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Interaction between Objective and Subjective Occupational Conditions Affecting Physical Health of Women Workers

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Abstract

This is an investigation on the interaction between the subjective and objective occupational conditions in affecting the overall health of women workers in industries that have accommodated information technology. The sample consisted of 23 establishments and 630 women respondents. Results show that the most prevalent issues among workers in the electronics industry included the need to upgrade skills, repetitive and fast paced work, pressure at work, and work that entailed both physically and mentally demanding tasks. It was found that the overall good physical health of the workers was affected by these factors: overtime, mental work, close monitoring, medium industries, poor quality of work, and hazardous work ($P.=0.05$). Meanwhile, heavy physical workload, awkward positions, long hours of standing, tasks that produce pressure, pressure at work, limited rest breaks and low participation in benchmarking were variables found to be associated with body pains ($P.=0.05$). On the other hand, workers in the electronics industry with poor quality of work and exposure to hazards faced a higher risk of deafness. The same risk was also present among those that do have health and safety policies, and fair regular benefits ($P.=0.05$). The study has shown that work in the 21st century in spite of being Information-Technology (IT) intensive is still beset with work and health issues. Contrary to the belief that IT is light and stimulating, assembly line workers have reported rather issues in both objective and subjective occupational conditions affecting their health.

Keywords: Organizational Hazard, Health, Women Workers, Information Technology

Introduction

The issue of stress levels in the workplace is of growing interest in the field of occupational health. Stress has been defined as a continuous averse situation, the evasion of which is subjective[1]ly or objectively important to an individual. In situations of stress, the individual is not totally in control. In the setting of a work environment, the main sources of occupational stress are organizational factors (job demands, rank, etc) (van Vegchel, et al., 2001) and work hazards, the most common of which are air pollution, noise, vibration, physical and psychophysiologic strain, visual exertion, and inadequate working posture (Mironov, et al., 1994). Occupational stress has consistently been related to the incidence of psychosomatic disorders and mental stress (Spurgeon, et al., 1997; Mironov, et al., 1994). In a study by Noriega, et al., (2000), it was seen that job-related demands and work organization (excessive work, strict supervision, dangerous work, unnatural positions, and intense and hard physical labor) were intimately linked to mental and psychosomatic disorders and fatigue. Moreover, it was found that the ill effects of

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these occupational stressors were additive, and sometimes even synergistic. Other studies have also found occupational stress to be directly associated with state of health, and inversely associated with global constructive thinking and job satisfaction (Stacciarini & Troccoli, 2004).

The International Labor Organization (ILO) in 1984 defined psychosocial problems in the workplace as interactions between and among the work environment, job content and organizational conditions and the worker's capacities, needs, culture and personal extra-job considerations that may affect perceptions and experiences of health, work performance, and job satisfaction (ILO, 1998). Indeed, the health effects of work hazards and organizational factors that bring about stress span a wide variety of physical and psychophysiological disorders that impair human well-being and hamper his/her ability to carry out responsibilities both at work and at home. This was seen in the work of Gonzalez, et al. in 2003. After assessment of work health hazards (postural risks, sedentary work, excessive heat, and overcrowding) and psychosocial factors linked to work organization (psychological demands, work control, and social support), they found that continued use of video display terminals (VDT) were associated with visual, musculoskeletal, and skin illnesses, and with fatigue, mental and psychosomatic disorders, more so in women. Meanwhile, fatigue and diseases of locomotion and the nervous system were found among shoemakers exposed to similar work conditions (Mironov, et al., 1994).

Increased interest has also been going on regarding the respective contributions of individual and workplace factors in affecting the health of workers. While psychologists are concerned with an individual's psychological and mental state, occupational health practitioners and ergonomists are more likely to attribute health problems to workplace factors. The current trend in workplace health promotion programs is the use of traditional, lifestyle-oriented strategies when dealing with occupational stress and its effects on worker's health, ignoring the possible impact of workplace and organizational factors on the health of employee. Other studies have found that individual characteristics and organizational factors are both significant in assessing the health and job satisfaction of employees (Elovainio, et al., 2000) and that both subjective and objective occupational conditions have important roles in workers' health (Pulido & Noriega, 2003).

