



Total Worker Health (TWH) With Interventions: Literature Review

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Abstract. This study aimed to explore Total Worker Health (TWH) and its implementation to improve occupational safety, health, and well-being. Researchers explored and gained an understanding of intervention studies, research designs, and existing research. The existing studies were analyzed to obtain a new design for implementing TWH. This article used a qualitative systematic review to describe research TWH. Researchers used literature from digital libraries such as JStor, Science Direct, Scopus, Atlantis Press, Emerald, Inderscience Publisher, and Proquest from 2011 to 2021. The keywords used were total worker health, well-being, health, intervention, and workplace. The results of the disbursement found a total of 73 articles on occupational safety, health, and well-being. After eliminating duplication and irrelevance articles, 18 articles were analyzed. The stages in conducting meta-synthesis in this study are framing the research question, locating relevant research, inclusion criteria, extracting and coding data, analyzing at a specific case level, synthesizing on an across-study level, building theory from meta-synthesis, and discussing. The total worker health study used a qualitative and quantitative approach. In its development, TWH has used control hierarchies, conceptual models for the development of total worker health, and interventions have been introduced. The implementation of an integrated Total Worker Health can improve safety, health, and well-being of workers. The framework that involves all parties in the organization for workers. It was found that there are six main characteristics of Occupational Health and Safety Assessment in the workplace, leadership commitment, policy, and practice, participation, comprehensive and collaborative strategy, discipline/compliance, and evaluation/improvement.

Keywords: Total worker health, Well-being, Health, Intervention, Workplace, Safety

1 Introduction

Total worker Health (TWH) is policies, programs, and practices that integrate protection from work-related safety and health hazards with the promotion of injury and

illness prevention efforts to advance worker well-being. The TWH approach seeks to improve workforce well-being by protecting safety and improving worker health and productivity [1]. Since 2004, the National Institute for Occupational Safety and Health (NIOSH) in the United States has been trying to unify various methods in the field of occupational safety and health and carry out workplace introductions to produce a comprehensive solution. This initiative then culminated with the development of TWH with an approach: investigations, practices, and policies related to TWH. Total Worker Health is multidisciplinary and involves all places, individuals, groups, organizations, and work environments [2]. Total Worker Health is a strategy that integrates occupational safety and health protection to prevent injury and illness to workers and to improve worker health and safety [3]. This strategy supports the development of programs that align occupational safety with individual behavior that promotes a healthy lifestyle. The American College of Occupational and Environmental Medicine (ACOEM) explains that the components of a workplace health and socialization program include strategic, integrated, and systematic efforts, bringing together environmental and safety policies that prevent work-related injuries with activities that improve overall health and well-being of workers [4].

Total worker health concept is a form of disease and injury prevention that arises in the workplace. The company's occupational health department must involve and motivate workers to participate in reducing health and safety risks by changing lifestyles [1]. Several companies reported losses due to high health costs, worker accident compensation claims, absenteeism, and decreased worker productivity caused by accidents and worker health which tends to decline. In this case, employers have a role in offering programs and facilitating workers through occupational safety and health programs. As with business planning, initiatives in implementing TWH also require investment in costs and time. When companies invest to improve worker health, companies can also increase company profits [5]. Control & Prevention (2014) reports that companies that implement TWH can reduce healthcare costs and increase worker productivity.

Implementing TWH that is integrated into worker safety, health, and well-being provides a framework to help all parties involved and protect themselves, workers, and the public in a systematic way [6]. The Six Main Characteristics of a Safety and Health Assessment at Work are leadership commitment, policies, and practices, participation, comprehensive and collaborative strategy, discipline/compliance, and evaluation/improvement [6].

In 2015, TWH introduced a control hierarchy adapted from the control hierarchical framework used in occupational safety and health to strengthen the link between traditional OSH approaches and TWH. The following is the TWH control hierarchy as shown in Figure 1.

