A TRAINING PROGRAM TO PROMOTE CORRECT ERGONOMIC BEHAVIOR AMONG U.S. MILITARY MEMBERS

UNIVERSITY OF HAWAIʻI AT MĀNOA
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Abstract

Musculoskeletal disorders (MSDs) are a major cause of healthcare utilization, limited duty, and disability in the U.S. Armed Forces. MSDs are injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs. Work-related MSDs are conditions in which the work environment and performance of work contribute significantly to the condition. In the military, MSDs are primarily attributed to training and occupational activities and can have a direct negative impact on troop health and performance. Most musculoskeletal conditions that develop in the line of duty can be avoided or mitigated by a variety of injury prevention strategies, including ergonomic interventions. The aim of this Doctor of Nursing Practice (DNP) project was to implement an ergonomics-based training program to increase awareness in injury prevention and to promote correct ergonomic behavior among select members of the Hawaii Air National Guard (HIANG). Twenty-four HIANG members assigned to the CRE Medical Detachment participated in an ergonomics-based training program in June 2022 as part of their monthly in-services. Skills evaluation and participant survey were used to collect data. Results from the skills evaluation suggest that an ergonomics-based training program can increase safety awareness and encourage correct ergonomic behavior in the workplace. Results from the participant survey imply that participants found the training program helpful and practical. Results also indicate that participants felt very confident in applying the principles of ergonomics in their occupations, as a result of this training program.

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List of Abbreviations

ANG – Air National Guard

CBRNE – Chemical, Biological, Radiological, Nuclear, and Explosives

CRE – CBRNE Response Enterprise

HIANG – Hawaii Air National Guard

JHNEBP - John Hopkins Nursing Evidence-Based

Maj. – Major

MSD – Musculoskeletal Disorder

MSgt. – Master Sergeant

NIOSH – National Institute for Occupational Safety and Health

OSHA – Occupational Safety and Health Administration

Introduction

Musculoskeletal disorders (MSDs) are a major health problem across all branches of the U.S. Military. About 75% of all medically non-deployable military members are associated with a musculoskeletal condition, with the vast majority resulting from physical training and occupational tasks (Lovalekar et al., 2021). According to the Uniformed Services University of Health Sciences and Walter Reed National Military Medical Center, MSDs place 68,000 military members in non-deployable status every year (Grimm et al., 2019). In addition, MSDs result in 25 million days of limited duty and drive more than two million medical encounters per year, with healthcare costs exceeding $3.7 billion annually (Grimm et al., 2019).

The vast majority of MSDs in the U.S. Military result from cumulative microtrauma, according to Lovalekar and colleagues (2021). These conditions typically result from repetitive tasks, forceful exertions, vibration, mechanical compression, or sustained postures (Iqbal & Alghadir, 2017). Examples of MSDs that result from cumulative trauma include stress fracture, patellofemoral syndrome, shin splint, tendonitis, bursitis, plantar fasciitis, and lumbar pain. Although acute traumatic MSDs (i.e., joint dislocations and ligament tears) occur less frequently in the line of duty, the pain and disability associated with these conditions are typically more debilitating. Occupational and training environment, inadequate time for rest and recovery, and expectations beyond limit from leadership are additional risk factors that are unique to the military population (Sammito et al., 2021).

Many service members experience the consequences of MSDs for many years. A variety of factors can cause MSDs to recur or become chronic. According to the Army Public Health Center (2022), osteoarthritis and spondylosis are common long-term effects of these disorders which can continue to degrade the physical and mental wellbeing of affected individuals. As

reported by Grimm and colleagues (2019), osteoarthritis develops in about 35% of service members, compared to 20% in the civilian population. For many, musculoskeletal conditions that develop while on active duty translate into ongoing physical and psychosocial problems as veterans. Today, the most common pain conditions among veterans are MSDs (Adams et al., 2021).

Problem Statement

MSDs are a significant cause of healthcare utilization, limited duty, and disability in the U.S. Armed Forces (Molloy et al., 2020). Strategies to prevent or minimize the incidence and severity of MSDs are tailored to the physical and environmental nature of the occupation or training. Some of the most common injury prevention strategies in the military include routine safety education and mandatory use of protective gears. Since the COVID-19 pandemic began in March 2020, little emphasis has been put on MSD prevention, despite CRE Medical Detachment's continued involvement in high-intensity physical activities (i.e., setting up COVID-19 testing sites, moving medical supplies and equipment). Maj. Ercira Guisadio-Abis, the organization's Medical Plans Officer, reported that most members of the CRE Medical Detachment have not received any form of ergonomics-based training for at least ten years (personal communication, March 4, 2022). MSgt. Jordan Chang, the organization's Safety Officer, also claimed that MSDs remain a significant cause of reduced productivity among members of the CRE Medical Detachment (personal communication, March 4, 2022)

