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Factors Associated with Treatment Seeking in Automotive Manufacturing

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Factors Associated with Treatment Seeking in Automotive Manufacturing

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Public Health
College of Public Health
University of South Florida

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Dedication

I would like to dedicate this thesis to my parents, U Khin Maung Chit and Daw Tin Hla for their unconditional love and encouragement to be enthusiastic, energetic and accomplished.

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I would like to express my deepest gratitude to my advisor, Dr. Thomas E. Bernard for his excellent advice, patience, support and caring for my research. I would like to thank Dr. Thomas Truncale for his mentoring, guidance and support during my training in the University of South Florida. I would also like to thank Dr. Alfred Mbah for his guidance, his effort and tremendous time commitment for the data analysis. I would like to thank all the faculties from the University of South Florida Public Health and clinical faculties from the Occupation Medicine Residency Program and staff.

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List of Abbreviations

Outcomes

ANT	Asymptomatic – No Treatment
SNT	Symptomatic – No Treatment
SPT	Symptomatic – Private Provider Treatment
SCT	Symptomatic – In-plant Clinic Treatment

Independent Variables

Symptoms

AS	Asymptomatic
LS	Low Severity of Symptoms
HS	High Severity of Symptoms

Health Status

NJD = 1	Presence of any one or more of the following: Rheumatoid arthritis, Osteoarthritis, Neurological disorders
OCD = 1	Presence of any one or more of the following: Diabetes, Thyroid problems, Hypertension
ORF = 1	Current smoker and/or Hysterectomy/oophorectomy
CD = 1	NJD = 1 and/or OCD = 1

Psychosocial Factors

JST	Job Strain (2 levels)
JSU	Social Support (2 levels)
JSA	Job Satisfaction(3 levels)

Abstract

Introduction

The prevalence of work-related musculoskeletal disorders is very common. The main objective of the study was to identify any association between the severity of musculoskeletal symptoms and treatment choice by workers in automobile manufacturing plants.

Methods

A cross-sectional study of 1017 production workers in six automobile manufacturing plants was performed. The study included the structured interviews to determine symptoms, preexisting personal risk factors, treatment choices (health care provider or no treatment sought), job strain, and job satisfaction. Nordic style questionnaire for symptoms, Karasek's Demand Control Model and three job satisfaction questions were used to assign symptom severity, job strain, and job satisfaction, respectively. The case definition was that the person sought treatment from plant clinic or personal health care provider. The independent variables were symptom severity (2 levels), job strain (2 levels), job satisfaction (3 levels). The logistic analysis was used for data analysis.

Results

The Whole Body symptoms severity score was taken as the highest symptoms severity for any body region. Those with High symptoms were more likely to seek treatment than those with Low symptoms, OR=2.3 (1.23-4.27, 95%CI). There was no effect associated with job strain and job satisfaction. Those with osteoarthritis, neurological disorders and hypertension sought more treatment, OR= 3.32 (1.55-7.11, 95%CI), OR=30.5 (5.37-173, 95%CI) and OR=2.97 (1.19-7.44, 95%CI). Sex was significant, where women were more likely to seek treatment than men, OR=2.3 (1.33-3.07, 95%CI). There were no significant findings for BMI, diabetes, rheumatologic disorder, thyroid problems, and smoking.

Conclusion

The study found an association between the severity of the symptoms for a musculoskeletal disorder and the decision to seek treatment from a health care provider (either plant clinic or private provider). Participants with osteoarthritis, neurological disease and hypertension were also more likely to seek treatment more than those without the conditions. Women were more likely to seek treatment than men.

Introduction

Work-related musculoskeletal disorders (WMSDs) are common in manufacturing and services industry sectors, which account for about half of all WMSD cases. They are associated with fixed or constrained body positions, repetition of movements, force exertion, and work pace as well as heat, cold and vibration.[1, 2] WMSDs are associated with absenteeism, lost productivity, increased health care cost, disability, and increased worker compensation costs. The disorders account for nearly 70 million physician office visits in the United States annually, and an estimated 130 million total health care encounters including outpatient, hospital, and emergency room visits. In 1999, nearly one million people were absent from work for treatment and recovery from work-related musculoskeletal pain or impairment of function in the low back or upper extremities.[1, 2]

Because the decision to seek treatment is important in the management of WMSDs, it is worthwhile to examine conditions under which a person would seek treatment from a health care provider. Garg et al. (2014), Mannion et al. (2013), IJelenberg & Burdorf (2004), and Mortimer et al. (2003) reported that the degree of intensity increased the likelihood of seeking treatment.[3,6,10,12] Hartvigsen et al (2014), Menz et al. (2010), Grooten et al. (2004) and Feuerstein et al. (1998) reported an association between the presence of pain and treatment seeking without mention of severity.[4,7,11]

Psychosocial factors may affect treatment seeking, but the relationships are not consistent. Grooten et al (2004), IJelenberg & Burdorf (2004) and Steenbeek et al. (2012) reported higher

likelihood of seeking treatment with high job strain and low social support.[4,6,8] Mannion et al. (2013) found that perceived needs and fear avoidance were the strongest predictor of future seeking treatment.[12] Mortimer et al. (2003) also pointed out that fear avoidance was a contributing factor for some.[3] Garg et al. (2014) did not find an association between psychosocial factors and treatment seeking.[10] Murthy et al. (2014) reported the likelihood of seeking treatment with nontraditional providers (the only providers considered in the study) when social support was low.[5]

Hartvigsen et al. (2014), Steenbeek et al. (2012), Broom et al. (2012), Mannion et al. (2013), IJelenberg & Burdorf (2004) found an association between the comorbidities and seeking treatment.[6,8,11,12,13] Mortimer et al. (2003) identified that disability, pain, and economic factors were important factors in seeking treatment.[3] Nyman et al (2010) identified that the participant's involvement in the general disease management program sought treatment less than those who did not participate in the program.[15]

Sex may contribute in treatment seeking behaviors. Lipscomb et al. (2009), Grooten et al. (2004) and Adamson et al. (2011) reported that women were more likely to seek treatment than men.[4,9,14] Menz et al. (2010), IJelenberg & Burdorf (2004), Adamson et al. (2011) found no association between sex and treatment seeking.[6,7,9]

The purpose of this study was to explore associations between treatment seeking decisions and symptoms, demographic, chronic health factors, and psychosocial factors.

Methods

The objective of the study was to examine the associations between the severity of the musculoskeletal symptoms and the decision to seek treatment using a cross-sectional study of 1017 participants from six automotive manufacturing plants. A structured interview was administered by the study team. (See appendix for copy of questionnaire.) The questionnaires included demographic information plus a history covering some personal risk factors for musculoskeletal disorders, symptoms by body region, and job satisfaction and job strain scales.

Demographic information included date of birth, gender, self-reported height and weight. In addition, the participant was queried for physician diagnosed health conditions that included rheumatoid arthritis, hypertension, thyroid problems, osteoarthritis, neurological disorders, and diabetes mellitus.

To assess symptoms, the participant was asked: "Have you experienced musculoskeletal pain or discomfort during the PAST YEAR?". If the answer was NO, the interviewer would go to the end of the interview to ask seek perception information. If YES, they were asked to mark on a body map those areas for which they reported symptoms. The body regions were fingers, wrists, hands, forearms, elbows, neck, shoulder, upper region of the back, lower back, hips and thighs, knees, legs or ankles. For each of the indicated regions, a Nordic style questionnaire was used to gather information on the type, frequency, duration and severity of the symptoms. In addition, the person was asked whether they sought treatment from the plant clinic or a personal health care provider.