The word total worker health started in October 2004, which seeks to bring together knowledge and experience of health protection and health promotion to stimulate action for program development [8]. In 2005, this initiative was redeveloped and renamed the NIOSH Work-Life Initiative [9]. NIOSH initiatives support addressing worker health and well-being in new ways by addressing the physical and organizational work environment alongside individual health and behavioral decisions. Some of the goals of the WorkLife Initiative include supporting the evaluation of integrative approaches to work

and health, promoting the adoption of proven policies and practices, motivating cross-disciplinary collaboration among researchers, and carrying out the separation of occupational health and health promotion. In September 2007, NIOSH and 35 other organizations conducted the "WorkLife 2007: Protecting and Promoting Worker Health" symposium, in which more than 450 participants explored TWH-based policies and practices that support and enhance worker health and well-being.

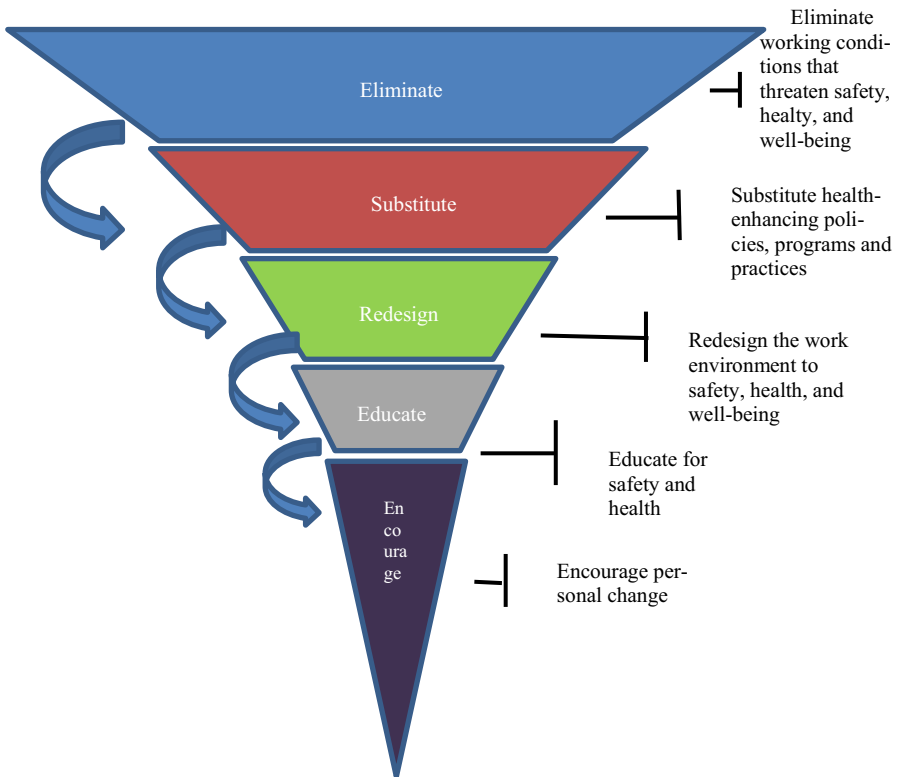


Fig. 1. Hierarchy of Controls Applied to NIOSH Total Worker Health [7]

In 2008, collaborators at NIOSH and the Centers of Excellence developed 10 recommendations grouped in practice, research, and policy, as a long-term strategy for advancing WorkLife [3]. These recommendations are based on evidence-based practice and research-to-practice initiatives. In 2011, a collaborative symposium with other federal agencies culminated in the "2011 Federal Worker Symposium", which applied the TWH approach to federal employees. In 2011, NIOSH WorkLife became "Total Worker Health" to deliver a more comprehensive approach to prevention in the workplace. With TWH, NIOSH can continue to develop WorkLife initiatives through research, intervention, partnerships, and capacity building to meet workforce needs.

The year 2012 marked the publication of the TWH program, in which NIOSH proved that by integrating occupational safety and health protection program activities

with other workplace policies, programs, and practices it will be more effective to maintain worker safety, health, and well-being. In 2014, NIOSH created the TWH research coordination and support office to coordinate and advance extramural and intramural efforts. That same year NIOSH hosted a workshop on "TWH Best Practices", and also coordinated the first international symposium to advance TWH in Bethesda with over 350 participants. In 2016 TWH added an important element to advance worker safety, health, and well-being.

