

Naval Facilities Engineering Command Ergonomic Risk Assessment for Pharmacy

INTRODUCTION

This report summarizes the ergonomic risk assessment conducted in April of 2002. This assessment is based upon interviews with supervisors, safety specialist, occupational physician, and employees as well as an evaluation by the Navy Ergonomics Program occupational Ergonomist.

The Job Requirements Physical Demands Survey (JR/PD) was administered to the employees. The JR/PD is an ergonomic survey designed to assess ergonomic risk in the workplace. The results of the JR/PD indicate that the pharmacy is an Ergonomic Problem Area (EPRA) with an overall priority score of 5, on a scale of 1-9, where 9 has the greatest priority. The shoulder/neck and leg/foot regions were found to contain significant ergonomic risk. Ergonomic risk is based upon task-related risk factors and employee discomfort. Prolonged and repeated exposure to ergonomic risk factors places employees at risk of developing musculoskeletal disorders.

Musculoskeletal Disorders (MSDs) are injuries and illnesses that affect muscles, nerves, tendons, ligaments, joints, spinal discs, skin, subcutaneous tissues, blood vessels, and bones. Work-related Musculoskeletal Disorders (WMSDs) are:

- Musculoskeletal disorders to which the work environment and the performance of work contribute significantly, or
- Musculoskeletal disorders that are aggravated or prolonged by work conditions.

The pharmacy presents opportunities to reduce the risk of WMSDs. Recommendations to the command to reduce the probability of injury include considering equipment purchase,¹ redesigning processes, and implementing administrative controls.²

Representative vendor information³ is included in the recommendations to assist in the evaluation of products and services. Recommendations to the command include gathering input from the workers, safety specialists, occupational health professionals, and other personnel to evaluate equipment before purchasing. This process will increase product acceptance, test product usability and durability, and take advantage of worker experience.

PHARMACY DEPARTMENT

Purpose of the Operation

Processing medication requests, batching medications, mixing chemotherapy, and performing quality control for completed products.

Population

The pharmacy department employs 85 personnel, of which 56 are active duty. The pharmacy consists of one primary location with 3 satellite facilities. The main pharmacy is open from 0800 to 2000 Monday through Friday and 0800 to 1200 on Saturday.

Injury Data

One wrist injury and multiple complaints of fatigue have been reported.

Description of the Operation--Processing Medication Requests

The pharmacy department processes approximately 2,000 to 3,000 prescriptions per day through the walk-up windows shown in Photo 1. Customers approach the window after their number is shown and wait until their prescription is filled. The client flow is constant throughout the workday. The procedure and time required to process prescriptions varies with the type and quantity of medication. The recent improvement of stocking commonly requested drugs near the windows in typical quantities has decreased prescription fill times.

Employees receive customer requests and retrieve a pre-processed prescription or fill the order. Photo 2 shows the employees working at the customer windows. After the workers process the paperwork, they retrieve the various medications, count out medication quantities (if applicable), and label bottles. Retrieving medications requires bending and extreme reaching as shown in figures 3 and 4. Bending to retrieve items places stress on the back and knees while extended reaches place stress on the shoulders. Twisting caps off and on prescription containers causes repetitive awkward postures in the hands and wrist with moderate hand forces.



Photo 1: Customers waiting at the windows



Photo 2: Employees working at the customer windows



Photos 3 and 4: Employees retrieving medications to fill requests

Prescription requests also arrive by phone and fax. Employees spend a great deal of time on the phone receiving prescription requests. Photo 5 shows an employee with her neck in a bent static posture. Sustained awkward postures restrict blood flow and can cause fatigue. Fatigue can be a preliminary indicator for WMSDs.



