one wellness team with representation from each independent center due to the limited size and number of staff at each center. Therefore, four total wellness teams were convened and meetings were facilitated at the respective childcare sites in a conference room, common area, or office space. The directors invited staff to participate and selected a day and time that was convenient for their team within their scheduled working hours. Staff were not required to participate. The SHIP PSE Change Process (adapted from the COWP PSE Change Process) began in January, 2019; all meetings were completed by August, 2019. The Colorado Multiple Institutional Review Board approved all study procedures with an expedited review.

Instruments

Quantitative outcome evaluation data were collected via two instruments: (1) adapted version of the QWL module, and (2) PSE Outcome Evaluation Survey. All ECE teachers were administered a pre- (January 2019) and post- (August 2019) QWL module.[24] The

QWL module was originally developed as a special section of the General Social Survey (GSS) which is administered through the National Data Program for Social Sciences at the University of Chicago.[24] Forty-two individual items out of a total of 76 were selected from the QWL module for the SHIP Project based on the relevance of the questions to the ECE workforce and the SHIP intervention. Constructs assessed include items related to health protection, such as safety in the workplace, as well as health promotion, including worker autonomy, job satisfaction, job-related stress, and worker well-being. Additionally, each director at the six ECE centers completed a PSE Outcome Evaluation survey, which asked about the number and type of PSE changes selected and implemented. This was collected after the completion of the SHIP PSE Change Process and will be collected again 6-months after completion of the SHIP PSE Change Process (6-month follow-up results will be published in a future manuscript).

Qualitative data were collected from a sub-sample of wellness team participants after implementation of the SHIP project to inform facilitators and barriers related to the SHIP PSE Change Process. All wellness team members were invited to participate in focus groups or interviews. Two RAs conducted two focus groups ($n = 8$) and five interviews ($n = 13$) between May, 2019 and August, 2019. Focus groups or interviews took place on site in the afternoon, either in a common area like a break room, or in an empty classroom. The size of the focus groups ranged from four to five people. A protocol guide was created by the research team and used by the RAs. Questions included in the guide inquired about the SHIP PSE Change Process and was based on the COWP dissemination and implementation (D&I) framework to address the gap between the generation of evidence for health promotion programs and their application into practice.[25,26] For example, ECE teachers were asked the following questions during focus groups and interviews: "What skills did you and your staff need to implement PSE changes at your center?" (individual), "During the PSE meetings, describe the communication between members of the wellness team/staff" (organizational), and "How difficult or easy was it for your center to participate in the PSE process?" (intervention). The COWP D&I framework contains constructs that were particularly relevant to the implementation of the SHIP PSE Change Process and was based on two existing frameworks: the Consolidated Framework for Implementation Research (CFIR)[27] and a dissemination framework developed by Dreisinger et al.[28] Incorporating aspects of both frameworks, as well as adding new program-specific constructs, the COWP D&I framework (COWP framework article [in progress]) includes constructs at the individual (eg, attitudes, skills), organizational (eg, communication, leadership engagement), and intervention (eg, feasibility, adaptability) levels.

Data Analysis

The PSE Outcome Evaluation Form data and QWL module data were captured in Research Electronic Data Capture (REDCap), a secure web application for building and managing online surveys and database.[29] Data were exported in IBM SPSS Statistics for Windows, Version 25.0. (IBM Corp., Armonk, NY) for analyses.[30] Univariate and bivariate analyses were run to explore the number of PSE changes implemented and sustained after completion of the SHIP PSE Change Process with the six ECE centers. McNemar tests were used to analyze the change in proportions between the pre- and post-QWL module responses. Additionally, two-proportion z-tests were run to compare the post-intervention responses in this pilot sample with responses from the 2018 GSS national sample. Alpha (α) was set at 0.05; a more conservation correction (eg, Bonferroni) was not utilized to account for multiple comparisons because of the exploratory nature of this pilot study.[31] However, the researchers interpreted the findings cautiously.

All focus groups and interviews were transcribed using Otter.ai, which is a voice transcription application, and reviewed

by the two RAs to ensure correct transcription. Prior to beginning the analysis, one RA read all transcripts to familiarize themselves with the data before initial coding. A priori deductive and inductive coding was used.[32] The first round of coding was completed utilizing pre-defined deductive coding based on the D&I framework mentioned above. The RA re-read the transcript line by line in order to identify the underlying themes and concepts. The RA single-coded, double-coded, or triple-coded lines within the transcript. After initial coding, the transcripts were reviewed a second time by the same RA to categorize inductive codes. Once all transcripts were coded, findings were reviewed with the lead investigator to explore and confirm clear and concise themes were identified.