The objectives of the study are to: 1) to investigate factors such as hazard exposures and organizational processes that affect the health of women workers in the electronics and garment industries in the Philippines; 2) to look into possible interactions between subjective and objective occupational conditions; and 3) to differentiate health risk factors among various industry types and sizes. The research hypothesis is: HO-there is no interaction between worker's objective and subjective occupational conditions in affecting worker's physical health; and H1=there is an interaction between worker's objective and subjective occupational conditions in affecting worker's physical health.

Contribution to the field of women's occupational health psychology

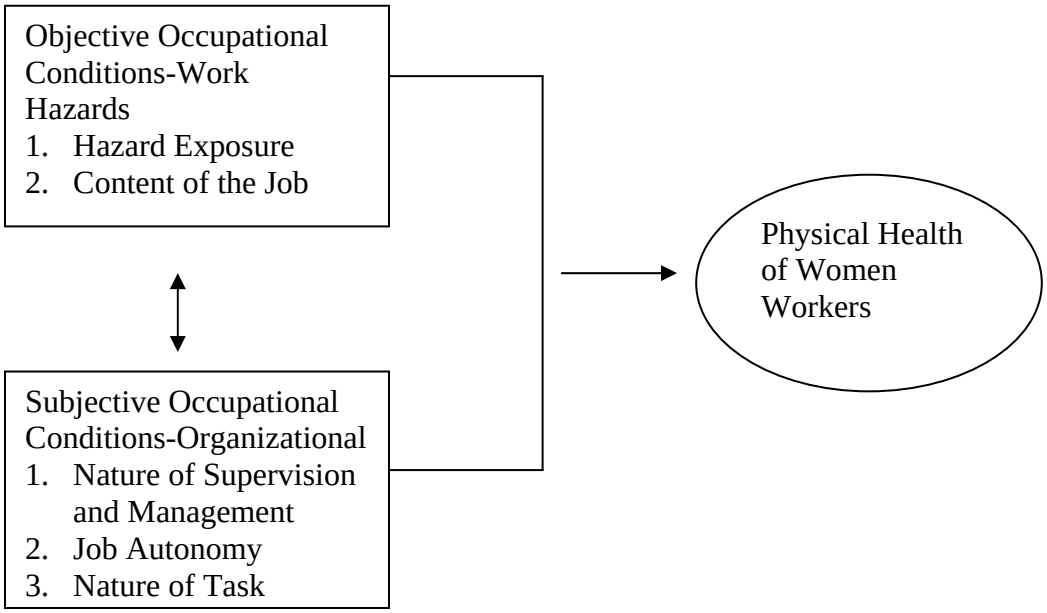
This paper will argue that:

1. There is a need to merge the viewpoints of psychologists and industrial hygienists in determining the best level of health among workers.
2. That both subjective organizational factors and objective hazard exposures should be looked into in work policies as they affect health of workers.

3. That even newer types of industries such as those that have accommodated information technology (IT) are confronted with health and work issues attendant in traditional industries.
4. The most affected in the chain of work production are the assembly line workers since they are directly involved with shop floor work.

Methodology

The conceptual framework



Operational definition of the variables above include:

1. Hazard exposure- based on noise, fumes, chemicals, ventilation, heat and cold exposures, humidity, radiation and illumination.
2. Content of the Job-- objective evaluation of the following: task that involves multiple skills, tiring visual inspection, requires physical exertion, requires awkward position, and requires concentration like visual inspection.
3. Nature of Management – presence of health and safety program, policies on compensation and other benefits, policies on promotion, tenure and training, policies on harassment and discrimination in the workplace; presence of newer organizational policies and management style like working in teams, timely delivery, total quality systems.
4. Nature of Supervision- subjective evaluation of either top-down and participatory supervisory styles.
5. Nature of Task- subjective evaluation of the following: boring and repetitive job, stressful jobs, feeling rushed, conflicting demands, pressured to meet deadlines, the need to learn skills just to keep up, amount of innovation needed for the jobs; or the other continuum of a better nature of task.
6. Job Autonomy- - subjective evaluation of freedom to decide how to complete the job, the order of tasks, the pace of task and amount of tasks to be completed.

7. The categories for health are based on the list of occupational illnesses provided by the Department of Labor and Employment (DOLE) which includes upper respiratory tract infections, reproductive disorders, hematologic conditions, urinary tract and related problems, cancer and metastatic conditions, dermatological conditions, neuro-muscular disorders, cuts and wounds, sensory problems, and mental health. The over-all physical health was based on the self-assessment of the women workers themselves.

