



Alternative methods for reaching vulnerable workers:

A pilot evaluation of pictograms and training in the restaurant service sector

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Agenda

- Background on the project
- Development of the intervention and evaluation
- Results
- Discussion
- Conclusions and moving forward

Background

Pictograms

- A visual representation of an object or action
- They can be used to indicate prohibited or desired actions
- Often used as warning labels
 - universal language?
- Effectiveness?





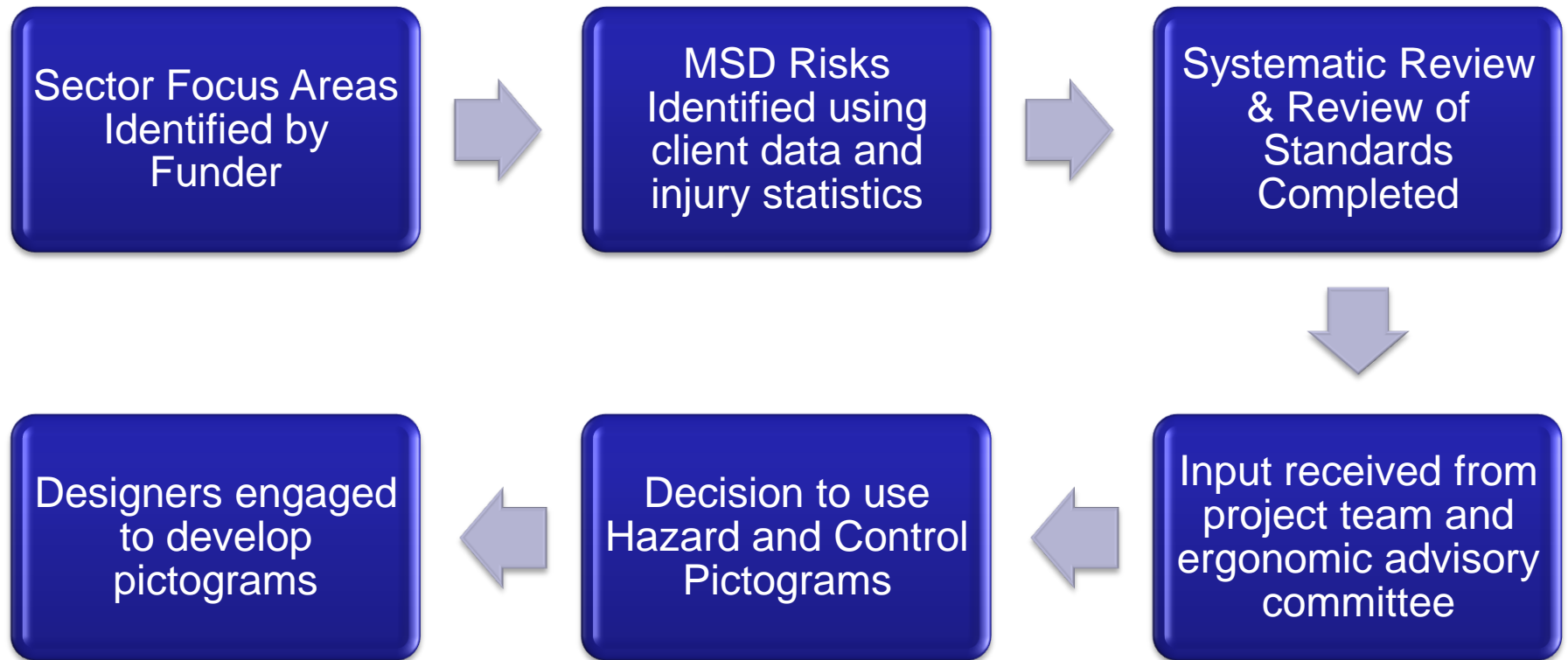
Background

Project Origin

- WSIB funded strategic collaboration (HSA's, IWH, WSIB, MOL – MSD taskforce) to develop an alternative method to educate and protect vulnerable workers from MSDs in various work sectors
 - Vulnerable workers (ESL/Low Literacy)
- Workplace Safety and Prevention Services (formally OSSA) took the lead on the development of pictograms for four service sectors:
 - Kitchens
 - Warehouses
 - Greenhouses
 - Retail
- An evaluation component was needed to anchor pictogram development in evidence-based application