The objective of this article is to explore Total Worker Health (TWH) and its implementation to improve occupational safety, health, and well-being. Researchers explore and gain an understanding of intervention studies, research designs, and from existing research. The existing studies were analyzed to obtain a new design for implementing Total Worker Health (TWH).

2 Methods

The research method used in this research is the literature review method. A literature review is one of the best ways to synthesize research findings to show meta-level evidence and to reveal which areas are still under-researched, it is also an important component for creating a theoretical framework and building a conceptual model [10]. The researchers used the literature which is the subject of study in this paper. Literature has been taken from journals published by journals obtained from digital libraries such as JStor, Science Direct, Scopus, Atlantis Press, Emerald, Inderscience Publisher, and Proquest 2011-2022 period. The keywords used by researchers in finding literature sources are total worker health, well-being, health, intervention, workplace, and safety. The researcher conducted a literature selection by taking articles whose topic was Total Worker Health. The initial year was chosen in 2011 due to the consideration that this research began to be developed and in 2012 the word total worker health was introduced, while the word intervention was used starting in 2000. A literature search was carried out using the terms "Total Worker Health", "Well-being", "Health", "Intervention", "Workplace", and "Safety".

Search results found a total of 73 articles found to be compatible with each other, and after eliminating duplication and irrelevance the number of relevant non-duplication articles was reduced to 18 articles. Irrelevance refers to articles in the form of short comments or short notes or when the implementation of total worker health requires intervention.

The stages in conducting this study following qualitative research according to (Hoon, 2013) are: (1) Framing the Research Question; (2) Locating relevant research; (3) Inclusion Criteria ; (4) Extracting and coding data ; (5) Analyzing at a case-specific level ; (6) Synthesizing on an across-study level ; (7) building theory from meta-synthesis ; (8) discussed. In the first step, a literature study on total worker health is carried out to identify problems or phenomena. The second step is screening relevant research, meaning that researchers define keywords to be able to find sources for the location of literature databases in the form of scientific research results that have the topic of total worker health. A literature search was performed using databases such as JStor, Science

Direct, Scopus, Atlantis Press, Emerald, Inderscience Publisher, and Proquest. A literature search was carried out on the internet using Google Scholar. The Third step, inclusion criteria, is to build a list of inclusion/exclusion criteria so that the most suitable research articles are obtained in terms of method, design, research focus, and interventions used. The sample inclusion stage should clearly describe the study design, population, interventions, and outcomes to be included and excluded from the review. The inclusion criteria according to [11] can be seen in Table 1.