RESULTS

Table 2 displays characteristics of the sample population who completed the baseline QWL module ($n = 83$). The majority of ECE teachers work full-day schedules (88%), 77% of ECE teachers are paid hourly, and 71% of ECE teachers reported working in ECE settings for over 1 year. Approximately a third of the sample were supervisors (31%) and 21% of ECE teachers reported having at least one other job.

Quantitative

Table 3 displays the types of PSE changes that ECE centers implemented after participation in the SHIP project. The two most commonly implemented PSE changes were: center coordinates a healthy recipe exchange for staff (83%) (system change); and having a dedicated space for staff to relax, unwind, or decompress provided on site (83%) (environment change). Overall, 28 SHIP PSE changes were implemented across six ECE centers (average of 4.7 changes/ECE center).

Table 4 contains pre-post data from the QWL module, as well as comparisons to the national sample. Eighty-three ECE teachers completed the baseline survey; 47 ECE teachers completed the post-survey. Within this sample, only 32 ECE teachers completed both the pre- and post-survey and were included in univariate and bivariate analyses. Implementation of this SHIP project resulted in an increase in health protection-related responses, although these differences were not statistically significant. For example, after the intervention 94% of teachers agreed or strongly agreed that the safety and health conditions where they work are good compared

TABLE 2. Background Characteristics of Baseline Sample ($n = 83$)

ECE Teachers	*n*	*%*
Work schedule		
Half day	10	12.2%
Full day	72	87.8%
Payment type		
Salaried	19	23.2%
Paid by the hour	63	76.8%
Length of time working in ECE centers		
Less than 6 months	13	15.7%
6–12 months	11	13.3%
More than 1 year	59	71.1%
At least two sources of employment		
Yes	17	21.0%
No	64	79.0%
Supervision status		
Yes	25	30.9%
No	56	69.1%

ECE, early childhood education.

TABLE 3. Policy, System, and Environment Changes Implemented After Participation in the SHIP Pilot Project

	Centers Implemented	
SHIP-Related Policy, System, and Environment Best Practices	*n*	%
Center coordinates a healthy recipe exchange for staff	5	83.3%
A dedicated space for staff to relax, unwind, or decompress is provided on site	5	83.3%
Center offers workplace wellness challenges	3	50.0%
Center provides a ''healthy cupboard,'' snack stations, or vending for healthy eating	3	50.0%
A room for breastfeeding mothers is provided on site	3	50.0%
Center has a physical activity club	2	33.3%
Center sponsors healthy potluck lunches for staff monthly	2	33.3%
Information on proper posture techniques are available for staff	2	33.3%
Monthly nutrition newsletters with tips and recipes are distributed to staff	1	16.7%
Center provides ideas for monthly mindfulness and relaxation exercises (yoga, meditation, gratitude exercises, etc)	1	16.7%
Center encourages active breaks for staff such as walking or exercising and have mapped a nearby safe walking route	1	16.7%
Total number of PSE changes	28	
Average number of PSE changes/ECE centers	4.7	

ECE, early childhood education; PSE, policy, system, and environmental.

with 87% at baseline ($P > 0.05$); this compares to 95% of workers who agreed or strongly agreed with this statement in a national sample ($z = -0.39$, $P = 0.70$). One health promotion-related item significantly improved after the SHIP intervention: 78% of ECE teachers agreed or strongly agreed that they have too much work to get everything done compared with 97% at baseline ($P = 0.03$). This is still significantly higher than the national sample (61%; $z = 1.97$,

$P = 0.05$) suggesting that although the SHIP intervention decreased this specific job demand, challenges related to workload remained significantly higher than the national average. Additionally, the percent of ECE teachers who reported having access to stress management interventions after the intervention increased and approached significance (pre: 38%, post: 59%, $P = 0.09$). This was significantly higher than the national average (39%;

TABLE 4. ECE Teacher Pre-Post NIOSH Quality of Work Life Responses After Participation in the SHIP Pilot Project and Comparison to a National Sample