Purpose and Objectives

The purpose of this DNP project was to increase injury prevention awareness and promote correct ergonomic behavior among members of the CRE Medical Detachment. The goal of this project was to increase members' competence and confidence in applying basic

ergonomic principles in the workplace. The purpose and goal were addressed by the following objectives:

1. Develop a sustainable ergonomics-based training program that is customized to the CRE Medical Detachment. This training program would include:
    a. A demonstration video of four military members applying proper lifting techniques as they perform a 4-man litter carry
    b. A hands-on activity to allow members to practice the five lifting techniques in a controlled environment
2. Train the trainers. Prepare two senior members of the CRE Medical detachment to deliver and maintain the training program. These trainers would be trained to:
    a. Provide a brief introduction to workplace ergonomics
    b. Facilitate the training program
    c. Conduct a skills evaluation and survey
3. Implement the training program in the following sequence of events:
    a. Brief introduction to workplace ergonomics
    b. Demonstration video presentation
    c. Hands-on activity: skills practice
    d. Skills evaluation and participant survey

Background

The U.S. Armed Forces consist of the six service branches: Air Force, Army, Coast Guard, Marine Corps, Navy, and most recently, Space Force. The Air National Guard (ANG) is a reserve component of the Air Force and is further divided up into units stationed in each of the 50 states, the District of Columbia, the Commonwealth of Puerto Rico and the two U.S.

territories (USA.gov, 2022). The ANG is unique in that it has both a federal and state mission. The federal mission of the Hawaii Air National Guard (HIANG) is to provide operationally ready combat units, combat support units, and qualified personnel for active duty in the Air Force in time of war, national emergency, or operational contingency (Air Force, n.d.). The state mission of the HIANG is to provide organized, trained units to protect Hawaii's citizens and property, preserve peace, and ensure public safety in response to natural or human-caused disasters (Air Force, n.d.).

The 24 HIANG members who participated in this DNP project are assigned to the CBRNE Response Enterprise (CRE) Medical Detachment – a medical component of the HIANG. In a state of emergency (i.e., pandemic, hurricane, etc.), their unit-specific obligations can include triage, decontamination, evacuation, search extraction, and field trauma management (*Hawaii CERFP MEDEL*, n.d.). Year round, they are responsible for maintaining back-up medical supplies and equipment such as ventilators and defibrillators (*Hawaii CERFP MEDEL*, n.d.). Additionally, they are responsible for maintaining high density equipment such as electrical generators, cargo trailers, and climate-controlled tents (*Hawaii CERFP MEDEL*, n.d.). At a minimum of twice a year, the team participates in local and multi-state field training exercises to ensure year-round force preparedness (J. Chang, personal communication, March 4, 2022.).

Members of the CRE Medical Detachment are heavily involved in manual activities during field training exercises, according to Maj. Guisadio-Abis (personal communication, March 4, 2022). These activities can include loading/unloading cargo trailers, building medical treatment tents, carrying items over rugged terrains, and crawling into collapsed structures (J. Chang, personal communication, March 4, 2022). Many of these activities require members to

kneel over long periods of time, bend over frequently, carry/lift heavy objects, pull/push oversized items, and twist their bodies in awkward positions. The physical and environmental nature of these field training exercises predisposes members to a variety of musculoskeletal injuries.

PICO Question

Compared to standard safety training, does the inclusion of an ergonomics-based training program increase injury prevention awareness, and promote correct ergonomic behavior among members of CRE Medical Detachment?

Framework

The Iowa Model-Revised Model (University of Iowa Hospitals and Clinics, 2017) served as the guiding framework for this project.

1. Identify the trigger where an EBP change is warranted.
2. Determine if the problem at hand is a priority for the organization.
3. Form a team that will develop, evaluate, and implement the EBP change.
4. Gather and analyze the research related to the desired practice change.
5. Critique and synthesize the research discovered during the literature search.
6. Stop and decide if there is sufficient research to implement a practice change.
7. Implement change into a pilot program.
8. Evaluate results. Is the change feasible and does it result in improved outcomes?

Synthesis of the Evidence

Literature Search: Strategy

Literature review was conducted using PubMed/MEDLINE, CINAHL, Google Scholar, and Cochrane Library databases. Filters were set to retrieve full text articles available in English.

A publication date filter was applied to exclude articles older than 10 years. To expand the search results, no restrictions on article types were applied. Various key words were used to find articles that covered a wide range of topics in work-related musculoskeletal disorders and ergonomic interventions. Search items included: musculoskeletal disorder, work-related injury, ergonomic interventions, ergonomic strategies, ergonomic education, ergonomic approach, body mechanics, ergonomic principles, and lifting methods. A total of 104 literature articles were chosen for relevance assessment.