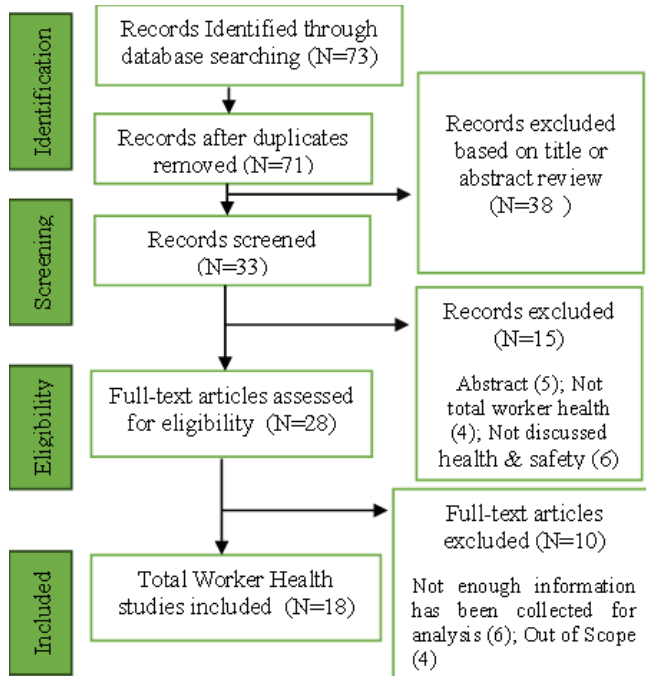


Fig. 2. Research Inclusion and Exclusion

The fourth step is extracting and coding data, which is the process of collecting data in the form of information related to the characteristics of total worker health. Based on the extracting stage, 18 articles were obtained that met the requirements as articles to be included in this literature review. The fifth stage is analyzing at a specific case level, which is an analysis of qualitative findings from a systematic review to reveal new recommendations. The sixth stage is synthesizing on an across-study level, which is synthesizing the results with narrative techniques sourced from data sets from various articles. The seventh stage is building theory from meta-synthesis, which is making a review of research results and connecting them with theories that are on the total worker health research topic. The eighth stage is discussion, which is a discussion of the theory that has been found.

Table 1. Intervention Studies on Total Worker's Health (TWH)

No	Author	Design	Intervention	Results	Information
1	Carr, Leonhard, Tucker, Fethke, Benzo and Gerr [12]	Randomized control trial, Two Groups	Participants accept intervention optimization workstations ergonomics and three - mail/ training week rest and variety posture work.	The intervention recipient group was able to increase physical activity, more work and large activities, health and produce better work productivity	1. Health protection-only group (HPO) 2. Health protection/health promotion group (HP)
2	Williams, Tompa, Lero, Fast, Yazdani and Zeytinoglu [13]	The comparative pre-post-test study design used the effectiveness, cost analysis, and analysis approaches intervention.	Place of intervention Work related to potential impacts on health, particularly mental, psychosocial, and physical health.	Cost savings, increased productivity, and organizational commitment influenced the outcome of the intervention	Evaluation economical and productivity
3	Coffeng, Hendrikse n, Duijts, Proper, van Mechelen and Boot [14]	2x2 factorial design, intervention Group Motivational Interviewing (GMI)	The intervention consisted of a motivation Interview Group supported by social media platforms, and environment modification.	GMI has produced a program of activities for physical and relaxation reduce the need for recovery for office employees.	Evaluation economics and process implementation
4	Olson, Elliot, Hess, Thompson , Luther, Wipfli, Wright and Buckmaster [15]	The COMPASS (Community of Practice and Safety Support) study is a cluster randomized trial implemented among workers.	Environment, individual internal determinants, and individual behavior	The intervention group showed positive changes in behavior compared to the control group	The COMPASS study was designed to evaluate the efficacy of the TWH program. improve the welfare of workers.
5	Wipfli, Wild, Hanson, Shea, Winters-Stone and	Randomized control trial	Physical work activity place intervention	Group intervention was able to increase productivity compared to the control group	Measuring physical activity objectively.

No	Author	Design	Intervention	Results	Information
	Thosar [16]				
6	DeChant, Acs, Rhee, Boulanger, Snowdon, Tutty, Sinsky and Craig [17]	Organizational intervention	Work team, work time management.	Implement intervention studies place for reduce burnout with simplified work-flows through team-based interventions.	Of the 50 included studies, 35 (70.0%) reported intervention that worked.
7	Sauter and Murphy [18]	Organizational intervention, behavior-based safety	Health promotion program, stress management program.	Organizational receive work interventions more effectively However need to be developed, implemented, and evaluated.	Evidence is accumulating that management practices like downsizing, flexible work arrangements can improve worker health and safety
8	Amick III, Menéndez, Bazzani, Robertson, DeRango, Rooney and Moore [19]	Pre-post intervention. chair with office ergonomics training (CWT).	Receive group chair + training, group training, group control	Adjustable worker chair and ergonomics training for reduced visual symptoms and their effects for 12 months post-intervention	Visual symptoms in the control group reduced
9	Dubuy, De Cocker, De Bourdeaudhuij, Maes, Seghers, Lefevre, De Martelaer and Cardon [20]	Interventions where the Re-Aim Questionnaire works	The RE-AIM framework was used for guide evaluation. Two months after the start of the intervention.	There was a long period of effectiveness and sustainability after the intervention.	The results of the study in dissemination are quite promising. There is evidence of long periods of effectiveness and sustainability.
10	Cantonnet, Aldasoro and	Intervention organization With workplace health	Healthy nutrition interventions, sports activities after	The results showed that materially the effect of WHPI	On average, the WHPI that occurs the most is