Methods of Data Collection

This was a cross sectional study where the sampling frame was taken from a list of establishments in the electronics and garment industries in export zones. Using the sampling size estimation with level of significance at 90%, the alpha was set at 0.10, and the corresponding the sampling size chosen was 23 establishments, and 630 respondents.* The target respondents consists of the women workers in the establishments. The labour force profile of industries in export zones consists of 75-90% women and only 10-25% men. This suits the target population of the study consisting of women workers in electronics and garments industries.

**The sample size was calculated using the equation* $n = \frac{NZ^2 x\ (P(1-p)}{Nd^2 + Z^2.p\ (1-p)}$

Stratified random sampling with strata was used to draw the respondents. The strata consisted of the type of industry and size of industry. For the type of industry, electronics and garment industries were chosen. The focus was on these two types of industries since IT innovations are prevalent in the newer and "modern" industries of electronics manufacturing and the more "traditional" garment factories (Webster, 1996). For the size of industry, categories used by the DOLE were used such as small-scale, medium-scale and large-scale industries. The small-scale industries are those that employ less than 100 workers, medium-scale for 100-199 workers, and large-scale for 200 or greater number of workers. Thus 6 strata resulted in the combination of these categorizations of type and size of industry. Methods of data collection included survey questionnaire, walk through survey of establishments, and environmental monitoring.

Pre-testing of questionnaire was done prior to actual survey for the editing of questions and to establish the reliability and validity of the research instruments. Statistical tools used in analyzing the data from the questionnaires included the following:

1. Summary statistics such as means, standard deviations and correlations.
2. For the detailed analysis of the degree and direction of association between health and work factors, logistic regression was used.
3. Differences between electronics and garments industries and among small, medium and large industries were analyzed using logistic regression.
4. Factor Analysis for variable reduction.

Discussion of Results

A total of 23 facilities was sampled from the list of semiconductor and garment industries located in the Laguna and Cavite export zones: 13 from the electronics industry and 10 from the garment industry. The mean age of the female respondents (N= 630) was 27 years old, with majority being 24 years old (mode). This shows a relatively young

and active working population. Most of them were single (64.4%) with 32.1% being married. Forty-one percent had a salary range of 6001 to 8000 pesos per month.

The new technologies and computer-aided facilities used by the sample industries in this study were: computerized decision support systems, computer information systems; computer aided design (CAD, computer aided manufacturing (CAM), computer integrated manufacturing (CIM), computer numerically controlled machining (CNC), mechanized product systems such as conveyor belts and workstations, and robotics.

The electronics industry used relatively more information technology-based devices and programs (Table 1).

Table 1. Distribution of Types of Information Technology Used by Electronics and Garments Industries

Information Technology*	Electronics N= 23		Garments N= 24	
	Freq.	%	Freq.	%
Microelectronics Equipment	16	69.6	5	20.8
Controllable Programmers	15	65.2	4	16.7
Numerically Controlled Machine Tools	13	56.5	4	19.0
Computer Aided Design	8	34.8	11	52.4
Robotics	14	60.9	0	0

*N=47: This is multi-response which means that a supervisor may have more than one of these categories.

However, the application of CAD among the garments industry was higher, accounting for 52.4%. The industries focused more on component parts production (58.3%) which affirms the new international division of labor where the back-end processing of the production is located in developing nations while the more skill- and technology- integrated processes are done in the industrial countries. Very few of the respondents were involved in design, research and development, which are the phases in the production process commonly relegated to first world countries (Table 2).

Table 2: Distribution of the Application of Information Technology in the Production Line Between Electronics and Garments

Line of Production*	Electronics (N= 23)		Garments (N= 24)	
	Freq.	%	Freq.	%
Design	2	8.7	7	31.8
Fabrication of Model Parts/Products	6	26.1	6	27.3
Assembly of Whole Parts/Products	6	25.0	15	68.2
Assembly of Component Parts/ Products	14	60.9	1	4.5
Sales and Marketing	9	39.1	5	22.7
Research and Development	3	13.0	4	18.2

*N=47: Multi-response

On the nature of their tasks (Table 3), the most prevalent issues among workers in the electronics industry included the need to upgrade skills, repetitive and fast paced work, pressure at work, and work that entailed both physically and mentally demanding tasks. The same pattern was also seen in the garment industry.