Grading of Evidence

Nineteen of the 104 articles were selected and critically appraised. The John Hopkins Nursing Evidence-Based Practice (JHNEBP) grading system was utilized to critically appraise articles and identify the level and quality of evidence (shown in Appendix D). One article was a systematic review of randomized control trials (Level I), three were quasi-experimental studies (Level II), seven were non-experimental studies (Level III), seven were expert opinions based on scientific evidence (Level IV), and one was a case report (Level V).

Summary of the Evidence

MSDs are a significant health problem among U.S. service members (Molloy et al., 2020). The high prevalence of MSDs in the U.S. Military negatively impacts force readiness and mission accomplishment (Grimm et al., 2019; Lovalekar et al., 2021; Molloy et al., 2020). In addition, MSDs are responsible for exorbitant medical costs to the U.S. Government (Grimm et al., 2019; Hauret et al., 2019). Many affected service members develop chronic pain and long-term disabilities which may increase their risks for secondary health deficits and psychosocial problems (Adams et al., 2021; Grimm et al., 2019; Higgin et al., 2014; Williams et al., 2019).

Currently, there is a lack of quality studies that support the efficacy of ergonomic-based interventions in military populations. However, there is a large body of literature that supports ergonomics-based interventions in a wide variety of occupations in the general population. Ergonomics-based interventions, particularly education and training, show benefits in terms of work efficiency, safety, and worker satisfaction (Rasmussen et al., 2018; Robertson et al., 2017). Employee ergonomics training has been shown to reduce workers' exposure to MSD risk factors in high-risk industries such as construction, healthcare, and agriculture (Brick, 2014; Carola, 2019; Robertson et al., 2017). Additionally, ergonomics-based training programs have been shown to influence positive behavior and attitude in the workplace (Carola, 2019; Oviya & Thenmozhi, 2018; Shuai et al., 2014). The Occupational Safety and Health Administration (OSHA) strongly recommends employers to implement formal training programs that cover topics in physical, cognitive, and organizational ergonomics. The National Institute for Occupational Safety and Health (NIOSH) also recommends ergonomics-based interventions in high-risk industries including healthcare, construction, manufacturing, and transportation (NIOSH, 2018).

The strength of the evidence is the large number of research studies that support ergonomics-based training interventions. Many of these studies suggest that ergonomics-based training interventions lead to employee satisfaction, increased safety awareness, and improved ergonomic behavior in the workplace. In addition, federal agencies such as the OSHA and NIOSH are consistent with recommendations for ergonomics-based interventions such as education and training. One weakness of the evidence is the lack of high-quality research studies that support ergonomics-based training interventions in reducing the incidence and severity of MSDs in the workplace. Another weakness is the lack of published research studies assessing the

efficacy of ergonomics-based training interventions in military populations. Nonetheless, ergonomics-based training programs appear to be feasible interventions in promoting safety in the workplace.

Methods

Project Design

This project used an intervention format with a pass/fail skills evaluation (shown in Appendix B) and a two-part participant survey (shown in Appendix C). The aim of this project was measured by using the data collected from the skills evaluation and participant survey.

Setting

This project was implemented in a classroom located at Wheeler Army Airfield, Hawaii on Sunday, June 5, 2022. An audiovisual system was used to present the demonstration video. Additional resources for training purposes were also provided by the CRE Medical Detachment.

Participants

This project was intended for members of the CRE Medical Detachment only. Due to COVID-19 infections and various other reasons, only 24 members of the 40-member organization were available to participate in this project (see Appendix A for participants).

Procedures

Several steps were taken to ensure the completion of this project. The following list describes these steps in details:

1. The student produced a training video that shows four military members applying proper lifting techniques as they perform a 4-man litter carry. These lifting techniques were:
    a. Assessing load and using help with heavy or awkward loads
    b. Standing close to the object with feet about shoulders width apart

c. Bending at knees, not at waist

d. Keeping back straight at all times

e. Rising by gradually straightening the legs

2. The student trained two senior members (the Safety Officers of the organization) to deliver the training program and collect post-training data via a skills evaluation and survey.

    a. Demonstration video, skills evaluation checklist, and survey were reviewed with the Safety Officers.

    b. Video file was saved and converted into various digital formats (i.e., MP4, MOV, and YouTube link https://youtu.be/XXSjR1EsAvo). Each digital format was provided to the Safety Officers.

    c. Procedures for training implementation and data collection were rehearsed.

3. On training day (July 5, 2022), the Safety Officers gathered all participants in a training facility at Wheeler Army Airbase.

    a. Student introduced self and provided a brief introduction to ergonomics.

    b. Safety Officers discussed training objectives and expectations.

    c. Demonstration video was presented using the organization's audiovisual system.

    d. Student and Safety Officers facilitated a hands-on training activity for 30 minutes, using Army litters and mannequin patients.