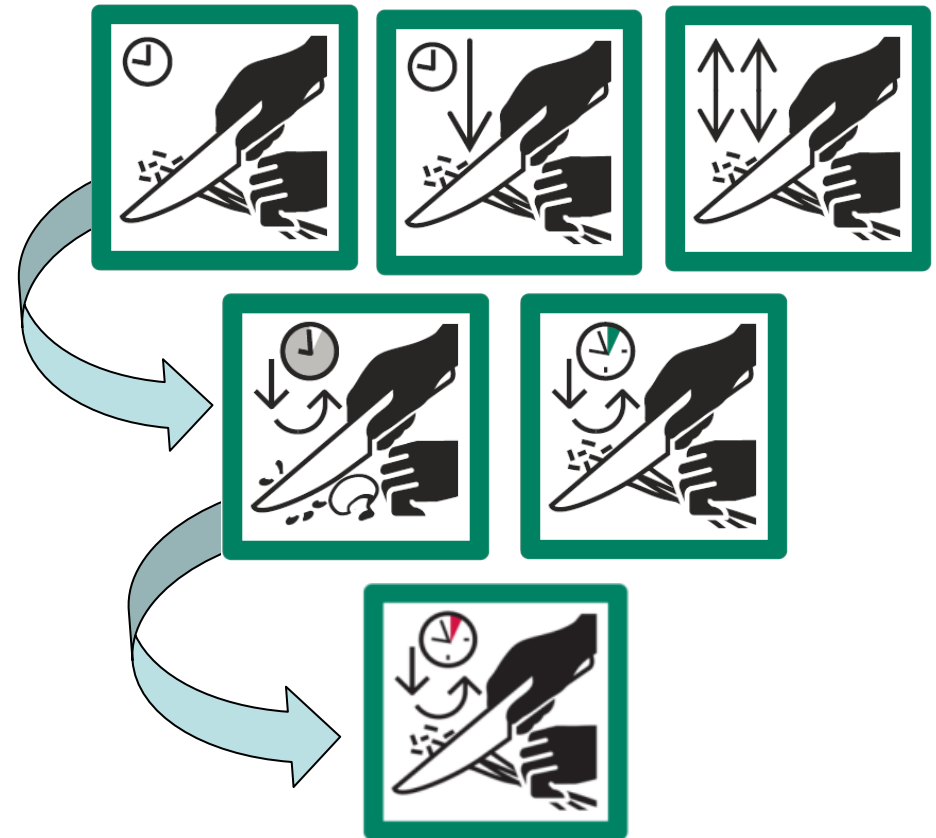
Development Creating the Pictograms



Development

Creating the Pictograms – Focus Group Testing

- Focus group tested with prep kitchen employees
 - 8-12 participants per group (employees and managers)
 - Four focus groups (large, medium, small, cafeteria)
- 59 different pictograms
- Consensus based decision to reach final design, reviewed by team and ergo advisory





Development

- Chopping



Methods: Development process

- Handling large containers of food





Methods: Development process

- Moving prepped food to the cooking area





Methods: Development process

- Reaching for stored materials





Development

Creating the Training Program

- Included training for workers and managers
- Content creation supported by ergonomics and kitchen prep Subject Matter Experts (SME's) and instructional design experts
- Content was reviewed and adjusted for a 6th grade reading level (top 9, bottom 6)
 - Flesch-Kincaid

What is an MSD

- The musculoskeletal system is the body's soft tissue framework
- An MSD happens when the musculoskeletal system can't handle the load put on it
- People have different levels of tolerance for MSDs

What is an MSD?