The end of the structured interview was used to gather data on perceived exertion and psychosocial factors described below.

The independent variables of the study were 1) symptom severity, 2) chronic disease and 3) psychosocial factors. The dependent variable was the decision to seek treatment.

For each of the body regions, participants were categorized according to symptom severity based on the frequency, duration and intensity of symptoms according to Swift et al. (2001) and Fernandes and Carvalho (2011) as follows: [23,24]

- Asymptomatic (AS): No reported symptoms of musculoskeletal disorders in any body region in the past 12 months.
- Low Symptom (LS): Not Asymptomatic AND not High Symptom.
- High Symptom (HS): > 3 episodes in past year, OR each episode lasted > 3 weeks, OR intensity of episodes > 2.

The symptoms classification for the individual was the highest severity level noted for any of the body regions.

Presence of a diagnosed chronic diseases was another independent variable, which was categorized dichotomously as follows:

- Rheumatoid arthritis (Yes = 1; No =2)
- Hypertension (Yes = 1; No =2)
- Thyroid problem (Yes = 1; No =2)
- Osteoarthritis (Yes = 1; No =2)
- Neurological disorders (Yes = 1; No =2)

- Diabetes Mellitus (Yes = 1; No =2)

Psychosocial factors were also considered. They were divided into Job Strain and Job Satisfaction. Job Strain and Social Support were based on the Karasek Job Content Questionnaire (JCQ), which used Likert scales (strongly disagree, disagree, agree and strongly agree) for each question. Questions addressed Skill Discretion, Decision Authority, Job Demand and Social Support.[17,18,19,20,21,22]

Questions for “Skill Discretion” dealt with:

- 1) learn new things,
- 2) repetitive work,
- 3) creativity,
- 4) high skills,
- 5) variety
- 6) I can take a break

Questions for Decision Authority were:

- 7) little freedom
- 8) say

Then Job Decision Latitude = Skill Discretion + Decision Authority

Questions for “Job Demand” were:

- 9) work fast,
- 10) work hard,
- 11) not excessive work,

12) have time, and

13) very hectic.

The questions for "Social Support" was:

14) Supervisor Listens

The scores for some questions were reversed scored.[22] These included repetitive work (Q2), little freedom (Q7), not excessive work (Q11), have time (Q12) and very hectic (Q13). After adjusting the score, the following formulas from the Job Content Questionnaire were used to calculate Job Skill Discretion and Job Decision Authority.[20,21] The Job Decision Latitude was calculated by the summation of job skill discretion and job decision authority. The job demand was also calculated by using the formula from JCQ created by Karasek. Job strain was calculated as the ratio of Job Demand multiplied times 2 divided by Decision Latitude.

Job Skill Discretion = $[Q1 + Q3 + Q4 + Q5 + Q6 + 5 - Q2] * 2$

Job Decision Authority = $[2 * (Q7 + Q8)] * 2$

Job Decision Latitude = Job Skill Discretion + Job Decision Authority

Job Demand = $3 * (Q9 + Q10) + 2 * (5 - Q11 + Q12 + Q13)$

Job Strain = $(\text{Job Demand} * 2) / \text{Job Decision Latitude}$

If Job Strain was > 1 , then there was a presence of job strain (JST=1). For Job Strain ≤ 1 , there was an absence of job strain (JST=0).

For Social Support, the score of the single item was used. The Social Support score ranged from 1-4. If the score was 1 or 2, there was no social support (JSU=0), if the score was 3 or 4, there was social support (JSU=1).

Job Satisfaction (JSA) was based on on three questions with a four-point scale (1: no, 2: little, 3: somewhat, and 4: very) for three questions: 1) how satisfied with your job, 2) recommend job to someone else, and 3) take the job again. The range of the total score of all the questions was from 3-12. The Job Satisfaction scores were categorized into dissatisfied if scores were 3-6, ambivalence if scores were 6-9, and satisfied if score were 9-12.

The psychosocial scales were classified as follows:

- Job Strain (JST) (No job strain=1; Job strain=2)
- Social Support (JSU) (No social support=1; social support=2)
- Job Satisfaction (JSA) (Dissatisfied=1; Ambivalence=2; Satisfied=3)

The outcome variable in the study was the treatment seeking options which were categorized into:

- SCT: treatment with the plant clinic healthcare provider,
- SPT: treatment with private (outside) healthcare provider,
- SNT: no treatment sought from healthcare provider
- ANT: asymptomatic with no treatment by default

The data were analyzed by using SAS software. Unadjusted odds ratios for treatment seeking were computed from logistic regression with just one independent variable. Because the data on treatment seeking was asked of those who reported symptoms, a subset of the data that

included only those persons who reported symptoms was used to explore the associations between symptoms and treatment seeking. The adjusted odds ratios were based on a multiple logistic regression. The odd ratios were used as the measures of association.

Results

The goal of this study was to explore the associations between treatment seeking decisions and symptoms of musculoskeletal disorders, history of chronic disease, job strain, and job satisfaction. There were 1017 participants in the study and the summary distribution is included in Table 1. There were 736 males, 277 females and 8 unknown. Of these, 257 did not report any symptoms and thus they were not specifically asked about treatment seeking during the interview. These 257 were assumed to not have made a treatment seeking decision. There were 763 who reported symptoms in at least one body region over the past year and who were asked if they sought treatment from a health care provider (HCP).

First, the symptomatic participants were combined with asymptomatic participants to explore associations with treatment seeking decisions; see Table 2. which 2 reports the unadjusted odds ratios for treatment seeking by symptom severity and body region. The comparison groups were non-symptomatic versus high and low versus high. The body regions in which there were significant associations with treatment seeking and non-symptomatic versus high symptomatic were shoulder, back, and ankle. The body regions in which there were significant associations with treatment seeking and Low versus High symptoms were shoulder, elbow, hand, and knee.

Table 1. Demographic and medical history relationships between participants who did not seek treatment (no reported visits to health care provider) and those who did seek treatment from a health care provider (HCP). Table reports numbers.

		No Reported Visits to HCP (n=943)	Reported Visits to HCP (n=78)
Sex	Male	694	42
	Female	241	36
	Missing	8	0
BMI	Mean	27.6	26.6
	Median	27.1	25.9
	Min-Max	16.0 - 54.8	16.1 - 39.4
Smokers	Yes	559	49
	No	381	29
	Missing	3	0
Rheumatoid Arthritis	No	893	70
	Yes	46	8
	Missing	4	0
Hypertension	No	795	68
	Yes	145	8
	Missing	3	2
Thyroid Problems	No	913	75
	Yes	28	3
	Missing	2	0
Osteoarthritis	No	886	65
	Yes	53	13
	Missing	4	0
Neurological Disorders	No	932	73
	Yes	5	4
	Missing	6	1
Diabetes	No	905	75
	Yes	35	3
	Missing	3	0

Table 2. Symptoms severity and treatment seeking by body region

Body Regions and Severity	Odds Ratio	95% CI
Shoulder		
Noncase vs High	3.07	1.68-6.63
Low vs High	3.37	1.83-6.22
Elbow		
Noncase vs High	1.62	0.74-3.55
Low vs High	2.23	1.06-4.69
Hand		
Noncase vs High	1.38	0.75-2.56
Low vs High	2.02	1.09-3.74
Back		
Noncase vs High	2.12	1.13-3.96
Low vs High	1.8	0.99-3.30
Hips		
Noncase vs High	1.12	0.28-4.43
Low vs High	1.6	0.55-4.69
Knee		
Noncase vs High	1.12	0.46-2.72
Low vs High	2.84	1.42-5.68
Ankle		
Noncase vs High	2.16	1.03-4.54
Low vs High	2.04	0.90-4.59

The following results were based on the subset of participants who reported symptoms and the symptoms severity was based on the highest severity in any one region (i.e., whole body determination). At this point, a multiple logistic regression was used and the reported odds ratios are adjusted values. Table 3 provides the total number of participants who sought treatment with an outside healthcare practitioner (SPT). Those with Low Symptoms had an average of 8 visits and those with High Symptoms had 17 visits, with the respective median visits of 3 and 5. Table 4 has similar information for seeking treatment with the in-plant provider

(SCT). There were 9 participants with Low Symptoms with an average number of 14 visits and a median number of 12 visits; and 37 with High Symptoms and 38 and 10 average number and median number of visits, respectively. There was a bias toward higher number of visits due to treating a visit in a body region as an independent visit.