4. On data collection day (July 7, 2022), the Safety Officers gathered the participants in a training facility in Reno, Nevada, where the CRE Medical Detachment was participating in a field training exercise.

a. The 24 participants were divided into two groups, since there were two Safety Officers tasked to conduct the skills evaluation.
b. Each group was provided an Army litter containing a mannequin patient.
c. In the group, four participants were asked to perform a 4-man litter carry whilst demonstrating the five lifting techniques.
d. The evaluator filled out a skills evaluation form for each participant.
e. Upon completion of the evaluation, participants were asked to complete a participant survey.
f. Upon participants' return to Hawaii, completed evaluations and surveys were submitted to the student for analysis.

Data Collection

All data was collected from the pass/fail skills evaluation and two-part participant survey. All data was stored in a secure Google Drive located within the University of Hawai‘i at Mānoa's Google@UH Drive system. All files uploaded to Google@UH Drive were encrypted while stored on Google's servers. Data was stored in the author's secured file folder on the Google drive that uses file encryption and is only accessible with dual-authentication identification password protection.

Human Subjects Consideration

This DNP project involved making judgements about a program to improve or further develop program effectiveness and inform decisions about future programming within an organization (University of Hawai‘i Human Studies Program, 2019). All these tasks were related to quality improvement, meant for internal use only, and did not produce generalizable knowledge.

Analysis

For the pass/fail skills evaluation, scores were categorized into two sections: pass and fail. Individuals who correctly demonstrated all five lifting techniques were placed in the pass category. Individuals who did not correctly demonstrate all five lifting techniques were placed in the fail category. The data was then analyzed to determine the percentage of participants who showed competency in all five lifting techniques. The data was also analyzed to determine the pass rate for each skill.

Responses from Part I (open-ended questions) were tallied to identify common answers to the questions. The data was then analyzed to determine common themes for each question. Responses to the open-ended questionnaire were mainly used to provide feedback on the overall design of the project, as well as to suggest ideas on how to tailor future trainings. Responses from Part II (a 5-point confidence Likert scale with "1" = not at all confident to "5" = extremely confident) were also tallied, and scores were derived from each item. The data was then analyzed to determine the participants' confidence levels regarding the application of ergonomic principles in the workplace.

Results

Pass/Fail Skills Evaluation Results

Results from the pass/fail skills evaluation were analyzed to determine the pass rate for each skill on the skills evaluation checklist, as shown in Table 1.

Table 1.
Pass/Fail Rates by Skills

Skills (Lifting Techniques)	Fail Rate	Pass Rate
1. Airman assesses load and ask for help for heavy or oversized loads.	0%	100%
2. Airman stands close to the object with feet about shoulders width apart	0%	100%
3. Airman lowers body to the ground by bending at knees, not at waist.	0%	100%
4. Airman lifts the load by gradually straightening legs, using leg muscles.	0%	100%
5. Airman keeps back straight for the whole duration of evaluation.	0%	100%

Note. Each skill is correctly demonstrated by all 24 participants.

As shown in Table 1, all 24 participants showed competency in all five skills

Participant Survey Part I Results

Responses to the open-ended questions were thematically organized and tallied to identify common themes. Note that some participants provided more than one answer to each question. Figure 1 summarizes the common themes derived from the responses to question 1. Figure 2 summarizes the common themes derived from the responses to question 2. Figure 3 summarizes the common themes derived from the responses to question 3.