No	Author	Design	Intervention	Results	Information
	Oyarbide [21]	promotion interventions (WHPI).	working hours, sports after returning to work, addiction prevention, and procedures for returning to work after prolonged illness	intensity and type was significant	the return to work procedure after a long illness, followed by physical activity and sports after working hours.
11	Anger, Elliot, Bodner, Olson, Rohlman, Truxillo, Kuehl, Hammer and Montgomery [22]	Organizational intervention, Work environment	Training, counseling, and participation	Total worker health interventions have an effect, including objectively measured biomarkers.	Total worker health interventions have been steadily improving.
12	Sorensen, Dennerlein, Peters, Sabbath, Kelly and Wagner [9]	cluster randomized trial pre-post . Behavior based safety	environmental interventions in the workplace	There was a change in behavior in the group intervention	High respondent inconsistency factor
13	Eriksen, Ihlebaek, Mikkelsen , Grønningsæter, Sandal and Ursin [23]	Randomized control trial pretest-post-test	intervention compared to effectiveness, physical exercise, training management stress, and integrated programs related to behavior	There is no difference between groups	Used descriptive statistics
14	Kuehl, Mabry, Elliot, Kuehl and Favorite [24]	Quasi-Experimental Design	Work environment interventions, behavior, work-related musculoskeletal disorders	There was no impact of intervention including previous health	Interventions that can reduce health costs
15	Rasmussen, Glasscock , Hansen, Carstensen, Jepsen	Quasi-Experimental Design	Interventions are participatory, work risk evaluation, work observation more	The results of the intervention were better than before the intervention	Structural changes cause the system to have no hierarchical

No	Author	Design	Intervention	Results	Information
	and Nielsen [25]		personal protective equipment.		management.
16	Nagler, Stelson, Karapanos, Burke, Wallace, Peters, Nielsen and Sorensen [26]	Using the Implementation Guidelines to Develop the Intervention	Participatory TWH interventions can be challenging to design and implement in real-world settings, especially in low-wage, fast-paced, high-attrition industries such as food service	The Implementation Guidelines can be used by both practitioners and researchers to develop interventions that are responsive to the organizational context and address targeted working conditions to improve worker safety, health, and well-being. Efforts such as this to translate theory-based Implementation Guidelines into pragmatic processes and considerations for both practitioners and researchers is an important step forward to develop TWH interventions across industry sectors	Application of the Guidelines is likely transferable to other industries
17	al [27]	Pre-post randomized controlled trial .	Intervention participative for workers factory	Participation can increase health and work performance	There was a significant impact on the results of the intervention
18	Alkhajah, Reeves, Eakin, Winkler, Owen and Healy [28]	Quasi-Experimental Design	Sitting time intervention during working hours	Intergroup intervention	There was a significant impact on the results of the intervention

3 Results

The 18 articles summarized in Table 1 show that the intervention study on total worker health used a qualitative and quantitative approach using 6 designs, namely a) randomized controlled trial 4 articles [29], b) pre-post intervention comparative [13,

19], c) cluster randomized trial [9, 15], d) factorial design [14], e) organizational intervention [17, 18], f) Quasi-Experimental [24, 25, 28, 30]. The basic theory used in the intervention with a) a socioecological approach, a theoretical framework by knowing multilevel influences, b) social-cognitive which explains the influence of behavior, work environment, and organization after the intervention, c) a control model, namely by looking at the comparison before and after the intervention was carried out.

Workplace interventions are associated with potential impacts on health, and in particular on mental, psychosocial, and physical health [13] indicating that cost savings, increased productivity, and organizational commitment affect intervention outcomes. [14] produced a program of physical activity and relaxation to reduce the need for recovery in office employees and also analyzed the economic impact. The interventions carried out [15] showed changes in behavior in the control group and resulted in a total worker health design to improve worker well-being. Organizational intervention [18] found that work organizations that receive interventions are more effective but need to be developed, implemented, and evaluated. [31] Organizational interventions have influenced a variety of outcomes, including biomarkers that are objectively measured and are undergoing continuous improvement.