Table 3. Severity and treatment seeking with outside healthcare practitioner

Severity	Number Not Seeking Treatment	Number Seeking Treatment	Mean Number of Visits	SD	Median Number of Visits	P-value
Low	278	5	6.4	7.89	3	0.01
High	409	10	13.2	16.6	5	

Table 4. Severity and treatment seeking with plant healthcare practitioner

Severity	Number Not Seeking Treatment	Number Seeking Treatment	Mean Number of Visits	SD	Median Number of Visits	P-value
Low	278	9	14.1	14.0	12	0.08
High	409	37	38.2	96.8	10	

When treatment seeking is compared to no treatment seeking for those with symptoms rolled up to the whole body, those with High Symptoms compared to Low Symptoms had a significant OR of 2.3 (see Table 5). Table 5 reports the adjusted odds ratios for treatment seeking based on individual factors in the multiple regression. Those individual factors with significant associations with treatment seeking included symptoms severity, sex, hypertension, osteoarthritis and neurological disorders. No job strain was weakly associated with a lower likelihood of seeking treatment.

Table 5. Independent factors in multiple logistic regression and treatment seeking

Factors	Odds Ratio	95% CI
High vs. Low Symptoms	2.3	1.23-4.27
Female vs. Male	2.3	1.33-3.07
BMI [continuous value]	0.95	0.89-1.01
Diabetes vs. Non-DM	1.49	0.35-6.44
Rheumatoid Arthritis vs. Non-RA	1.36	0.53-3.47
Hypertension vs. Non-HTN	2.97	1.19-7.44
Thyroid Problems vs. Non-Thyroid	1.15	0.31-4.28
Osteoarthritis vs. Non-OA	3.32	1.55-7.11
Neurological Disorder vs. Non-Neuro	30.5	5.37-173
Smoker vs. Non-Smoker	1.18	0.69-2.02
No Strain vs. Strain	0.6	0.34-1.00
Not Satisfied vs. Satisfied	1.24	0.57-2.71
Ambivalence vs. Satisfied	1.24	0.67-2.31
Social Support vs. No Social Support	1.15	0.64-2.06

Table 6 reports the overall distribution of treatment seeking outcomes by demographics, symptoms severity, and psychosocial factors. There were more males (737) than females (277). By design (selecting the median age), the older and younger participants were equally distributed in the study. The total number of asymptomatic participants was 257, Low severity was 295, and a High severity was 470. Most of the participants did not have chronic diseases categorized as NJ (neurological or joint-related) (i.e., rheumatoid arthritis, osteoarthritis, and neurological disorders), OD (Other disease) (i.e., diabetes, thyroid problems, and hypertension). A third category of chronic condition was personal risk factors for MSDs (ORF) (i.e., current smoker and/or hysterectomy/oophorectomy). There was no huge difference in number in current smoking and /or hysterectomy/oophorectomy status among the participants. Majority of the participants had job strain, job satisfaction and social support. Majority of the symptomatic participants did not seek treatment irrespective of their sex, age, BMI, symptom severity, chronic disease, and psychosocial factors. If they sought treatment, most sought in-plant clinic treatment. The symptomatic participants with chronic disease, without job strain, without job satisfaction and without social support has higher number of treatment seeking with in-plant clinic provider.

Table 6. Distribution of treatment seeking outcomes by demographics, symptoms severity, and psychosocial factors

Characteristics	All	ANT	SNT	SPT	SCT
Sex					
Male	737	210	485	6	26
Female	277	43	198	9	20
Age					
Younger (\leq median age)	512	109	364	11	17
Older ($>$ median age)	503	148	316	4	29
BMI					
Lower (\leq median BMI)	505	133	328	8	27
Higher ($>$ median BMI)	503	118	351	7	19
Symptoms					
AS – Asymptomatic	257	257	---	---	---
LS – Low Symptoms	295	---	278	5	9
HS – High Symptoms	470	---	409	10	37
Chronic Disease					
Neurological and Joint Disease (NJD)					
None: NJD=0	900	238	607	14	27
Present: NJD=1	122	19	80	1	19
Other Chronic Disease (OCD)					
None: OCD =0	826	212	549	15	37
Present: OCD=1	196	45	138	0	9
Other Personal Risk Factors (ORF)					
None: ORF=0	578	148	385	8	30
Present: ORF=1	444	109	302	7	16
Chronic Disease (CD)					
None: CD=0	754	202	503	14	24
Present: CD=1	268	55	184	1	22
Psychosocial Factors					
Job Strain (JST)					
None: JST=0	231	26	181	6	14
Present: JST=1	791	231	506	9	32
Job Support (JSU)					
None: JSU=0	399	77	283	10	22
Present: JSU=1	623	180	404	5	24
Job Satisfaction (JSA)					
Dissatisfied: JSA=0	153	7	129	5	9
Ambivalence: JSA=1	463	93	331	6	25
Satisfied: JSA=2	403	155	227	4	11

Table 7 reports the unadjusted ORs for independent variables against four case conditions. Females were more likely than Males to seek treatment in with a personal provider (SPT) unadjusted OR= 3.67; in the plant clinic unadjusted OR= 1.88, or with either a personal or plant provider, unadjusted OR= 2.22. Older participants were more likely to seek treatment than younger participants from a plant clinic provider with unadjusted OR= 1.97 when compared to non-treatment seeking; and this became very clear when comparing those who sought in-plant clinic treatment over a personal provider, unadjusted OR =4.69. The participants with high severity symptoms were more likely to seek treatment at the plant clinic than those with low severity with unadjusted OR=2.79 and more likely to seek treatment in the plant clinic or with a private provider with unadjusted OR=2.28. With regard to chronic diseases, it was clear that those with existing disease of the nerves and joints (NJD) where more likely to seek treatment from either the plant clinic (OR=5.34) or either (OR=3.70), but clearly the preference was the plant clinic over the personal provider (OR=9.85). A similar pattern of treatment seeking occurred when all chronic disease was considered, but the significant ORs occurred with treatment seeking in the plant clinic OR=2.51 compared to no treatment seeking and 12.8 compared to treatment with a private provider). There were no statistically significant findings in treatment seeking with job strain, job satisfaction and social support.