Table 3. Nature of Task in the Company as Reported by Women Workers

Nature of Task- Mutiresponse*	Garment (N=23)		Electronics (N=24)	
	Freq.	%	Freq.	%
Work is boring	54	8.7	66	10.6
Work is repetitive	164	26.2	233	37.3
Work is fast-paced	174	28.0	207	33.3
Work produces pressure	167	27.0	214	34.6
Working hours is too long	98	16.0	128	20.8
Worker encounters conflicts	123	20.7	142	23.9
Work requires new quality	208	33.9	281	45.8
Work is physically and mentally tiring	174	27.8	202	32.3
Salary is sufficient	62	9.9	124	19.9

*N=630: Multi-response; this means that a worker may manifest one or more of the above categories

Factor Analysis of Certain Variables

Factor analysis was used to check for the clustering of related variables. This was done for the reduction of data set to allow a more parsimonious analysis. Among the workers, the nature of task was categorized into three main factors: quality of work (factor 1), work pressure (factor 2) and salary and compensation (factor 3). See Table 4.

Table 4. Factor Analysis* for the Nature of Tasks of Workers (N=630)

Factors	**Rotated Component**
Factor 1: Poor Quality of Work	
Boring	0.578
Repetitious	0.619
Much work than salary	0.752
Conflict between work and family	0.643
Physically and mentally tiring	0.746
Factor 2: Work Pressure	
Fast pacing	0.828
Pressure	0.805
New quality regularly	0.624
Factor 3 salary and compensation	0.912
Enough salary to meet needs	

*Factor analysis is a statistical method that tries to make a summative category for related items in the questionnaire

Logistic Regression Differentiating Electronics and Garment Industries and Industry Sizes

The following differences were found between the electronics and garment industry (Table 5): The electronics industry is 32% more likely to have workers with higher educational attainment than the garment industry. Work pressure is also 31% more likely to occur in electronics. However, it is 62% more likely to have health and safety policies and 73% more likely to have better policies and benefits than the garments industry. In contrast, the garment industry presents with a 62% greater chance of having hazardous work.

Table 5. Comparison between Electronics and Garments Industries (Workers)*

Industry Type	Coefficient	Odds Ratio	Standard Error	z	P>|z|	[95% Confidence Interval]		Remarks
Educational Attainment	0.28	1.32	0.08	3.25	0.00	0.11	0.44	The electronics industry have workers who have higher levels of educational attainment
Nature of Task								
Work Pressure	0.27	1.31	0.11	2.50	0.01	0.06	0.48	Workers in electronics industries experience more work pressure
Content of Job								
Hazardous Work	-0.48	0.62	0.11	-4.33	0.00	-0.70	-0.26	Workers in garments industries are more exposed to hazardous work such as chemical handling and exposure to radiation
Nature of Management								
Health Safety	0.47	1.62	0.11	4.13	0.00	0.69	0.25	The management in electronics industries give more concern to the health and safety of their worker through policies, seminars and insurance
Workers Regular Benefits	0.31	1.73	0.11	2.91	0.00	0.52	0.10	There are also better policies on benefits of workers in the electronics industries
Constant	-1.38		0.42	-3.28	0.00	-2.20	-0.55	

Note: * - significant at the 5 and 10 percent levels of significance.
Electronics are those manufacturing microelectronic parts for computers, radios, and other products.
Garments are those engaged in the manufacture of clothing.

Certain differences were found between small, medium and large-scale industries based on the results of the logistic regression. The former was characterized by work-specific illnesses, such as headaches, coughs and colds, and their workers are subjected to more dust exposure and long hours of standing. Meanwhile, medium-scale industries were associated with physical heavy load work, strict visual inspection, presence of accidents and chemical spills (particularly in the electronics sector), and a higher incidence of fainting, eye infection and wounds (specifically in the garment industry). On the other hand, it was also associated with better company programs and trainings, better health and safety management, more worker participation in benchmarking, and receiving more rewards and suspensions. In the large- scale industries, workers were more exposed to hazardous work environments, the most common of which are as fumes, vapors, intoxicating odors, high temperatures, cold, noise and radiation. They also dealt with more work pressure, but were more able to slow down the pace of their work and received higher salaries. Due to widespread use of IT as a supervisory tool in large-scale industries, there was greater autonomy in handling tasks, accomplishing work, and taking rest from work among workers. This may also be due to the adoption of better organizational tools in production and in the surveillance of worker's performance such as "just in time production," "total management systems," " zero inventory" and the like Table 6).