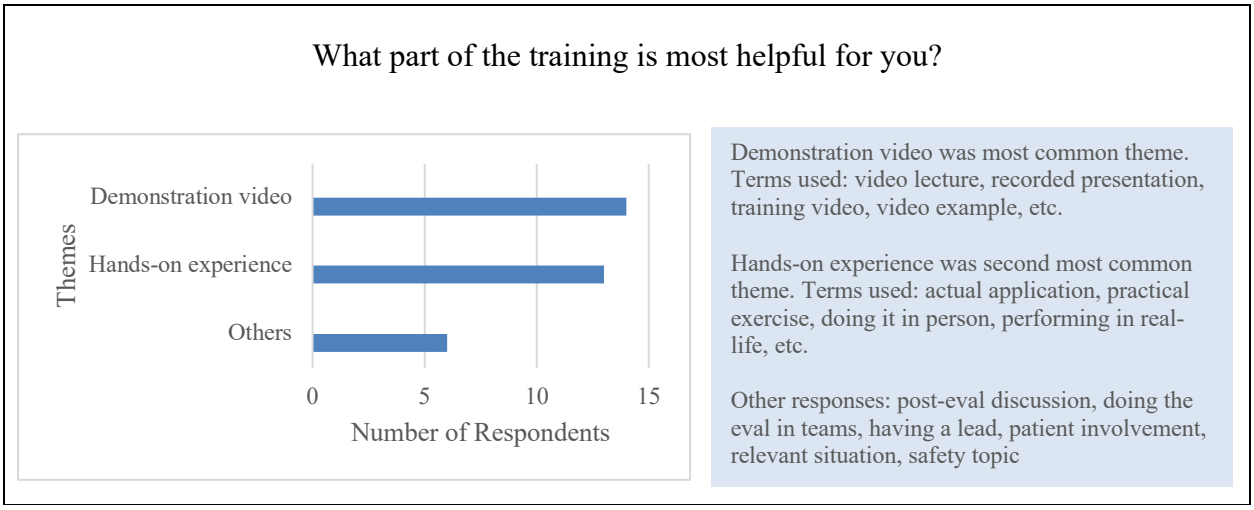

Figure 1. Responses to Question 1. This figure summarizes the common themes derived from question no. 1, based on the number of responses.

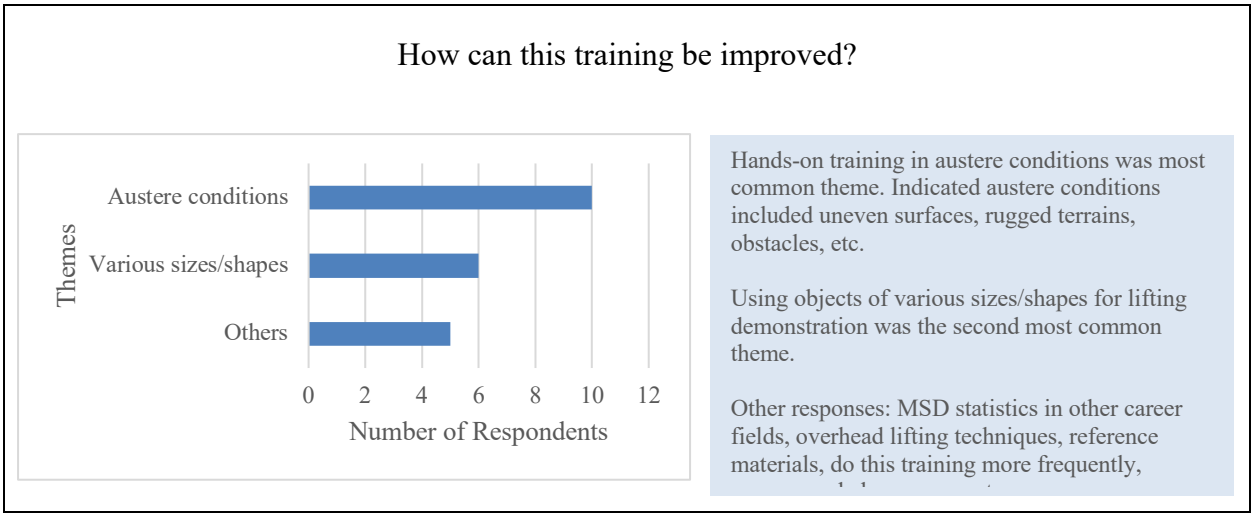

Figure 2. Responses to Question 2. This figure summarizes the common themes derived from question no. 2, based on the number of responses.