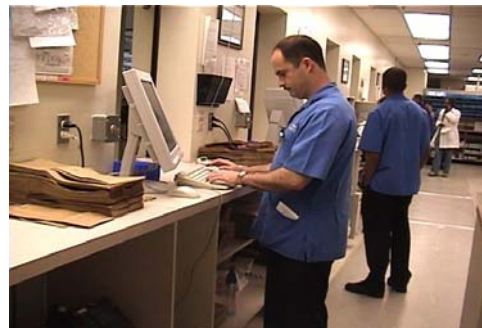
Photo 5: Employee entering prescriptions from telephone requests

The pharmacy has a linoleum floor with sparse anti-fatigue matting. Workers spend all day on their feet resulting in frequent complaints of leg/foot fatigue. Civilians are permitted to wear soft-soled shoes but active duty personnel wear uniform shoes. Employees can be seen in photo 6 trying to relieve fatigue by alternating the supporting leg and resting a foot on the ledge.



Photo 6: Employees working at the customer window

Employees enter prescriptions and client information on computers. Employees interacting with customers have computer monitors located to the side of the customer window, as shown in photos 7 and 8. When a computer monitor is located to the side of the user or below the user's line of site, he/she is required to twist or bend the neck to view the screen which can cause fatigue and discomfort.



Photos 7 and 8: Employee using computers at customer windows

Drive-through Satellite Pharmacy

The drive-through satellite pharmacy is located outside the main hospital in a parking lot. Customers drive up to a pharmacy window to pick up prescriptions, as shown in photo 9. Employees reach out of the window to take prescriptions and deliver completed orders, as shown in photo 10. Extended reaches combined with twisting and bending of the torso places employees at risk of developing WMSDs.



Photo 9: Drive through pharmacy

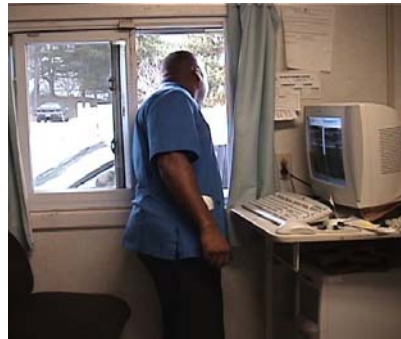


Photo 10: Employee delivering prescription

The computer workstation in the drive-through pharmacy does not encourage neutral postures while typing, as shown in photo 11. There is no legroom if the computer user is seated and the monitor and keyboard are too low for a standing workstation. Sustained awkward postures are a risk factor for WMSDs.



Photo 11: Computer workstation at drive-through window

Ergonomic Issue Description

The major ergonomic risk factors for processing medication requests are awkward postures (with excessive reaching) and prolonged standing. Stress associated with constant client flow, interacting with customers, and risk of germ exposure from sick patients compounds ergonomic risk. Stress is a contributing factor for WMSDs.

Awkward Postures. Extended reaches are examples of awkward postures that require the body to deviate from the neutral in the arms, shoulders, and back. Repeatedly performing tasks in such positions imposes increased stress on the joints and/or spinal

discs. Injuries result when stressed muscles do not have adequate time to rest and recover. The neck/shoulder discomfort found in the JR/PD may be a product of the continual reaching and awkward postures found with computer and telephone use. The configuration of most of the computer work stations result in extreme neck flexion and twisted postures

Prolonged Standing. Workers stand for the entire day. Standing for long periods can be a strenuous activity that promotes blood pooling in the legs and feet and can result in discomfort and fatigue. Leg/Foot discomfort indicated in the JR/PD may be a result of prolonged standing.

Recommendations

- Encourage workers to take stretching breaks during the day to relieve discomfort and encourage muscle movement². The following web sites include exercises that can be printed and posted. Sources should be cited when reproducing information. Additional stretching posters used successfully at Naval Shipyard Puget Sound are found in Appendix II. Web site links updated Jan 2002.