- Your body is made up of bones, tendons, joints and other tissues. This is the **musculoskeletal system**.
- When you injure a part of this system it is called a **Musculoskeletal Disorder**, or **MSD**

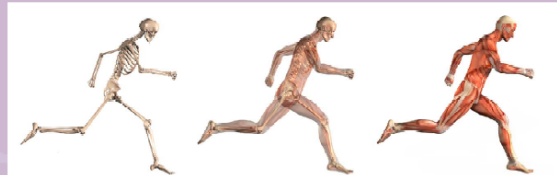


Image Source: iStockphoto.com



Development

Creating the Training Program

- **Employee Training Objectives – Length 1 hour**
 - Identify some MSD Hazards in Prep kitchens
 - Explain what you can do to reduce the risk of being hurt (review of hazards and controls)
 - Talk about where you can get help at work
 - Talk about what you will do to avoid injury at work
- **Manager/Supervisor Training Objectives – Length 1.5 hours**
 - Same objectives as above plus:
 - Learn where and how to place pictograms
 - Understand how to provide coaching and support to staff post training and posting



Development

Evaluation Design

- Pre/Post design with control and intervention groups
- Measures: Knowledge, Work Practices, Symptoms
- N: 61, 51, 38

T0 (1 Month
pre-
intervention
observations)

T3 (1 Month
post-
intervention
observations)



Intervention
(Pictograms &
Training Session);
T1, T2 (Pre/Post
Knowledge Test)

T4 (2 Months
post-
intervention
observations)



Development

Measurement Tools

- Outcomes of interest:
 - Knowledge (MSD & Pictograms)
 - Worker Practices
 - Pain and Discomfort



Development

Measurement Tools

- Knowledge Test:
 - Adapted from an Office Ergonomics Knowledge Test (Robertson et al., 2009)
 - 14 Items: 9 MSD, 5 Pictogram
 - T/F (6), MC (8)
 - Also adapted to a 6th grade reading level












Development

Measurement Tools

- Worker Practices
 - Capture changes in worker practices
 - Risk practices : Control practices
 - Unable to find a suitable tool from the literature
 - Consulted experts in the field
 - Suggested method: capturing activities 1/min over 7hrs (Village et al., 2008); Back-EST
 - Budget/Time restrictions
 - High observer burden
 - Adapted method: 1/min over 30min x 3 days x 3 observation periods



Development

		 								 		 						
Observation Windows	Action List for Observed Actions:	Work Class:	Chopping			General Handling			Cold/Hot Prep			Moving Prepped food to cooking area		Reaching for stored materials				
(Snapshot - 1min Increments)	Chopping;	Task Elements:	maintains neutral wrist postures when possible	rocking motion used when possible	tucked fingers for two-handed technique	use of cart for transporting heavy/many materials	neutral back postures maintained when possible - item(s) held close to the body	small portions carried	two-person lift utilized for very heavy materials	cart/wheeled box/bucket used to transport materials long distances	neutral back postures maintained when possible	items portioned into small loads when possible	small portions carried	use of cart for transporting heavy/many materials	neutral back postures maintained when possible	use of cart for transporting heavy/many materials	heaviest materials stored and retrieved from midzone	two-person lift utilized for very heavy materials
	General Handling;																	
	Hot Prep;																	
	Cold Prep;																	
	Moving Prepped Food to Cooking Area;																	
	Reaching for Stored Materials																	
	Actions Observed (Notes):																	
5min																		



Development

Measurement Tools

- Pain and Discomfort
- Modified Nordic Musculoskeletal Questionnaire for musculoskeletal symptoms (Kuorinka et al., 1987; Crawford, 2007)

DATE: _____

ID# _____


PLEASE CIRCLE ONE OF THE FOLLOWING:

START OF DAY

END OF DAY

DAILY HEALTH DIARY

Record your answers by shading in the ovals with dark pencil or black ink.