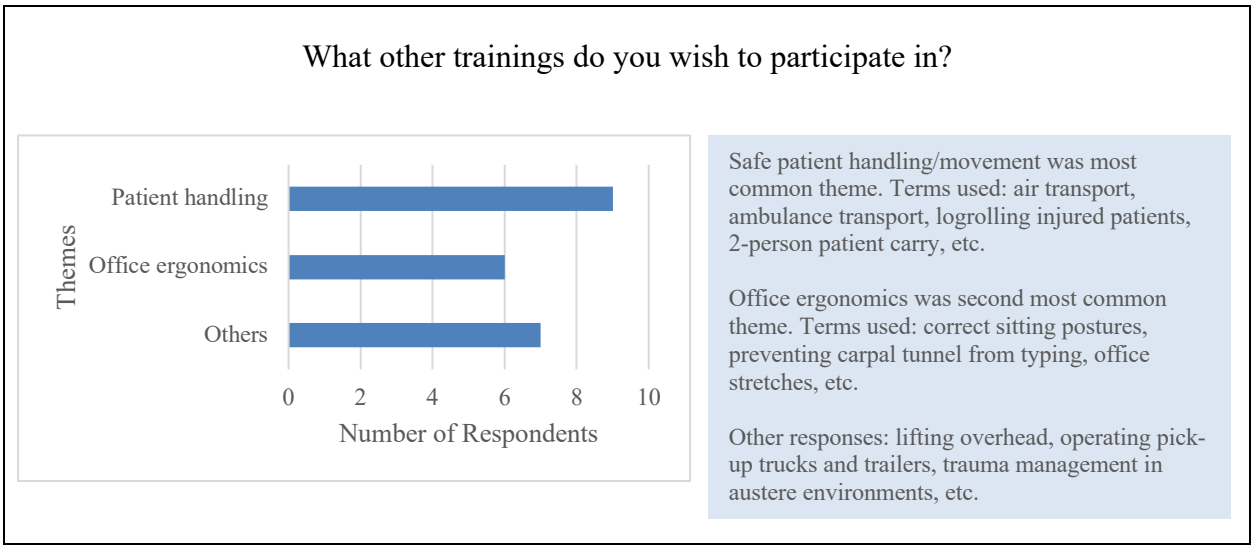

Figure 3. Responses to Question 3. This figure summarizes the common themes derived from question no. 3, based on the number of responses.

According to Figures 1, 2, and 3, responses to the open-ended questions were widely varied, but common themes were identified for each item. The demonstration video and hands-on experience were common themes for the most helpful part of the ergonomics training program. Additional hands-on training in austere conditions and using load models of varying sizes/shapes were common themes for improving the training program. Safe patient movement/handling and office ergonomics were common themes for future training ideas.

Participant Survey Part II Results

Responses to Part II were tallied, and scores were derived from each item. Figure 4 shows participants' confidence levels in applying each skill in their day-to-day tasks.

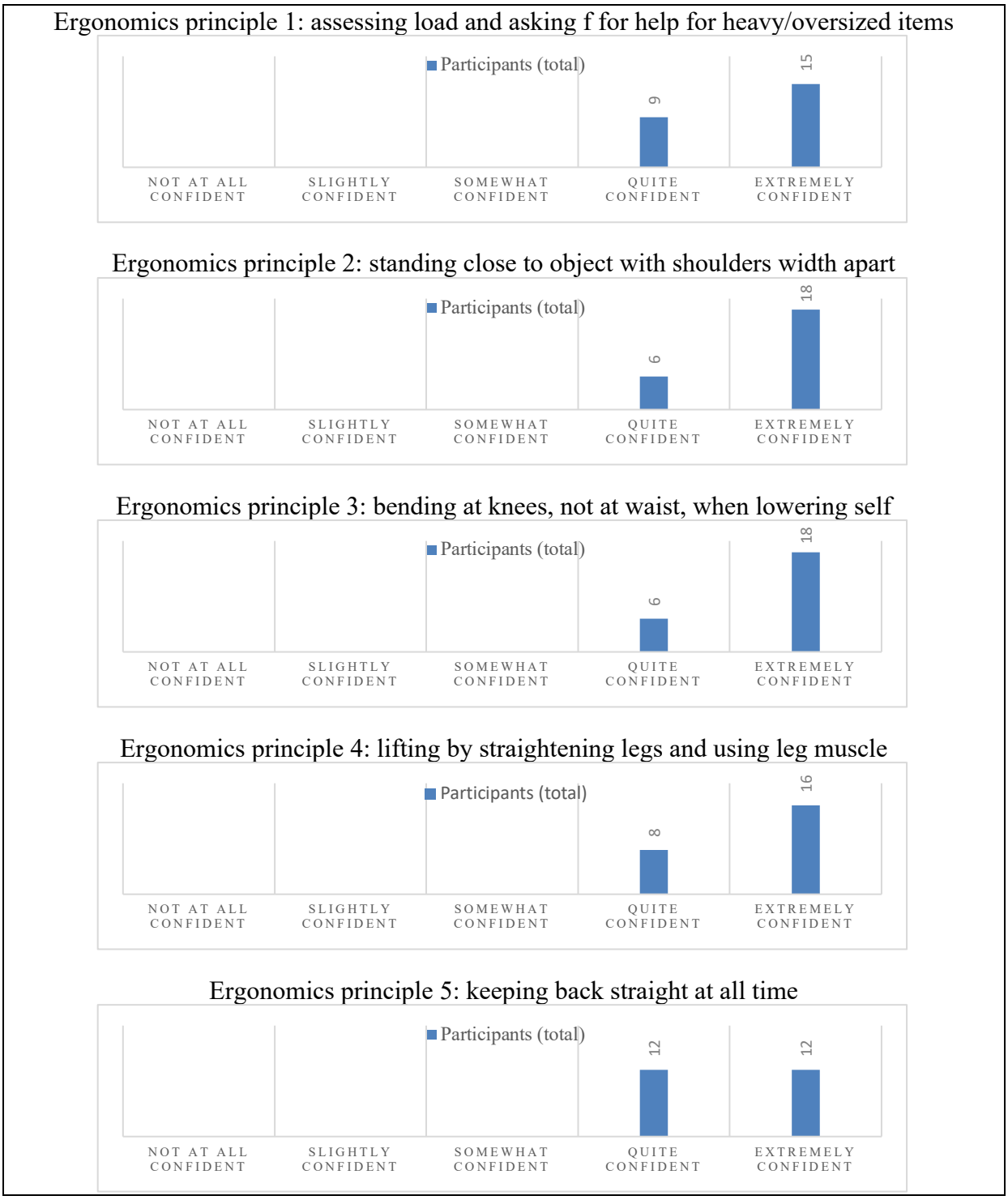

Figure 4. Confidence Levels. This figure shows participants' confidence levels each skill.