http://www.steelcase.com/servlet/ToolsInsightsServlet?ACTION=5&CONTENT_ID=202

www.shelterpub.com/fitness/office_fitness_clinic/OFC_online_stretches.html



<http://www.ucsc.edu/opers/wellness/pages/officestretches.html>

www.safety.duke.edu/Ergonomics/90_seconds.htm


- Encourage workers to wear soft-soled shoes to reduce fatigue and discomfort. Active duty personnel working in the pharmacy at Naval Hospital San Diego are permitted to wear personal shoes with their uniform. The Safety Office can work with the Pharmacy department to request a revised footwear policy.
- Computer workstation accessories should be provided to promote neutral postures while keying. Computer monitors should be located directly in front of the user with a monitor height equal to or slightly below the user's eye height. A monitor arm would allow the computer user to position the monitor to the correct height. A monitor on an arm can also be pulled closer to the user while still allowing them to maintain contact with customers at the window.
- Provide workers with sit/stand chairs. A sit/stand chair provides the support of a chair while giving the user the mobility and reach associated with standing. Workers could reduce fatigue and improve blood flow by using sit/stand chairs. Workers should alternate between sitting and standing during the day. Footrests or foot bars should be provided to facilitate changing of the supporting leg when standing. At customer windows, footrests should be designed to avoid interference with emergency safety devices.




- Standing workstations should have anti-fatigue matting. In areas where carts are used, anti-fatigue matting should be smooth with beveled edges. Cushioned inner soles can be provided as an alternative to anti-fatigue matting, especially for employees that walk regularly throughout the hospital making deliveries.
- Provide employees with an assistive device to reduce repetitive awkward hand motions and lower the hand force required to open prescription bottles.
- The Navy Ergonomics team is available to review equipment drawings and layout for renovation and installation for the new fill station currently proposed.
- Stock medications no higher than shoulder height and no lower than knee height (approximately 48" to 20"). If medication must be stored outside this range, provide step stools that move easily and lock into place.
- Employees who use the telephone for extended periods of time should be provided with a telephone headset to eliminate static and awkward neck postures. Contact telecommunications for a headset compatible with the current phone system.



Table 1: Representative Products for Processing Medication Requests

Description	Vendor	Product	Est Cost	Figure
Computer Workstation Accessories	Alimed 1-800-225-2610	ISE Flat Panel Monitor Arm	\$275	
		Versa Tech Monitor Arm	\$199	
	Office Organix 800-569-9236	Flat panel monitor arm	\$265	

Description	Vendor	Product	Est Cost	Figure
		Monitor arm	\$194	
		Sit/Stand monitor lift	\$273	
	Workrite 1-800-930-8989	Monitor Mover Flat Panel Regular	 \$278 \$278	
Sit/Stand Chairs				
	Alimed 1-800-225-2610	Portable Sit/Stand	\$300	
	Alimed 1-800-225-2610	Stand Stool RA75195	\$300	
	Global Industrial 1-800-645-1233	Lyon Sit- Stand Stool XF244849	\$223	
	C&H 1-800-336-1331	Lyon Sit- Stand Stool 41-186D	\$219	
	C&H 1-800-336-1331	Workspace Sit/Stand Stool 41-340A	\$190	
	Lab Safety and Supply 1-800-356-0783	Lyon Sit- Stand Stool OM-27282	\$221	

Description	Vendor	Product	Est Cost	Figure
Anti-fatigue matting	Alimed 1-800-225-2610	Vinyl Tech 2'x3' 3'x5'	\$48 \$119	
	C&H 1-800-336-1331	Wearwell	\$23-\$91 or \$14-\$30/foot	
	Lab Safety and Supply 1-800-356-0783	Ergo-Stance	\$48-\$119 or \$17-\$33/foot	
Cushioned Insoles	Alimed 1-800-225-2610	Plastazote	\$18/pair	

Bottle Opener--manual assist	North Coast Medical 1-800-235-7054	Oxo Good Grips Opener	\$9	
Electric Bottle Opener	Independent Living Products	Open-Up	\$42.00	
Bottle Opener--manual assist	Freedom Living Devices 1 (866) 699-9300	Rubber Lid Gripper	\$3	