		DISCOMFORT OR PAIN LEVEL							
		NONE	VERY LITTLE	←-----→				SEVERE	
	Neck _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Shoulders _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Upper Back _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Elbow _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Lower Back _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Lower Arm/Wrist/Hand _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Buttocks/Thighs _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Knees _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Lower Leg/Ankles/Feet _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Results

Knowledge Test

Knowledge was increased among workers

- Pre Intervention Mean: 81.3%
- Post Intervention Mean: 92.8%
 - 11.5% increase was statistically significant
 - (paired T-test & Wilcox rank sum test; $p < 0.0001$)





Results

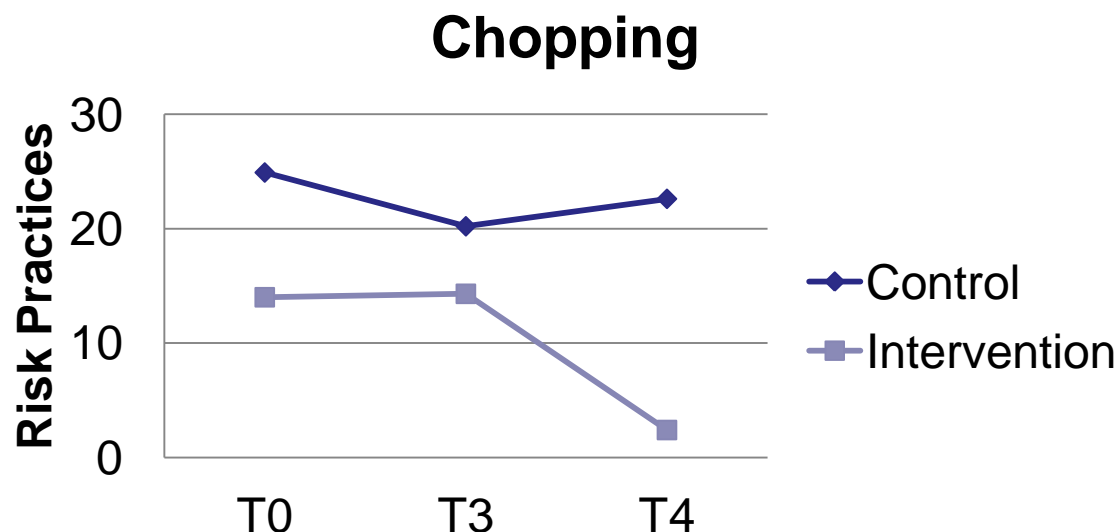
Work Practices

- Assessed overall (all tasks combined) and independently for each pictogram related task
- Was there a statistically significant difference between groups in the ratio of hazard practices to control practices at each time point (T0, T3, T4)?

Results

Work Practices

- Chopping
 - T0: **YES**; T3: **NO**; T4: **YES** ($p = 0.0051$)
 - No difference in risk practices at baseline between those that remained and those lost to follow-up



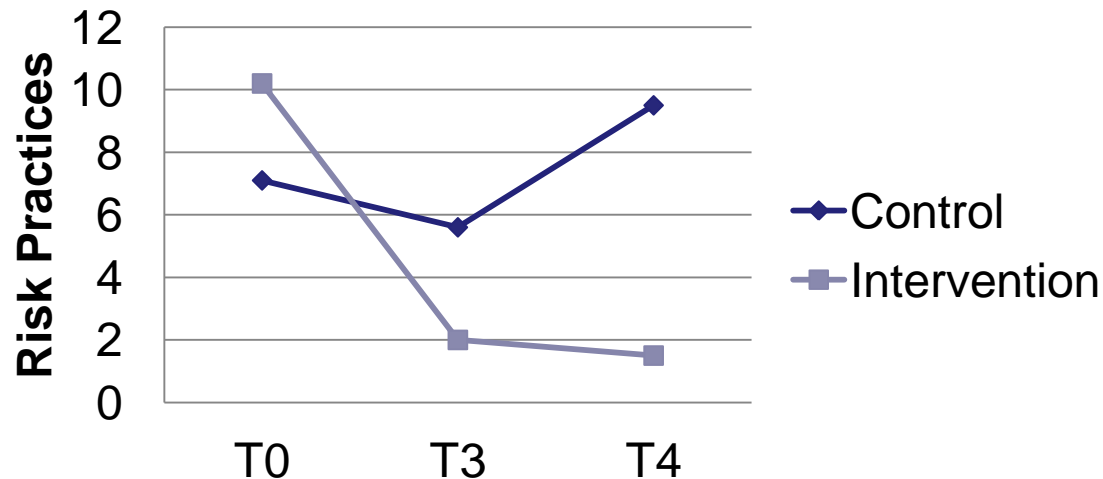
Results

Work Practices

- General Prepped food handling (H&C)
 - T0: **NO**; T3: **YES**; T4: **YES** ($p < 0.001$)
 - No difference in risk practices at baseline between those that remained and those lost to follow-up