	SHIP Pilot Sample ($n = 32$)				Post Versus Nat'l Sample	
NIOSH Quality of Work Life Survey Item	Pre	Post	*P*-Value	National Sample[a]	*z*-Score	*P*-Value
Health protection				% agree or strongly agree		
The safety of workers is a high priority with management where I work	90.3%	87.1%	0.63	92.0%	−1.02	0.31
The safety and health conditions where I work are good	87.1%	93.5%	1.00	95.0%	−0.39	0.70
There are no significant compromises or shortcuts taken when worker safety is at stake	84.4%	87.5%	0.63	89.0%	−0.27	0.79
Employees and management work together to ensure the safest possible working conditions	96.9%	90.6%	1.00	91.0%	−0.08	0.94
Health promotion				% always, often or sometimes		
How often are there not enough people or staff to get all the work done?	96.9%	78.1%	0.03*	61.0%	1.97	0.05*
				% very often or often		
In the past month, how often have you felt used up at the end of the day?	43.8%	46.9%	1.00	36.0%	1.28	0.20
				% very satisfied		
In general, how satisfied are you with your job?	37.5%	28.1%	0.51	49.0%	−2.36	0.01**
		% yes				
Do you have access to stress management programs at your current workplace?	37.5%	59.4%	0.09	39.0%	2.35	0.01**
				% agree or strongly agree		
The place where I work is run in a smooth and effective manner	73.3%	70.0%	1.00	78.0%	−1.09	0.28
On my job, I know exactly what is expected of me	100.0%	87.5%	0.13	95.0%	−1.94	0.05*
I have too much work to do everything well	43.8%	43.8%	1.00	35.0%	1.04	0.30
Health Outcomes				% excellent, very good, or good		
Would you say that in general your health is excellent, very good, good, fair, or poor?	83.3%	76.7%	0.63	84.0%	−1.12	0.27

ECE, early childhood education; NIOSH, national institute for occupational safety and health; SHIP, safety and health innovation in preschools.
[a]Sample size ranges from 5876 to 8994 depending on question (2018).
*P value <0.05.
**P value <0.01.

$z = 2.35$, $P < 0.01$). Two additional health-promotion related items were significantly different between the post-survey pilot sample and the national sample: the national sample reported significantly higher satisfaction with their job compared with ECE teachers (49% vs 28%; $z = -2.36$, $P < 0.01$) and the national sample reported that they were significantly more like to know exactly what is expected of them in their job (95% vs 87.5%; $z = -1.94$, $P = 0.05$).

Qualitative

Facilitators and barriers related to the SHIP project are presented in Table 5.

Three facilitators were feasibility of the SHIP project and staff engagement (deductive codes) and planting the seed (inductive code). Staff shared that feasibility of the intervention was a facilitator to implementation of the SHIP project at their site. One staff member said, ''It got the ball rolling, just to see what we needed to focus on. We're able to actually think about if we were able to do it or not able to do it.'' Another staff member shared, ''I just think the whole process was helpful, like starting out with a whole bunch of things. Then going through them to think which ones we were actually interested in and what we could actually make happen and do. It was really helpful to just go through that process.''

Staff engagement was identified as a facilitator to successful implementation of the process. Staff members shared that they benefited from collaborating and working together during the process. One participant shared, ''I think the fact that staff saw a positive outcome was really important to the morale. You actually can have the buy-in from staff because they saw the result.'' Staff engagement also helped build rapport among coworkers. Another participant said, ''I think we're not always all together with our team. So that was nice to be included and have a set time to be with everybody else.'' A final staff member said, ''I liked the group time, versus like, in theory, we could have all talked individually, and you could have aggregated the ideas or something. I liked having it be a group.''

One inductive code emerged from the data: ''planting the seed'' for change. Several participants shared that the SHIP PSE process gave inspiration for others to make health and wellness changes, even if they did not participate directly. One provider shared, ''I think it planted the seed. And even if there's not any follow through right now, the seed is there. It may happen at some point. It's like some people take longer to get inspired than others.'' Another shared that the meetings are helpful, even if not all staff participate: ''Just having people that want to do [the meetings] is good idea. Because then you actually have those people that are

TABLE 5. Facilitators and Barriers Related to Implementation of the SHIP Pilot Project in Early Childhood Education Centers