Based on NIOSH's definition of total worker health (2012) policies, programs, and practices that integrate protection from work-related health and safety hazards with the promotion of efforts to prevent injury and illness to advance worker well-being. TWH research is considered important to carry out the integration and combination of several intervention models so that the implementation can be sustainable, and the results and impact of interventions can be evaluated. Researchers see that work environment interventions, organization, and work behavior can increase productivity, occupational health and safety, and well-being through the concept of total worker health. With this intervention approach, one can also see the economic impact of implementing total worker health.

4 Discussion

In previous studies, the implementation of total worker health was carried out in a participatory manner, so it is important to do it in an organized manner by placing the implementation of total worker health in one particular section or as a steering group. Steering groups use experience, skills, and knowledge to drive health interventions in the workplace and make strategic decisions. This steering group can be attached to the position if the organization is small but can also stand alone. The steering group is composed of individuals with diverse skill combinations and from various levels within the organization. The ideal arrangement of a steering group involves a representative sample of different groups of employees in the organization where the size of the steering group will vary depending on the size of the organization and can range from two members to many more. Individuals in the steering group are usually recruited from two pools namely board leaders, senior management representatives, line managers, HR, staff board representatives: representatives from various fields, and other board members [32].

Most of the effectiveness of total worker health implementation can be seen after interventions have been made in the work environment, organization, work behavior, and others. Evaluation carried out as a continuation of the program and implementation of total worker health. The results obtained are in the form of increased productivity, levels of occupational health and safety, and some others show the cost of implementation by calculating the return on investment. Most of total worker health intervention programs do not identify costs, there are three categories of factors that would make interventions more expensive or otherwise would allow economic interventions such as the use of external trainers or facilitators to plan or implement interventions, new training and programs, and purchase of new equipment. Interventions in previous research in the implementation of total worker health show all models better results and the need to integrate total worker health as a strategy taken by management in companies even though it can also be a problem [22]. The total worker health program should be seen more as a long-term objective that guides an integrated qualitative and quantitative approach [9].

No matter what kind of research study design is used, measurement and evaluation interventions might present a number of difficulties. For instance, the TWH intervention is multi-factorial by definition, making it challenging to isolate certain components and contrast them with those present in businesses or workplaces that do not use a TWH program. Besides as a result, both employees and employers may consider data collecting to be useful but also distracting, cumbersome, or not absolutely necessary for the job. This challenge is made more challenging by the requirement to collect data from a control group of employees who would not directly benefit from the intervention being evaluated. This also raises questions about the interrelationship between methodological options or decisions and Institutional Review Board considerations. The organization has a significant amount of influence over the implementation of the intervention at the workplace, including the content, duration, and intensity of the intervention as well as the manipulation of specific variables. Changes in an organization, including in the leadership and the working environment, can be quite challenging. Particularly when TWH programs are customized to particular workplaces and provided for various exposure times, intervention fidelity and consistency throughout the workplace may prove challenging to control. Additionally, it may take a long time to see results from TWH treatment [33].

5 Conclusion

The following summaries need attention in total worker health research based on the findings of the conducted literature review. Total worker health research is participatory, so it's crucial to conduct it in an organized manner by assigning implementation of total worker health to a specific section or as a steering group so that there is a continuous planning, implementation, and evaluation process taking the resources available into consideration. The TWH program's intervention method produces qualitatively and quantitatively better outcomes in time, necessitating a shift in perspective in the program's implementation in support of a long-term objective that directs the use of an

integrated qualitative and quantitative approach. The results of the literature study revealed that while there was insufficient evidence to support the best type of intervention, all strategies produced superior outcomes. When TWH is implemented, objective results should be used to find best practices that have measurable outcomes, such as better health and fewer accidents, cost savings for organization, and more efficient treatments accidents, cost savings for industry, and more effective interventions.

Author's Contributions

WT contribute to topic selection, meta-analysis, collection data, manuscript writing, revision of the manuscript. WT, SGP,AS read and approved the final manuscript.

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