Hot and Cold Food Prep





Results

Work Practices

- General Prepped food handling
 - T0: **NO**; T3: **YES**; T4: **YES**
 - Statistically significant difference in risk practices between those that remained and those lost to follow-up
- Moving Prepped Food to the Cooking Area
 - T0: **NO**; T3: **NO**; T4: **NO**
 - No difference in risk practices at baseline between those that remained and those lost to follow-up
- Storing/Retrieving Food
 - T0: **NO**; T3: **YES**; T4: **NO**
 - Statistically significant difference in risk practices between those that remained and those lost to follow-up



Results



Daily Symptom Survey

- Data was positively skewed (few reports of high pain and discomfort)
 - Data was Log transformed for further analysis (T-test)
- Data was grouped by body part (Upper Extremity, Upper Body, Total Body).
- Was there a statistically significant change in pain over the day (for each day) at baseline?
 - ($p = 0.018$)
 - **YES**



Results

Daily Symptom Survey

- Was there a statistically significant difference between groups in their average change in pain scores (end of day – start of day; over three days) at T3 or T4?
 - ($p > 0.05$ for at both T3 and T4; no differences at T0)
 - **NO**
- Was there a statistically significant difference between groups in pain for the dichotomous variable: symptoms remained the same/improved OR symptoms worsened?
 - (T3, $p > 0.05$; T4, $p = 0.05$)
 - **NO**



Discussion

Challenges

- Recruitment
 - Locating sites
 - 5/7 original sites from one parent corporation
 - The location of the sites was a factor
 - Minimum size was necessary to make travel worth while
 - Few sites could afford the time required for training



Discussion

Challenges

- Participants
 - Limited understanding during the recruitment process
 - Purpose of the study
 - Who we were
 - Consent form
 - Low trust
 - Poor manager/employee relations



Discussion

Challenges

- Loss to follow-up
 - N = 61, 51, 38
 - One site was removed from the study after failing to post the pictograms two months after the training (5 participants)
 - Another site posted pictograms one month after the training
 - Observations were coded at T3, no values for T4 (7 participants)
 - Other participants were lost to follow up for various reasons (9 participants)
 - Seasonal change/ semester change/ schedule change
 - Change in duties
 - High turnover



Discussion

Challenges

- Intervention
 - Limited time to conduct training as intended (reduced to 1hr or less)
 - Employees were not required to attend or stay for the duration of the session
 - Managers and supervisors did not always have time to attend the management training
 - Managers and supervisors did not always participate in the pictogram implementation process



Discussion

Challenges

- Measurement Tools
 - Knowledge Test
 - Limited time to complete as intended
 - Some difficulty in comprehension
 - Observational Tool
 - Not always able to follow employees as intended
 - Unexpected change in duties
 - DSS
 - Limited time to complete as intended
 - Some difficulty in comprehension
 - Low trust in the original method



Discussion

Challenges

- Workplace Culture
 - Not a culture that readily admits to pain and/or discomfort
 - Why? Assumptions include:
 - Injuries/pain/discomfort seen as a badge of honour
 - Fear of job loss or creating a poor relationship with management and/or coworkers
 - Not done in previous country of origin
 - Pace of work does not allow for alternative work styles
 - Limited knowledge of steps and procedures to address these concerns



Conclusions and moving forward

- This was a collaborative effort to address a serious need in Ontario's workforce
- The participatory approach to creating the pictograms was seen as a success and will be used again in the future
- Serious limitations were identified in the training component of the intervention and in the measurement tools
- Despite numerous challenges, the findings suggest that this is a promising intervention for reaching this population
- Further work is required to refine both the intervention and evaluation methods to complete a high-quality randomized control trial
 - These efforts are currently underway in a development grant for pictograms in the hotel/motel sector



Questions?



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