Table 7. Unadjusted ORs for treatment seeking among those with symptoms

Characteristics	SNT v SPT	SNT v SCT	SNT v SPT + SCT	SPT v SCT
Gender				
Female vs. Male	3.67 (1.29-10.46)	1.88 (1.03-3.45)	2.22 (1.31-3.77)	0.51 (0.16-1.68)
Age				
<=median, >median	0.42 (0.13-1.33)	1.97 (1.06-3.64)	1.36 (0.80-2.30)	4.69 (1.29-17.07)
BMI				
<=median, >median	0.82 (0.29-2.28)	0.66 (0.36-1.21)	0.69 (0.41-1.18)	0.80 (0.25-2.60)
Symptoms				
LS vs HS	1.36 (0.46-4.02)	2.79 (1.33-5.88)	2.28 (1.23-4.22)	2.06 (0.56-7.52)
Chronic Disease				
NJD (0 vs 1)	0.54 (0.07-4.18)	5.34 (2.84-10.04)	3.70 (2.07-6.63)	9.85 (1.19-81.40)
OCD (0 vs 1)	--	0.97 (0.46-2.05)	--	--
ORF (0 vs 1)	1.12 (0.40-3.11)	0.68 (0.36-1.27)	0.77 (0.45-1.32)	0.61 (0.19-1.99)
CD (0 vs 1)	0.20 (0.03-1.50)	2.51 (1.37-4.58)	1.65 (0.96-2.85)	12.83 (1.56-105.7)
Psychosocial				
JST (0 vs 1)	0.54 (0.19-1.53)	0.82 (0.43-1.57)	0.73 (0.42-1.28)	1.52 (0.45-5.10)
JSU (0 vs 1)	0.35 (0.12-1.04)	0.76 (0.42-1.39)	0.63 (0.38-1.07)	2.18 (0.64-7.39)
JSA (0 vs 1)	0.47 (0.14-1.56)	1.08 (0.49-2.38)	0.86 (0.44-1.67)	2.31 (0.56-9.48)
JSA (0 vs 2)	0.45 (0.12-1.72)	0.69 (0.28-1.72)	0.61 (0.28-1.30)	1.53 (0.31-7.44)

A multiple logistic regression was used for independent variables that more likely contribute to treatment seeking. Table 8 reports the adjusted ORs for selected independent variables against four case conditions. Sex was an important factor in treatment seeking where women with symptoms were more likely than men to seek treatment with a private provider (OR=3.47). When treatment seeking at the plant clinic was considered the sex difference weakened, but there was some evidence that it affected treatment seeking decisions. The effect of age was significant only in demonstrating that older workers were more likely to see the plant clinic than

a private provider. Symptoms severity indicated that the more likely treatment choice was the plant clinic over no treatment (OR=2.47) and any treatment (SPT+SCT) over no treatment (OR=2.46). There was weak evidence for chronic disease affecting treatment seeking compared to no treatment (e.g., no statistically significant findings), but there was a definitely increased likelihood that any treatment sought would be with the plant clinic (OR=29.7). When Job Strain was included in the model, there was still no effect.

Table 8. Adjusted ORs for treatment seeking among those with symptoms

Characteristics	SNT v SPT	SNT v SCT	SNT v SPT+SCT	SPT v SCT
Sex: male vs female	3.47 (1.20-10.00)	1.80 (0.96-3.37)	1.76 (0.94-3.29)	0.29 (0.06-1.32)
Age : <=median vs >median	0.63 (0.19-2.09)	1.66 (0.85-3.21)	1.70 (0.88-3.30)	12.76 (1.85-88.27)
Symptom Severity: LS v HS	1.55 (0.52-4.67)	2.47 (1.16-5.25)	2.46 (1.16-5.24)	5.28 (0.76-36.66)
CD: 0 v 1	0.20 (0.02-1.63)	1.84 (0.96-3.51)	1.88 (0.98-3.58)	29.70 (2.48-355.5)
JST: 0 vs 1	0.38 (0.13-1.14)	0.74 (0.40-1.37)	0.75 (0.41-1.39)	1.33 (0.29-6.10)

Discussion

One goal of this study was to see if symptoms severity was associated with a decision to seek treatment from a health care provider. The first step in exploring this association was to divide symptom severity into three levels: Asymptomatic, Low Symptoms and High Symptoms.

Looking at the seven individual body regions described in Table 2, three regions (shoulder, back, and ankle) had a significant association when comparing None to High; and three different regions (elbow, hand, and knee) plus one that was the repeated (shoulder) had significant associations going from Low to High symptoms. These unadjusted ORs suggested some pattern of association, but it was not consistent across body regions. Other investigators [Garg et al (2014), Mannion et al. (2013), IJzelenberg & Burdorf (2005), and Mortimer et al. (2003)] found an association, which support the positive findings suggested by the individual body regions.[3,6,10,12] To this point, the data analysis included 25% of observations that were asymptomatic with the assumption that there were not treatment seeking decisions made.

To look more carefully at only data that the question of treatment seeking was asked, the asymptomatic observations were excluded. Also, symptoms in each of the body regions were rolled up to a whole body level. Looking at Tables 3 and 4, it is clear that there was an increase in the number of visits to a HCP with an increase of symptom severity from Low to High. The unadjusted OR for treatment seeking at the plant clinic due to High Symptoms was 2.8 (see Tables 5 and 7). The adjusted OR for treatment seeking at the plant clinic due to High Symptoms was 2.5 (see Table 8). (There was no significant increase in treatment seeking with a private provider due to High Symptoms.) This supported the findings of previous investigators

who found an increase in likelihood of seeking treatment based on symptom severity.(Garg et al (2014), Mannion et al (2013), IJzelenberg & Burdorf (2005), and Mortimer et al. (2003)) [3,6,10,12]

For sex, female were more likely to seek treatment than male with significance in both unadjusted and adjusted OR. Lipscomb et al. (2009), Grooten et al (2004) and Adamson et al. (2011)) had similar findings.[4,9,14] Although, Adamson et al. (2011) did not find a sex difference.[9]

Chronic diseases were associated with treatment seeking. These included hypertension, neurological disease and osteoarthritis. There was a general finding of treatment seeking with comorbidities (Hartvigsen et al (2014), Steenbeek (2012), Broom et al (2012), Mannion et al (2013), IJzelenberg & Burdorf (2004)). [6,8,11,12,13] Specifically, Hartvigsen et al 2014 found the association between treatment seeking and comorbidities such as heart disease, neurological disorders, and urogenital disorders.[11]

Previous investigators found mixed results between psychosocial factors and treatment seeking. While Grooten et al (2004), IJzelenberg & Burdorf 2004 and Steenbeek (2012) reported treatment seeking with high job strain and low social support, there was not a significant association in seeking treatment in high job strain or high social support. In addition, there was no significant association with job satisfaction.[4,6,8]

One major weakness of this study was that it is cross-sectional, so it can only infer associations. The temporal relationship between the symptom severity and the treatment seeking could not be evaluated. There could be misclassification of the asymptomatic, Low and High participants secondary to recall bias.

Another weakness was the failure to ask if asymptomatic workers sought treatment. For this reason, the study could not use asymptomatic as a reference point; and Low symptoms were used instead. This reduces the range of possible outcomes.

The study population was unionized automobile assembly line workers for whom in plant HCPs were available. Care may be needed to generalize to other populations.

A future study design might include prospective study including other factors contributed to treatment seeking such as socioeconomic factors, other chronic diseases not included in the study, consultation of non traditional practitioners, types of self treatments, involvement in disease management program and types of worker compensations.

In summary, the study showed that there was an association between the severity of the symptoms for a musculoskeletal disorder and the decision to seek treatment from a health care provider (either plant clinic or private provider). The association was significant for the whole body. Female sought treatment more than male. The participants with osteoarthritis, hypertension and neurological disease sought treatment more than those without the conditions.