As shown in Figure 4, responses to Part II show that participants generally have high confidence levels in applying the five safe lifting techniques in their day-to-day tasks. For lifting technique 1, 62% of respondents feel “extremely confident” and 38% feel “quite confident.” For lifting technique 2, 75% feel “extremely confident” and 25% feel “quite confident.” For technique 3, 75% feel “extremely confident” and 25% feel “quite confident.” For technique 4, 67% feel “extremely confident” and 33% feel “quite confident.” For lifting technique 5, 50% feel “extremely confident” and 50% feel “quite confident.”

Discussion

Each item on the skills evaluation checklist was correctly demonstrated by all 24 participants. One can argue that factors other than the training itself could have influenced the overall positive result. One possible factor is the professional backgrounds of the participants. Most participants were college educated and healthcare workers who may already be well-informed in the subject. Since there are no pre-training data for comparison, there is no way of knowing whether participants were already proficient in the skills. Another possible factor is evaluation error. The evaluator was tasked to evaluate four participants simultaneously, which could have posed some challenges for the evaluator. Due to less-than-ideal conditions, the two evaluators could have possibly overlooked key details during the evaluation process.

Responses to the open-ended questions reveal three things about the participants as a group. One, their preferred learning styles include one or more of the following: visual, auditory, and kinesthetic. Several respondents noted that the narrated demonstration video, followed with a hands-on component, optimized their learning experience. Two, they believed the training could be further improved by diversifying its settings and conditions. Many of the respondents expressed their desire for a more advanced training objective, such as learning to apply

ergonomic principles in combat and uneven terrain. Three, they valued safety in the workplace. The overwhelming number of requests for safety-related trainings demonstrated the participants care about their health and the health of their peers.

Responses to the 5-point confidence Likert scale show that participants were either "quite confident" or "extremely confident" in applying each lifting technique in the workplace. The overall positive response to the scale may be subject to speculation because there is no way of knowing the level of honesty among the survey takers.

Relationship of Results to Purpose/Goals/Objectives

The purpose of this DNP project was to increase injury prevention awareness and promote correct ergonomic behavior among members of the CRE Medical Detachment. The overall goal of this project was to increase members' confidence and competence in applying safe lifting techniques in the workplace. Three main objectives were met to achieve the goal of this project: (a) develop a sustainable ergonomics-based training program that is customized to the CRE Medical Detachment; (b) prepare two senior members of the CRE Medical Detachment to deliver and maintain the training program; and (c) implement the training program in preparation for the organization's field training exercise in Reno, Nevada.

The successful implementation of this project proved that the training program is sustainable at little-to-no cost to the organization. The trainers' ability to deliver and facilitate the training was apparent throughout the process. Members' understanding of the importance of this training was reflected in their eagerness to participate in the project. The 100% pass rate on the skills evaluation might suggest that the training program was effective; however, there are limitations that may have potentially impacted this result. With 100% of the participants rating themselves as "quite confident" or "extremely confident" in applying the skills in their

occupations, it is likely they will use safe lifting techniques in the workplace. With the overall positive results, it is fair to say that this training program with revisions to manage the project's limitations, is a feasible intervention in increasing injury prevention awareness and in encouraging correct ergonomic behavior in the workplace.

Implications

One implication for future practice is the expansion of this training program to include office ergonomics. Members of the CRE Medical Detachment spend considerable amount of time in front of the computer, according to MSgt. Chang (personal communication, June 7, 2022). Additionally, office ergonomics appears to be a training of interest among survey respondents. A second implication for future practice is the adoption of a recurring ergonomics training to ensure all members remain adequately trained and currently proficient. A third implication is to expand the training to different contexts, such as in combat or with uneven and rocky terrain. The fourth implication is to decrease the number of participants to evaluators ratio. This would allow for increased accuracy of the evaluator's observations. The final implication for future practice is the dissemination of this training program to other organizations within the HIANG. The CRE Medical Detachment is one of several small organizations within a larger medical organization. The training presentation is saved in various digital formats for accessibility. Given its simplicity, distribution of this training program requires only minimal effort.