D&I Construct	Type of Code	D&I Definition	Protocol Sample Question	Representative Quote/s
Facilitators				
Staff engagement	Deductive	Staff engagement and/or support for external/new programs	During the PSE meetings, describe the communication between members of the wellness team/staff.	''I liked the group time, versus like, in theory, we could have all talked individually, and you could have aggregated the ideas or something.''
Feasibility	Deductive	Perceived difficulty of implementation (complexity)	How difficult or easy was it for your center to participate in SHIP?	''Starting out with a whole bunch of things, then going through them to think which ones we were actually interested in and what we could actually make happen and do.''
Planting the seed	Inductive	N/A	N/A	''I think it planted the seed. And even if there's not any follow through right now, the seed is there. It may happen at some point. It's like some people take longer to get inspired than others.''
Barriers				
Center schedules	Deductive	Time of day, academic calendar, center calendar and schedule, timing of intervention	In what ways could the PSE process be changed to better meet your needs or the needs of the center?	''For me, if we haven't had third Fridays, or like the training week in February, (days without kids) things like that, it would have been a nightmare to figure out how to get [everyone together].
Readiness for implementation	Deductive	Tangible and immediate indicators of organizational commitment to implementing an intervention.	At the start of this SHIP pilot program, how ready was your center to implement PSE changes?	''Like, all I can say is when I said yeah, sure, I'll do it, I didn't know what I was agreeing to. I didn't have a clear understanding. I mean, not that I'm unhappy with what happened. I just kind of went into it, like, now what are we doing?''
Implementation climate	Deductive	The absorptive capacity for change, shared receptivity of involved individuals, and the extent to which use of that intervention will be supported	We have found that some preschools implement changes quickly and others take more time. What do you think might contribute to those differences?	''I think so much is going on, like what we do every day. In general, there's always so many things that pop up, staffing issues, we got observed yesterday, we have an end of the year celebration...800 million things in my brain. So yeah, [the SHIP project] kind of got booted to the back burner in my brain.''

Deductive codes, identified a priori based on the COWP D&I framework; Inductive codes, identified organically from the transcripts.

encouraged to help the other staff members that may not be [participating] but maybe next time they'll be into doing the meetings as well."

The data revealed three barriers related to implementation of the SHIP pilot project: center schedules, readiness for implementation, and implementation climate (all deductive codes). ECE teachers have numerous competing priorities throughout the day. One participant shared, "For me, if we hadn't had third Fridays, or the training week in February, (days without kids), it would have been a nightmare to figure out how to get [everyone together]." Finding the time to meet as a team with challenging classroom schedules and adult-to-children ratios, as well as time to complete action item tasks, made it difficult to fully implement SHIP changes.

Another barrier identified was readiness for implementation. Several participants shared that while they were interested in staff health, wellbeing, and safety, they were not sure what they signed up for. One shared, "When I said yeah, sure, I'll do it, I didn't know what I was agreeing to. I didn't have a clear understanding. Not that I'm unhappy with what happened, I just kind of went into it, like, now what are we doing?" Implementation climate was a final barrier identified by participants. For example, one provider shared, "I think so much is going on related to what we do every day. In general, there's always so many things that pop up such as, staffing issues, we got observed yesterday, we have an end of the year celebration...800 million things in my brain. So, [the SHIP project] kind of got booted to the back burner in my brain."

DISCUSSION

The SHIP model was based on six key characteristics that lead to healthier and safer employees, as well as improved operating outcomes. These include, (1) leadership commitment, (2) participation from stakeholders at all levels within a childcare center, (3) policies and practices focused on improving working conditions, (4) comprehensive and collaborative strategies, (5) adherence, and (6) data-driven change.[15,16] Organizations that have used this integrated system-levels approach to improving workforce well-being have found advancements related to safety in the workplace,[33] improvement in productivity and worker satisfaction,[24] a reduction in absenteeism and lower turnover rates,[34] improvement in employee participation in safety, health and well-being initiatives,[35] stronger health and safety programs[36] and greater improvements in health-related behavior changes.[34,37]

These findings suggest that the SHIP pilot project led to the implementation of health protection- and promotion- related PSE changes; on average, center-based wellness teams implemented 4.7 PSE changes after participation in SHIP (n = 28 PSE changes). Although the menu of TWH best practices used during the SHIP PSE Change Process included sections on health protection (eg, PSE changes related to safety such as ergonomic considerations) and health promotion (eg, PSE changes related to mental and physical health such as relaxation corners for stress reduction activities), the majority of the PSE changes selected by the center-specific wellness teams were related to health promotion in the workplace. For example, the two most common PSE changes implemented by five out of six ECE centers included: (1) center coordinates a healthy recipe exchange for staff, and (2) a dedicated space for staff to relax, unwind, or decompress is provided on site. The only PSE change implemented that related to health protection was, "Information on proper posture techniques are available for staff." This PSE change was implemented by two ECE centers.