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Appendices

Initial IRB Approval Letter



RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX(813)974-7091

8/18/2014

Khin Chit, M.D.
Environmental and Occupational Health
12901 Bruce B. Downs Blvd.
MDC56
Tampa, FL 33612

RE: **Expedited Approval for Initial Review**

IRB#: Pro00017920

Title: The association between the symptom severity of musculoskeletal disorders and types of treatment taken by the workers at the auto plants.

Study Approval Period: 8/18/2014 to 8/18/2015

Dear Dr. Chit:

On 8/18/2014, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents outlined below.

Approved Item(s):

Protocol Document(s):

[The association between the symptom severity of musculoskeletal disorders and types of treatment taken by the workers at the auto plants](#)

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

Your study qualifies for a waiver of the requirements for the informed consent process as outlined in the federal regulations at 45CFR46.116 (d) which states that an IRB may approve a consent procedure which does not include, or which alters, some or all of the elements of informed consent, or waive the requirements to obtain informed consent provided the IRB finds and documents that (1) the research involves no more than minimal risk to the subjects; (2) the waiver or alteration will not adversely affect the rights and welfare of the subjects; (3) the research could not practicably be carried out without the waiver or alteration; and (4) whenever appropriate, the subjects will be provided with additional pertinent information after participation.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,



E. Verena Jorgensen, M.D., Chairperson
USF Institutional Review Board

IRB Reapproved Letter



RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4795
(813) 974-5638 • FAX(813)974-7091

Khin Chit, M.D.
Environmental and Occupational Health
12901 Bruce B. Downs Blvd.
Tampa, FL 33612

RE: Expedited Approval for Continuing Review

IRB#: CR1_Pro00017920

Title: The association between the symptom severity of musculoskeletal disorders and types of treatment taken by the workers at the auto plants.

Study Approval Period: 8/18/2015 to 8/18/2016

Dear Dr. Chit:

On 8/4/2015, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within including those outlined below.

Approved Item(s):

Protocol Document(s):

[The association between the symptom severity of musculoskeletal disorders and types of treatment taken by the workers at the auto plants](#)

The waiver of informed consent process and the waiver of HIPAA authorization have been renewed.

The IRB determined that your study qualified for expedited review based on federal expedited category number(s):

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with USF HRPP policies and procedures and as approved by the USF IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

A handwritten signature in blue ink that reads "Vjorgensen MD". The signature is written in a cursive style.

E. Verena Jorgensen, M.D., Chairperson
USF Institutional Review Board

Approval Email for Questionnaires

Re: Thesis Package



Bernard, Thomas

To: CHIT, KHIN;



Reply all |

Mon 11/16/2015 3:21 PM

Inbox

You replied on 11/16/2015 3:41 PM.

Khin

The questionnaire was developed for a specific research project for which I was the Principal Investigator. We did not seek a copywriter nor claim one. You have my permission to include it in your thesis.

Tom

--

Thomas E. Bernard
University of South Florida, College of Public Health
[13201 Bruce B. Downs Blvd, Tampa FL 33612-3805](http://13201.Bruce.B.Downson.Bldg.Tampa.FL.33612-3805)
813-974-6629 / tbernard@health.usf.edu
<http://personal.health.usf.edu/tbernard/>
"our practice is our passion"

From: "CHIT, KHIN" <khinchit@health.usf.edu>
Date: Monday, November 16, 2015 at 2:22 PM
To: Thomas Bernard <tbernard@health.usf.edu>
Subject: Re: Thesis Package

Hello Dr. Bernard,

How are you? Hope you are doing fine. By the way, I am now working with ETD for formatting. They have question related to the questionnaires attached at Appendix. I would like to know whether you have created the questionnaires and have permission to allow me to use. They asked me related to this questionnaires. Please let me know. The highlight is the question they asked me.

Do you have permission to reprint this? Unless you created this, you will need permission from the copyright holder.

Material created by others (figures, tables, images, rubrics, portions of a previously-published article, etc.) may be used within your ETD, providing you have the proper permissions to do so. In most cases, approval must come from the publisher. (If it hasn't been published, you would need to have the author of the work's approval.) Once you have an approval email or letter, include it in the Appendices. The publisher may have specific guidelines you must adhere to – be sure you follow any requirements outlined in the agreement. Contact Drew Smith in the Library (dsmith@usf.edu) if you need guidance. (<http://guides.lib.usf.edu/copyright>)

Copy of Questionnaire

Subject ID #

PERSONAL DATA SHEET: UAW – FORD STUDY

DATE: / /
mm dd yy

NAME: _____ SOCIAL SECURITY #

HOME ADDRESS: Street _____ Apt # _____

City _____ State _____ Zip _____

HOME PHONE NUMBER

Subject ID #

INTERVIEW: UAW - FORD STUDY

1. Date / /
mm dd yy
2. Interviewer
3. DOB / /
mm dd yy
- 4-5. HT: ft in 6. WT: lbs
7. Gender: male female 8. Are you right handed? Left-handed? ambidextrous?
9. DROT/DEPT # 10. PROCESS/JOB #
11. JobTitle/Name? _____
12. Shift worked? Day shift Swing shift 13. Usual number of hours worked /week?
14. Time on **CURRENT JOB(S)**? years months weeks days
15. On your **CURRENT JOB(S)** how long has it been since your last musculoskeletal injury?
years months weeks days
16. If you are currently on shift how many hours have you worked today

17. Have you done other jobs in the **LAST YEAR** for more than **2 WEEKS** at a time? No yes
If yes, please provide the information requested below. If more than 2 jobs in the **LAST YEAR**, include those on which you worked the longest?

1. Plant # Dept #
Job Title/Name? _____
Time on that job during the **LAST YEAR**? months weeks
2. Plant # Dept. #
JobTitle/Name _____
Time on that job during the **LAST YEAR**? months weeks

18. Have you ever been told by a health care provider that you had any of the following health problems?

- 1) Diabetes no yes 2) Thyroid problems no yes
3) Rheumatoid arthritis no yes 4) Osteo Arthritis no yes
5) Hypertension no yes 6) Neurological disorders no yes

Female workers only

- 7) Are you pregnant now? no yes NA
8) Are you currently taking birth control pills? no yes NA
9) Have you had a hysterectomy/oophorectomy? no yes NA
19. Are you a current smoker? ex-smoker? never smoked?

Subject ID #

20. In what kinds of out of plant activities are you or have you been involved during the last year?

1. Outside job or business: _____ Hours/Times/Week _____

Hours/Times/Week _____

Hours/Times/Week _____

Musculoskeletal risk factors? low med high

2. Sports: _____ Hours/Times/Week _____

Hours/Times/Week _____

Hours/Times/Week _____

Musculoskeletal risk factors? low med high

3. Hobbies: _____ Hours/Times/Week _____

Hours/Times/Week _____

Hours/Times/Week _____

Musculoskeletal risk factors? low med high

4. Arts/Crafts: _____ Hours/Times/Week _____

Hours/Times/Week _____

Hours/Times/Week _____

Musculoskeletal risk factors? low med high

5. Others: _____ Hours/Times/Week _____

Hours/Times/Week _____

Hours/Times/Week _____

Musculoskeletal risk factors? low med high

21. Have you experienced musculoskeletal pain or discomfort during the **PAST YEAR**? no yes

If **YES**, carefully shade in areas of the drawing on the next page that have or do bother you the **Most**.