Bottle Opener--manual assist	Freedom Living Devices	Deluxe Jar Opener (Zim Jar Opener)	\$16.00	
Bottle Opener--manual assist	Freedom Living Devices	Multi Purpose Jar Wrench	\$9.00	

Description of the Operation--Compounding Station

Employees in the compounding station formulate lotions, creams, ointments, and oral solutions. After mixing the appropriate medications, the employee scoops the compound from the metal mixing bowl into a large graduated cylinder, as shown in photo 12. The employee then pours the liquid from the graduated cylinder into smaller prescription bottles, as shown in photo 13. While pouring the mixture into the small bottles, the worker rests his arms on the edge of the sink area. The edge of the sink creates a contact stress or compression on the soft tissues of the forearms and elbows. The employee currently has a large bursa on his elbow, which he attributes to this task. The mixing bowl has a metal tab on each side of the bowl, photo 14, which the employee uses to lift the bowl. The small tabs are not designed to be handles and are difficult to use for lifting the heavy bowl, as shown in photo 15.



Photo 12: Pouring lotion from the mixing bowl



Photo 13: Pouring lotion into small bottles



Photo 14: Mixing Bowl



Photo 15: Lifting the mixing bowl

Ergonomic Issue Description

The employees are exposed to awkward sustained postures, occasional heavy lifting, and contact stress to the elbows and forearms. The combinations of ergonomic stressors place the employee at risk of developing a WMSDs.

Contact Stress

The forearms and elbows contain nerves that are close to the skin's surface. Compression of these nerves between a hard sharp surface, such as the edge of the sink, and the body can lead to nerve disorders.

Awkward Postures

Holding the arms in a sustained awkward posture while transferring lotion can reduce blood flow to the upper extremities and lead to fatigue. The employee also raises his shoulders to increase stability and reduce spillage, which places stress on the shoulders and neck.


Contributing Factors



The worker also experiences physical and mental tension associated with trying to achieve a high level accuracy in pouring. Sustained muscle contraction prevents muscle recovery and leads to fatigue.

Recommendations

- An arm rest or edge protector is recommended to reduce contact stress to the employee's forearm and elbow when filling individual prescription bottles. The employee could also perform the transfer of lotion in a new location with a deeper surface rather than over the sink. A pan or disposable mat could be used for possible spills.
- A new dispensing system should be investigated for feasibility. Naval Medical Center San Diego should be contacted to determine the vendor for their automated compound dispensing system.
- The current metal ladle should be replaced with a user-friendly version with a larger handle to reduce contact stress to the hand and the force required to hold the tool.

Table 2: Representative Products for Compounding Station

Description	Vendor	Product	Est Cost	Figure
Ladle	OXO (800) 545-4411	Stainless Steel Ladle	\$9	

Description	Vendor	Product	Est Cost	Figure
Edge protector	Alimed 1-800-437-2966	Versatile SoftEdge #JA70459 Deluxe Edge Rest #JA73075	\$18 \$30	
Arm rest	Alimed 1-800-437-2966	Microscope Arm Support #JA73911	\$120- \$180	
	Ergosource 952-404-1058	Laptop-Adjustable forearm support A5000, A6000	\$300	

*Some information has been removed from this report that is specific to the activity.

Notes

¹ Equipment purchase without proper and repeated training will not mitigate risk and may in fact increase hazards.

² Administrative controls are management-controlled work practices and policies designed to reduce exposures to work-related musculoskeletal disorders (WMSDs) hazards by changing the way work is assigned or scheduled. Administrative controls reduce the exposure to ergonomic stressors and thus reduce the cumulative dose to any one worker. Examples of administrative controls that are used in the ergonomics context are employee rotation, employer-authorized changes in the pace of work, and team lifting.

³ This report does not constitute an endorsement of any particular product. Rather, it is a recitation of how Navy personnel have addressed a particular work place safety issue. Neither the Navy nor its employees and agents warrant any product described in this report for any use, either general or particular.

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