Strengths and Limitations

The decision to implement an ergonomics training program in the CRE Medical Detachment was made in agreement with senior members who truly understood the needs and priorities of the organization. Additionally, members of the organization took active roles in the development and implementation of this training program. For example, members were featured

in the demonstration video, and the Safety Officers were directly involved in the data collection. The organization's direct involvement throughout the process encouraged cooperation and generated enthusiasm among the participants. Furthermore, the demonstration video was uploaded in the organization's Facebook page, giving all members direct and unlimited access to the training material. Due to unforeseen time constraints, the skills evaluation and survey were conducted on a different day at another location. Fortunately, this change resulted in more opportunities for the participants to review the material, practice the skills, and ask questions.

Due to COVID-19 infections and other various reasons, only 24 members of the CRE Medical Detachment were evaluated and surveyed. This sample size reflected only 60% of the organization, suggesting that results may not reflect the entire organization. Additionally, the skills evaluation was conducted via overt/disclosed observation which may have influenced a specific behavior among the participants during data collection. Participants' actions during the skills evaluation may not reflect their true behavior in a normal setting in which they are not observed or evaluated.

The high participant to evaluator ratio for the pass/fail skills evaluation may have impacted the accuracy of the evaluators' scoring. Having more evaluators available to decrease the participant to evaluator ratio is recommended. Additionally, survey respondents might have been less than 100% honest when completing the surveys. Their knowledge of the academic nature of this training program could have potentially led them to respond inaccurately or falsely on the survey. For example, some respondents might have provided feedbacks they believed were in the student's best interest. Results from the 5-point confidence Likert scale also does not guarantee improved behavior in the workplace.

Conclusion

The purpose of this DNP project was to promote musculoskeletal health by encouraging members of the CRE Medical Detachment to apply fundamental ergonomic principles in the workplace. While survey results show that participants, in general, are very confident in their ability to use safe lifting techniques in the workplace, this data does not guarantee they will consistently apply these learned skills in their day-to-day tasks. While the 100% pass rate in the skills evaluation showed that participants are indeed proficient in the skills, this data still does not guarantee they will regularly use these skills in the workplace. Nevertheless, it is reasonable to say that this training program can play a part in promoting safety in the workplace.

Appendix A

Participant Demographics

Participating Members of the CRE Medical Detachment	
Internal Medical Physician	1
Family Practice Physician	1
Flight Surgeon	1
Physician's Assistant	1
Critical Care Nurse	1
Emergency Room Nurse	2
Nurse Practitioner	1
Clinical Nurse	1
Respiratory Therapist	1
EMT	6
Bioenvironmental Engineer Officer	1
Med Planner	1
Medical Admin/Systems	2
Med Logistics	1
Public Health Tech	1
Biomedical Equipment Tech	1
Bioenvironmental Engineer Tech	1
TOTAL	24

Appendix B

Pass/Fail Skills Evaluation

Evaluatee:
Evaluator:
Date:

Airman assesses load and ask for help for heavy or oversized loads.	□ Yes □ No
Airman stands close to the object with feet about shoulders width apart.	□ Yes □ No
Airman lowers body to the ground by bending at knees, not at waist.	□ Yes □ No
Airman lifts the load by gradually straightening legs, using leg muscles.	□ Yes □ No
Airman keeps back straight for the whole duration of evaluation.	□ Yes □ No

Number of activities passed: _____
Pass/fail: _____

Appendix C

Two-part Participant Survey

Part I: Please answer the following questions:

What part of the training is most helpful for you?

_____

_____

How can this training be improved?

_____

_____

What other trainings do you wish to participate in?

_____

_____

Part II: Rate your level of confidence in applying the following lifting techniques in your everyday tasks.

1. Assess load and ask for help for heavy or oversized loads.

Not at all confident	Slightly confident	Somewhat confident	Quite confident	Extremely confident

2. Stand close to object with feet about shoulders width apart.

Not at all confident	Slightly confident	Somewhat confident	Quite confident	Extremely confident

3. Bend at knees, not at waist, as you lower yourself to pick up load.

Not at all confident	Slightly confident	Somewhat confident	Quite confident	Extremely confident

4. Lift load by gradually straightening legs and using leg muscles.

Not at all confident	Slightly confident	Somewhat confident	Quite confident	Extremely confident

5. Always keep back straight when lifting.

Not at all confident	Slightly confident	Somewhat confident	Quite confident	Extremely confident

Appendix D

John Hopkins Nursing Evidence-Based Practice (JHNEBP)

Level of Evidence	Number of Studies
Level 1 - Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis	1
Level 2 - Quasi-experimental study - Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis	3
Level 3 - Non-experimental study - Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, or non-experimental studies only, with or without meta-analysis - Qualitative study or systematic review with or without a meta-synthesis	7
Level 4 - Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence - Includes: clinical practice guidelines and consensus panels	7
Level 5 - Based on experiential and non-research evidence Includes: literature reviews, quality improvement, program or financial evaluation, case reports, opinion of nationally recognized experts(s) based on experiential evidence	1

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