22. Separate sections are available for the following body sites. Please check sections to be completed.

Head/Neck Shoulder Elbow Hand/Wrist
Lower Back Hips Knees Ankles/Feet None

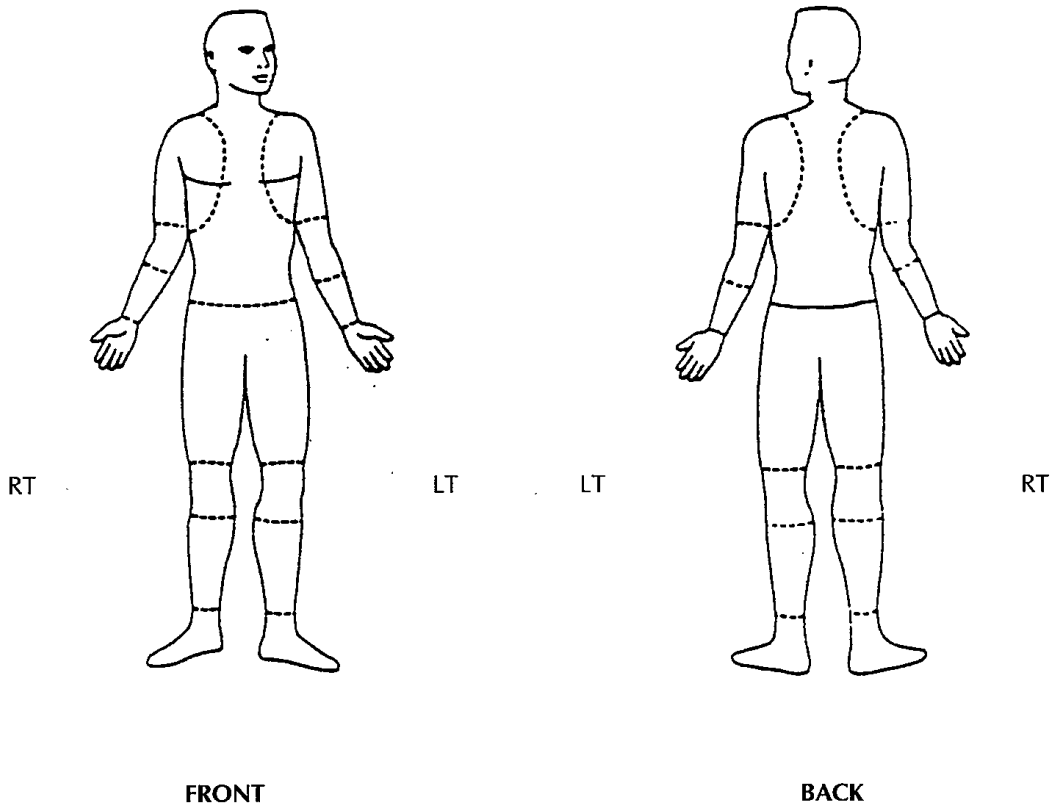
Please complete a separate section for each body site in which the worker notes he/she has symptoms

8/12/98

Subject ID #

BODY MAP

Carefully shade in areas of the drawing below that have or do bother you the **Most**.



DM/8/12/98

Subject ID #

Five 5 hn

HEAD/NECK

1. Have you experienced musculoskeletal pain or discomfort of your **head/neck** during the **PAST YEAR**?
no yes

2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)

1) Aching <input type="checkbox"/>	2) Pain <input type="checkbox"/>	3) Weakness <input type="checkbox"/>
4) Burning <input type="checkbox"/>	5) Swelling <input type="checkbox"/>	6) Knots <input type="checkbox"/>
7) Cramping <input type="checkbox"/>	8) Spasms <input type="checkbox"/>	9) Nocturnal discomfort <input type="checkbox"/>
10) Loss of color <input type="checkbox"/>	11) Stiffness <input type="checkbox"/>	12) Numbness <input type="checkbox"/>
13) Tingling <input type="checkbox"/>	14) Other <input type="checkbox"/> (Please explain) _____	
15) None <input type="checkbox"/>	_____	

3. Were you working on your **CURRENT JOB(S)** when these musculoskeletal symptoms started?
yes If **NO**, since working on your **CURRENT JOB(S)** have the musculoskeletal symptoms
gotten worse remained the same improved

4. How many **SEPARATE** episodes have you experienced in the **LAST YEAR**?
(If Continuous enter 365 for question # 4 and > 3 mo for question # 5)

5. How long does the **TYPICAL** episode last? (Mark the appropriate box)
<1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo

6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom
number from the above list

7. Have you experienced this symptom in the **LAST 7 DAYS**? No yes

8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM TODAY.



9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM WHEN IT IS THE WORST.



Subject ID #

66666666

HEAD/NECK

10. Have you received treatment for this symptom? no yes

If NO, Why not _____

If YES, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in last year

Outside of plant? How many times in last year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **head/neck**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **head/neck**? _____

17. Are your **head/neck** symptoms related to a **PREVIOUS CONDITION OR INJURY**?

no yes If yes, please explain _____

DM/8/12/98

Subject ID #

777 Seven

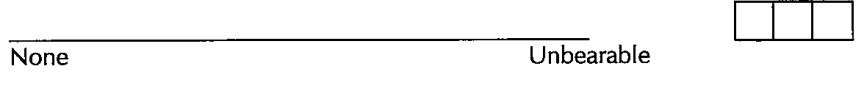
SHOULDER(S)

1. Have you experienced musculoskeletal pain or discomfort of your **shoulder(s)** during the **PAST YEAR**?
no if yes please specify: right left both
2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)
1) Aching 2) Pain 3) Weakness
4) Burning 5) Swelling 6) Knots
7) Cramping 8) Spasms 9) Nocturnal discomfort
10) Loss of color 11) Stiffness 12) Numbness
13) Tingling 14) Other (Please explain) _____
15) None
3. Were you working on your **CURRENT JOB(S)** when these musculoskeletal symptoms started?
yes If **NO**, since working on your **CURRENT JOB(S)** have the musculoskeletal symptoms
gotten worse remained the same improved
4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**?
(If continuous enter 365 for question # 4 and > 3 mo for question # 5)
5. How long does the **TYPICAL** episode last? (Mark the appropriate box)
< 1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo
6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom
number from the above list
7. Have you experienced this symptom in the **LAST 7 DAYS**? no yes

8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM TODAY.



9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM WHEN IT IS THE WORST.



Subject ID #

eight 888

SHOULDER(S)

10. Have you received treatment for this symptom? no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **shoulder(s)**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **shoulder(s)**? _____

17. Are your **shoulder** symptoms related to a **PREVIOUS** condition or injury?
no yes If yes, please explain _____

DM/8/12/98

Subject ID #

Eee 999 nine

ELBOW(S)

1. Have you experienced musculoskeletal pain or discomfort of your **elbow(s)** during the **PAST YEAR**?
no if yes, please specify: right left both
 2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)
1) Aching 2) Pain 3) Weakness
4) Burning 5) Swelling 6) Knots
7) Cramping 8) Spasms 9) Nocturnal discomfort
10) Loss of color 11) Stiffness 12) Numbness
13) Tingling 14) Other (Please explain) _____
15) None
 3. Were you working on your **CURRENT JOB(S)** when these musculoskeletal symptoms started?
yes if **NO**, since working on your **CURRENT JOB(S)** have the musculoskeletal symptoms
gotten worse remained the same improved
 4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**?
(if continuous enter 365 for question # 4 and > 3 for question # 5)
 5. How long does the **TYPICAL** episode last? (Mark the appropriate box)
<1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo
 6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom
number from the above list
 7. Have you experienced this symptom in the **LAST 7 DAYS**? No yes
-
8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM TODAY.
None _____ Unbearable
9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM WHEN IT IS THE WORST.
None _____ Unbearable
-