Table 6. Comparison among Workers in Small, Medium and Large Industries*

Factors			Coif.	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]		
Constant		s/m	-0.85		0.32	-2.67	0.01	-1.47	-0.23	
		l/m	0.77		0.21	3.73	0.00	0.37	1.18	
		s/l	-1.62							
Content of Job	Manual Work	s/m	-0.80	0.45	0.27	-2.91	0.00	-1.34	-0.26	Workers in medium
		l/m	-0.18	0.83	0.23	-0.78	0.44	-0.64	0.27	industries perceive that they are have more physical load and are under strict visual
		s/l	-0.62	0.54						inspection
Work Environment	Semiconductors/ Electronics	s/m	0.34	1.40	0.24	1.40	0.16	-0.14	0.81	Workers in large industries (particularly
		l/m	0.17	3.21	0.22	5.39	0.00	0.74	1.59	those in the semiconductors and electronics section) are more exposed to hazardous work environment such as fumes, vapors, cold temperature, noise and
		s/l	-0.83	0.44						radiation
Certain Accidents	Electronics	s/m	-1.26	0.28	0.26	-4.80	0.00	-1.77	-0.74	Workers in medium industries (particularly
		l/m	-0.44	0.64	0.24	-1.80	0.07	-0.92	0.04	those in electronics) are more prone to accidents
		s/l	-0.82	0.44						such (e.g. chemical

										spills, accidents)
Nature of Management	Health and Safety	s/m	-0.56	0.57	0.25	-2.25	0.02	-1.06	-0.07	Management on Health and Safety of Workers
		l/m	-0.15	0.86	0.16	-0.95	0.34	-0.46	0.16	is better in medium industries
		s/l	-0.42	0.66						
Diseases/Accidents	Work-specific Illnesses	s/m	4.95	141.46	1.46	3.38	0.00	2.08	7.82	Work-specific illnesses are more common among workers in small industries
		l/m	-0.23	0.79	0.90	-0.26	0.79	-2.00	1.53	
		s/l	5.19	178.90						
Diseases/Accidents	Work-specific Illnesses	s/m	4.95	141.46	1.46	3.38	0.00	2.08	7.82	
		l/m	-0.23	0.79	0.90	-0.26	0.79	-2.00	1.53	
		s/l	5.19	178.90						Work-specific illnesses are more common among workers in small industries
Nature of Task	Work Pressure	s/m	0.48	1.61	0.25	1.90	0.06	-0.01	0.97	Work pressure is worst
		l/m	0.01	1.01	0.18	0.03	0.97	-0.35	0.36	felt among workers in large industries
		s/l	1.47	1.60						
Job Autonomy	Taking Rest	s/m	-0.39	0.68	0.29	-1.33	0.18	-0.96	0.18	Workers in large
		l/m	0.44	1.56	0.21	2.12	0.03	0.03	0.85	industries are allowed more breaks and can slow down their pace
		s/l	-0.83	0.44						
Work Environment	Electronics Assembly	s/m	-0.26	0.77	0.33	-0.77	0.44	-0.91	0.40	Workers in large industries (particularly
		l/m	0.83	2.30	0.24	3.51	0.00	0.37	1.30	those in electronics assembly) are more exposed to intoxicating odors and high
		s/l	-1.09	0.34						temperature
Certain Accidents	Garments	s/m	-0.53	0.59	0.27	-2.01	0.04	-1.06	-0.01	Workers in medium industries (particularly
		l/m	-0.50	0.60	0.21	-2.40	0.02	-0.92	-0.09	those garments) are more prone to fainting, eye infection, dust
		s/l	-0.03	0.97						inhalation and wounds
Nature of Supervision	Rewards	s/m	-0.60	0.55	0.27	-2.17	0.03	-1.13	-0.06	Workers in medium industries have more
		l/m	-0.29	0.75	0.19	-1.56	0.12	-0.66	0.08	participation in benchmarking and receive rewards/suspension
		s/l	-0.30	0.74						more often
Diseases/Accidents	Undifferentiated Illnesses	s/m	3.03	20.66	0.82	3.70	0.00	1.43	4.63	There are more cases of headaches and coughs and colds among workers in small