The baseline results provide some justification as to why health promotion PSE changes were more commonly implemented by wellness teams. Prior to implementation of the SHIP project, ECE teachers reported that health protection was already a priority in their workplace. On average, teachers agreed or strongly agreed that the safety of workers was a high priority with management, the

safety and health conditions in their workplace were good, there were no significant compromises or shortcuts taken when worker safety was at stake, and employees and management work together to ensure the safest possible working conditions. The ECE centers that participated in the SHIP project were Head Start-funded ECE centers. Head Start centers must adhere to more rigorous stringent regulations, including safety guidelines, compared with privately funded ECE centers.[38] For instance, Head Start ECE centers are required to establish, train staff on, implement and enforce a system of health and safety practices. Examples of this requirement include regular filing of injury and incident reports, safety checklists to document hazards, facility maintenance logs, and hazard mapping.[39] The focus on safety in Head Start centers may translate to enhanced safety regulations for ECE teachers, which would explain the identified need for more PSE changes related to health promotion rather than health protection. There are no prior studies with comparable data that have explored these health protection-related constructs in non-Head Start ECE centers. Therefore, it is unclear if health protection is a higher priority at all ECE centers compared with the national workforce, or specifically ECE centers funded by Head Start.

Overall, the health protection-related work characteristics among ECE teachers were comparable to the national sample.[40] However, the majority of health promotion-related work characteristics were poorer among ECE teachers before and after implementation of the SHIP project compared with the national sample. ECE teachers reported not having enough coworkers to get the job done and not knowing exactly what is expected of them at their job more than the national sample. Additionally, only 28% of ECE teachers reported being satisfied with their job compared with approximately half of the national population. These data highlight the need for health-promotion interventions in ECE settings and aligns with past findings that suggest significant disparities exist related to the QWL in ECE settings compared with other professions.[5,8,9]

Pre-post data suggest that the SHIP project has the potential to positively impact health promotion of ECE teachers in ECE centers. After participation in SHIP, ECE teachers reported an increase in access to stress management programs in their workplace, which approached significance, suggesting this may be a big effect given the low statistical power. Additionally, ECE teachers reported that there were enough people or staff to get the work done more often after implementation of the SHIP project. PSE changes implemented by ECE centers may have fostered peer support and relationship building in the workplace, which is related to job satisfaction and retention.[41] For example, coordinating recipe exchanges, potlucks, and physical activity clubs may increase ECE provider interaction and perceived social support, which, in turn, can mitigate workplace stress.[41]

Qualitative findings suggested that staff engagement was a primary facilitator related to the successful implementation of the SHIP project. An additional study on the implementation of TWH-related changes in a retail setting found similar results, stating that participants of a planning process had a positive view of the process due to increased comradery with team members.[42] Planting the seed, an inductive code, was identified as a facilitator to implementation of the SHIP project and suggests that although some staff may not be ready to engage in a wellness-based program, seeing others participate encouraged them to think about their own health and potentially participate in the future. This aligns with the Trans-theoretical Model, or Stages of Change Model,[43] that behavior change is not a linear process, and when conducting community-based work it is critical to meet the needs of the target audience. Seeing other coworkers being healthy may transition individuals from the precontemplation stage (no intent on changing their behavior) to the contemplation stage (becoming aware that a problem exists).

Barriers related to implementation of the SHIP project included center schedules, implementation climate, and readiness for implementation. This aligns with past studies that have identified time limitations and lack of staff, including staff turnover, to be a primary barrier related to intervention implementation in early childhood education and elementary school settings.[44–46] Additionally, anecdotal evidence from this pilot study suggests that classroom staff struggled to find coverage to leave their classroom to participate in wellness team meetings because sites were so often understaffed. Implementation climate and readiness for implementation both relate to competing priorities, including internal requirements and alternative external programs being implemented in ECE centers. Similarly, Hunt et al[46] found that competing needs, including testing and academic requirements, impacted schools readiness to implement external interventions.

This pilot study is not without limitations. The small sample size, particularly related to the matched pre-post data, limited the power and resulting statistical significance, as well as the generalizability of these findings. The Head Start delegate agency that participated in the SHIP pilot project experienced 42% turnover rate during the 2018 to 2019 school year, which may explain the low number of ECE teachers who completed both the pre- and post- survey. Additionally, data on the types of PSE changes were self-reported by the ECE directors; self-reported data from the ECE teachers as well as objective observational data would help to increase the reliability of these findings. Further evaluation efforts, including direct observation of PSE changes, are needed to inform the level of implementation of these changes and sustainability of changes over time.

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