Subject ID #

IIIbbb 1010 ten

ELBOW(S)

10. Have you received treatment for this symptoms no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **elbow(s)**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **elbow(s)**? _____

17. Are your **elbow** symptoms related to a **PREVIOUS** condition or injury?

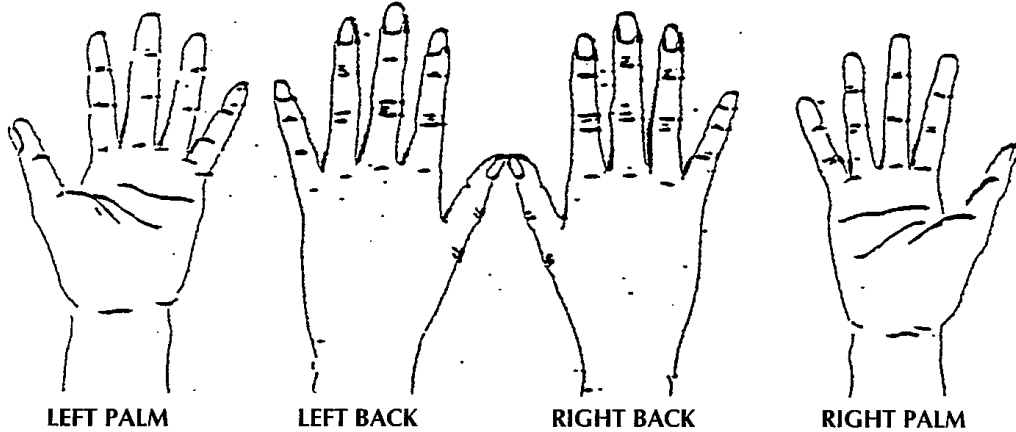
no yes if yes, please explain _____

DM/8/12/98

Subject ID #

HAND(S)/WRIST(S)

1. Have you experienced musculoskeletal pain or discomfort of your **hand(s)/wrist(s)** during the **PAST YEAR**? no if yes, please specify: right left both
If **YES**, carefully shade in areas of the drawing that have or do bother you the **Most**.



2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)

- 1) Aching 2) Pain 3) Weakness
4) Burning 5) Swelling 6) Knots
7) Cramping 8) Spasms 9) Nocturnal discomfort
10) Loss of color 11) Stiffness 12) Numbness
13) Tingling 14) Other (Please explain) _____
14) None

3. Were you working on your **CURRENT JOB** when these musculoskeletal symptoms started?

yes If **NO**, since working on your **CURRENT JOB** have the musculoskeletal symptoms gotten worse remained the same improved

4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**?
(if continuous enter 365 for question # 4 and > 3 mo for question # 5)

5. How long does the **TYPICAL** episode last? (Mark the appropriate box)

< 1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo

6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom number from the above list

page 11 for hand/wrist

Subject ID #

HAND(S)/WRIST(S)

7. Have you experienced this symptom in the **LAST 7 DAYS**? No yes

8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this SYMPTOM **TODAY**.

None _____ Unbearable

9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this SYMPTOM **WHEN IT IS THE WORST**.

None _____ Unbearable

10. Have you received treatment for this symptom? no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **hand(s)/wrist(s)**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **hand(s)/wrist(s)**? _____

17. Are your **hand/wrist** symptoms related to a **PREVIOUS** condition or injury?

no yes If yes, please explain _____

twelve 12121212

Subject ID #

RS is cool

LOWER BACK

1. Have you experienced musculoskeletal pain or discomfort of your **lower back** during the **PASTYEAR**?
no yes

2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)

- | | | |
|--|---|--|
| 1) Aching <input type="checkbox"/> | 2) Pain <input type="checkbox"/> | 3) Weakness <input type="checkbox"/> |
| 4) Burning <input type="checkbox"/> | 5) Swelling <input type="checkbox"/> | 6) Knots <input type="checkbox"/> |
| 7) Cramping <input type="checkbox"/> | 8) Spasms <input type="checkbox"/> | 9) Nocturnal discomfort <input type="checkbox"/> |
| 10) Loss of color <input type="checkbox"/> | 11) Stiffness <input type="checkbox"/> | 12) Numbness <input type="checkbox"/> |
| 13) Tingling <input type="checkbox"/> | 14) Other <input type="checkbox"/> (Please explain) _____ | |
| 15) None <input type="checkbox"/> | _____ | |

3. Were you working on your **CURRENT JOB** when these musculoskeletal symptoms started?

yes If **NO**, since working on your **CURRENT JOB** have the musculoskeletal symptoms
gotten worse remained the same improved

4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**?
(if continuous enter 365 for question # 4 and > 3mo for question # 5)

5. How long does the **TYPICAL** episode last? (Mark the appropriate box)

<1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo

6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom
number from the above list

7. Have you experienced this symptom in the **LAST 7 DAYS**? no yes

8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM **TODAY**.

None _____ Unbearable

9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM **WHEN IT IS THE WORST**.

None _____ Unbearable

Subject ID #

141 414fourteen14

LOWER BACK

10. Have you received treatment for this symptom? no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB** what do you think **CAUSED** the musculoskeletal symptoms of your **lower back**? _____

16. Are there tasks related to your **CURRENT JOB** that you think **AGGRAVATE** the musculoskeletal symptoms of your **lower back**? _____

17. Are your **lower back** symptoms related to a **PREVIOUS** condition or injury?

no yes If yes, please explain _____

DM/12/98

Subject ID #

Fifteen means hip 14

HIP(S)

1. Have you experienced musculoskeletal pain or discomfort of your **hip(s)** during the **PAST YEAR**?
no if yes, please specify: right left both
 2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)
 - 1) Aching
 - 2) Pain
 - 3) Weakness
 - 4) Burning
 - 5) Swelling
 - 6) Knots
 - 7) Cramping
 - 8) Spasms
 - 9) Nocturnal discomfort
 - 10) Loss of color
 - 11) Stiffness
 - 12) Numbness
 - 13) Tingling
 - 14) Other (Please explain) _____
 - 15) None
 3. Were you working on your **CURRENT JOB(S)** when these musculoskeletal symptoms started?
yes If **NO**, since working on your **CURRENT JOB(S)** have the musculoskeletal symptoms gotten worse remained the same improved
 4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**?
(if continuous enter 365 for question # 4 and > 3 mo for question # 5)
 5. How long does the **TYPICAL** episode last? (Mark the appropriate box)
< 1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo
 6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom number from the above list
 7. Have you experienced this symptom in the **LAST 7 DAYS**? no yes
-
8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this **SYMPTOM TODAY**.
- None _____ Unbearable
9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this **SYMPTOM WHEN IT IS THE WORST**.
- None _____ Unbearable
-
-

Subject ID #

fifteenhip

HIP(S)

10. Have you received treatment for this symptom? no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **hip(s)**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **hip(s)**? _____

17. Are your **hip** symptoms related to a **PREVIOUS** condition or injury?

no yes If yes, please explain _____

DM/8/12/98

Subject ID #

Knee equal to 15 25

KNEE(S)