										industries
		l/m	-0.33	0.72	0.51	-0.66	0.51	-1.33	0.66	
		s/l	3.36	28.87						
										Workers in large industries perceive that they have enough salary to compensate their
	Salary and									
Nature of Task	Compensation	s/m	1.96	2.62	0.42	2.32	0.02	0.15	1.78	needs
		l/m	0.77	2.15	0.30	2.60	0.01	0.19	1.35	
		s/l	1.19	1.21						
Work										Workers in small
Environment	Garments	s/m	0.37	1.45	0.30	1.25	0.21	-0.21	0.96	industries (particularly
		l/m	-0.58	0.56	0.22	-2.66	0.01	-1.01	-0.15	in garments) inhale more dust and are subjected to long hours
		s/l	0.96	2.60						of standing
Nature of										there are more company
Management	Other Programs	s/m	-0.52	0.59	0.30	-1.77	0.08	-1.10	0.06	programs and training
		l/m	-0.64	0.53	0.21	-3.02	0.00	-1.06	-0.23	and more participation of workers in medium
		s/l	0.12	1.13						industries

Note: * - significant at the 5 and 10 percent levels of significance.
Small industries (s) are those with less than 100 workers, medium industries (m) are those employing 100-199 workers, and large industries (l) are those with more than 199 workers. This is based on the classification of the Department of Labor and Employment.

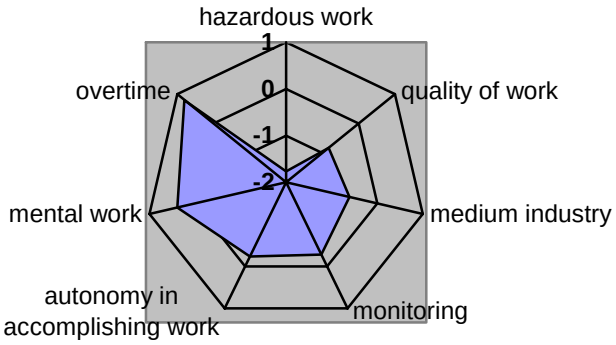
Logistic regression of factors that contribute to health and work-related illnesses among women workers

After performing logistic regression on the data and taking into consideration interaction effects, it was found that the overall good physical health of the workers was affected by these factors: overtime, mental work, close monitoring, medium industries, poor quality of work, and hazardous work (Table 7 and Figure 1).

Table 7. Logistic Regression of Good Physical Health among Workers*

Good Physical Health	Coefficient	Odds Ratio	Standard Error	z	P>|z|
Overtime (No overtime as base)	0.80	2.23	0.26	3.04	0.00
Mental work	0.39	1.48	0.14	2.80	0.01
Autonomy in accomplishing work	0.23	1.80	0.13	1.72	0.09
Close Monitoring	-0.28	0.76	0.13	-2.11	0.04
Medium Industry	-0.61	0.55	0.32	-1.91	0.06
Poor Quality of work	-0.83	0.44	0.14	-5.80	0.00
Hazardous work	-1.77	0.17	0.28	-6.36	0.00
Constant	1.38		0.28	4.85	0.00

Fig. 1. Web Analysis* of Factors Associated with Good Physical Health



(*Web analysis shows a graphical presentation of the magnitude of contribution of various risk factors associated with the independent variable.)

Meanwhile, heavy physical workload, awkward positions, long hours of standing, tasks that produce pressure, pressure at work, limited rest breaks and low participation in benchmarking were variables found to be associated with body pains (Table 8).

Table 8. Logistic Regression of Body Pain among Workers

Presence of Body Pains	Coefficient	Odds Ratio	Standard Error	Z	P>|z|
requires heavy physical load	1.44	4.23	1.77	3.44	0.00
work produces pressure	0.99	2.70	1.10	2.44	0.02
work pressure	0.89	2.43	0.71	3.06	0.00
Rest interacting with benchmarking	-0.55	0.72	0.28	-3.30	0.00
highest educational attainment	-0.16	0.85	0.07	-1.82	0.07
Absence of Awkward position*long hours of standing	-0.50	0.61	0.10	-3.09	0.00
small industry	-0.56	0.57	0.19	-1.70	0.09
Fast-paced x Heavy physical load *	-0.79	0.45	0.09	-3.95	0.00
Constant	4.28		0.93	4.60	0.00

*Interaction between two variables, fast paced work and heavy physical load, found to be statistically significant in this study.

Those with fast-paced work combined with heavy physical load were 45% more likely to experience body pains than those who were not. The study shows that even for skin allergies (Table 9), and wounds (Table 10), both objective and subjective factors are risk factors.