1. Have you experienced musculoskeletal pain or discomfort of your **knee(s)** during the **PAST YEAR**?
no if yes, please specify: right left both
2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)
- 1) Aching
 - 2) Pain
 - 3) Weakness
 - 4) Burning
 - 5) Swelling
 - 6) Knots
 - 7) Cramping
 - 8) Spasms
 - 9) Nocturnal discomfort
 - 10) Loss of color
 - 11) Stiffness
 - 12) Numbness
 - 13) Tingling
 - 14) Other (Please explain) _____
 - 15) None
3. Were you working on your **CURRENT JOB** when these musculoskeletal symptoms started?
yes If **NO**, since working on your **CURRENT JOB** have the musculoskeletal symptoms
gotten worse remained the same improved
4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**?
(if continuous enter 365 for question # 4 and > 3 mo for question # 5)
5. How long does the **TYPICAL** episode last? (Mark the appropriate box)
<1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo
6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom
number from the above list
7. Have you experienced this symptom in the **LAST 7 DAYS**? no yes
-
8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM TODAY.
- None _____ Unbearable
9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this
SYMPTOM WHEN IT IS THE WORST.
- None _____ Unbearable
-

Subject ID #

Kkknnn15eee

KNEE(S)

10. Have you received treatment for this symptom? no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **knee(s)**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **knee(s)**? _____

17. Are your **knee** symptoms related to a **PREVIOUS** condition or injury?

no yes If yes, please explain _____

DM/8/12/98

ANKLE(S)/FEET

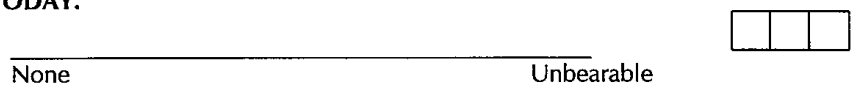
1. Have you experienced musculoskeletal pain or discomfort of your **ankle(s)/feet** during the **PAST YEAR**? no if yes, please specify: right left both
2. Which of the following word(s) best describe your musculoskeletal symptoms? (Check all that apply)

1) Aching <input type="checkbox"/>	2) Pain <input type="checkbox"/>	3) Weakness <input type="checkbox"/>
4) Burning <input type="checkbox"/>	5) Swelling <input type="checkbox"/>	6) Knots <input type="checkbox"/>
7) Cramping <input type="checkbox"/>	8) Spasms <input type="checkbox"/>	9) Nocturnal discomfort <input type="checkbox"/>
10) Loss of color <input type="checkbox"/>	11) Stiffness <input type="checkbox"/>	12) Numbness <input type="checkbox"/>
13) Tingling <input type="checkbox"/>	14) Other <input type="checkbox"/> (Please explain) _____	
15) None <input type="checkbox"/>	_____	
3. Were you working on your **CURRENT JOB(S)** when these musculoskeletal symptoms started?

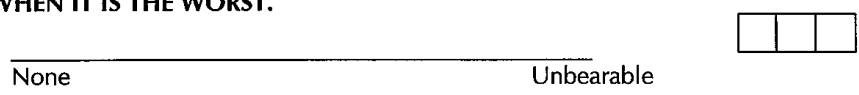
Yes If **NO**, since working on your **CURRENT JOB(S)** have the musculoskeletal symptoms gotten worse remained the same improved
4. How many **SEPARATE** episodes have you experienced in the **PAST YEAR**? (if continuous enter 365 for question # 4 and > 3 mo for question # 5)
5. How long does the **TYPICAL** episode last? (Mark the appropriate box)

< 1 hr 1 hr 1 da 1 wk 1 mo 2 mo 3 mo > 3 mo
6. Which **ONE** of the symptoms on the above list gives you the **MOST** pain/discomfort? Use symptom number from the above list
7. Have you experienced this symptom in the **LAST 7 DAYS**? no yes

8. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this SYMPTOM **TODAY**.



9. Draw a line that intersects the horizontal line at the point that best describes the **INTENSITY** of this SYMPTOM **WHEN IT IS THE WORST**.



Subject ID #

ANKLE(S)/FEET

10. Have you received treatment for this symptom? no yes

If **NO**, Why not _____

If **YES**, where did you receive treatment? (Mark all that apply)

Plant clinic? How many times in past year

Outside of plant? How many times in past year

11. How much **LOST WORK TIME** have you taken in the **LAST YEAR** due to this musculoskeletal symptom? # of days

12. How many days were you on **RESTRICTED/LIGHT** duty in the **LAST YEAR** due to this musculoskeletal symptom? # of days

13. Since working on your **CURRENT JOB(S)** how much **LOST WORK TIME** have you taken due to this musculoskeletal symptom. # of days

14. Since working on your **CURRENT JOB(S)** how many days have you been on **RESTRICTED/LIGHT** duty due to this musculoskeletal symptom? # of days

15. **IF RELATED** to your **CURRENT JOB(S)** what do you think **CAUSED** the musculoskeletal symptoms of your **ankles(s)/feet**? _____

16. Are there tasks related to your **CURRENT JOB(S)** that you think **AGGRAVATE** the musculoskeletal symptoms of your **ankle(s)/feet**? _____

17. Are your **ankle/feet** symptoms related to a **PREVIOUS** condition or injury?
no yes If yes, please explain _____

fffffetweett

**WORKERS PERCEPTION OF PHYSICAL EFFORT/EXERTION RELATED TO
DOING HIS/HER CURRENT JOB**

Please complete all 5 questions below.

1. Draw a line that intersects the horizontal line at the point that best describes the amount of physical effort/exertion you place on your **HEAD/NECK** while doing your **CURRENT** job?

Low High

2. Draw a line that intersects the horizontal line at the point that best describes the amount of physical exertion you place on your **SHOULDERS** while doing your **CURRENT** job?

Low High

3. Draw a line that intersects the horizontal line at the point that best describes the amount of physical exertion you place on your **ELBOWS/HANDS/WRISTS** while doing your **CURRENT** job?

Low High

4. Draw a line that intersects the horizontal line at the point that best describes the amount of physical exertion you place on your **LOWERBACK** while doing your **CURRENT** job?

Low High

5. Draw a line that intersects the horizontal line at the point that best describes the amount of physical exertion you place on your **HIPS/KNEES/ANKLES/FEET** while doing your **CURRENT** job?

Low High

PERCEPTIONS ABOUT WORK AND HEALTH

For the questions below, please check the answer that comes closest to describing your situation. There are no right or wrong answers to these questions. We are interested in your ideas and your experiences.

1. My job requires that I learn new things.
strongly disagree disagree agree strongly agree
2. My job involves a lot of repetitive work.
strongly disagree disagree agree strongly agree
3. My job requires me to be creative.
strongly disagree disagree agree strongly agree
4. My job requires a high level of skill.
strongly disagree disagree agree strongly agree
5. On my job, I have very little freedom to decide how I do my work.
strongly disagree disagree agree strongly agree
6. I get to do a variety of different things on my job.
strongly disagree disagree agree strongly agree
7. I have a lot to say about what happens on my job.
strongly disagree disagree agree strongly agree
8. My job requires working very fast.
strongly disagree disagree agree strongly agree
9. My job requires working very hard.
strongly disagree disagree agree strongly agree
10. I am not asked to do an excessive amount of work.
strongly disagree disagree agree strongly agree

Subject ID #

11. I have enough time to get the job done.
strongly disagree disagree agree strongly agree
12. My job is very hectic.
strongly disagree disagree agree strongly agree
13. I can take a break when I want to.
strongly disagree disagree agree strongly agree
14. My supervisor is willing to listen to my work related problems.
strongly disagree disagree agree strongly agree

JOB SATISFACTION

1. All in all, how satisfied are you with your job?
not at all satisfied not too satisfied somewhat satisfied very satisfied
2. How strongly would you recommend your job to someone else?
not at all recommend not too strongly recommend would recommend Would strongly recommend
3. If you were looking for a new job now, how likely is it that you would decide to take this job again?
not at all likely not too likely somewhat likely very likely

DM/8/11/98