Table 9. Logistic Regression of Skin Allergy among Workers

Presence of Skin Allergy	Coefficient	Odds Ratio	Standard Error	z	P>|z|
Exposed to dust	1.44	4.22	1.36	4.46	0.00
Exposed to vapors	1.37	3.92	1.12	4.76	0.00
work pressure	0.89	2.44	0.36	6.01	0.00
Overtime	0.71	2.03	0.74	1.94	0.05

autonomy in accomplishing work	-0.45	0.56	0.21	-3.29	0.00
worker receives rewards/ suspension	-0.42	1.66	0.09	-3.13	0.00
hazardous work	0.70	1.50	0.09	3.97	0.00
Constant	-2.98		0.612	1.95	0.05

Table 10. Logistic Regression of Presence of Wounds among Workers

Presence of Wounds	Coefficient	Odds Ratio	Standard Error	z	P>|z|
exposed to fumes in workplace	1.25	3.50	1.05	4.17	0.00
autonomy in accomplishing work	-0.58	0.79	0.24	-4.29	0.00
autonomy in taking rest	-0.44	0.65	0.11	-2.53	0.01
worker's regular benefits	-0.96	0.38	0.08	-4.38	0.00
health and safety	-1.08	0.34	0.07	-5.00	0.00
small industry	-1.09	0.33	0.16	-2.25	0.03
quality of work	-1.09	0.34	0.06	-6.63	0.00
company giving promotions and training	-2.17	0.11	0.06	-4.43	0.00
Constant	-0.84		0.34	-2.47	0.01

Analysis of Data

1. There is a need to merge the viewpoints of psychologists and industrial hygienists in determining the best level of health among workers.

While psychologists are concerned with an individual's psychological and mental state, occupational health practitioners and ergonomists are more likely to attribute health problems to workplace factors. This study has shown that there is an array of risk factors in the workplace in the attribution of health problems. Poor physical health was influenced by overtime work, lack of job autonomy, poor quality of work, and exposure to hazards (P.=0.05).

These findings validate and add to those of others who have similarly tackled this topic. In the study of Araki, et al., in 1999, overtime work was associated with an increased need for mental health management among Japanese female workers. The amount of overtime work, marital status, and the presence of children were also significant factors in determining health status. High rates of eye discomfort, fatigue, headache, and menstrual pain were also seen among the respondents in association with irritability and depression. Meanwhile, Shimizu, et al. (2003) found that job rank contributed significantly and positively to general health, while age, communication with superiors, and self-management skills contributed negatively.

2. That both subjective organizational factors and objective hazard exposures should be looked into in work policies as they affect health of workers.

Studies have found that individual characteristics and organizational factors are both significant in assessing the health and job satisfaction of employees (Elovainio, et al.,

2000) and that both subjective and objective occupational conditions have important roles in worker's health (Pulido & Noriega, 2003).

The data have shown that there is indeed an interaction between objective and subjective occupational conditions factors in affecting the physical health of women workers. The organizational hot spots which predispose women towards adverse health effects that were identified in this study included the physical work environment, nature of the task, lack of job autonomy, and difficult relationships with supervisors and management. These factors were shown to be significantly associated with body pains, skin allergy, wounds, deafness, cough and colds, headaches and UTI.

Many other studies have documented the effects of work hazards and organizational factors on the health of employees across varying occupations and settings. Among systems analysts in Brazil, visual fatigue was associated with mental workload, inadequate equipment and workstation, low level of worker participation, being a woman, and fascination with the computer (Rocha & Debert, 2004).

3. *The most affected in the chain of work production are the assembly line workers since they are directly involved with shop-floor work.*

This study has shown that assembly line workers were confronted with illnesses due to both objective and subjective work conditions in the workplace. Among these include body pains, skin allergies, wounds, hearing problems, anemia, abortion,, hypertension, coughs and colds, and headaches.

For those involved in assembly-work such as in the electronics industry, it has been documented that physical job demands were associated with musculoskeletal symptoms, while pressure at work was related to lower job satisfaction and psychosomatic symptoms among Swedes (Waluyo, et.al., 1996). The psychological health of oil workers in China was found to be impaired by increasing occupational stress and being new to the job (Liu, et al., 2002). In electronics and engineering workers in Japan, longer working shifts were associated with poor health, dissatisfaction with life and poor recuperation from fatigue (Yamada, et al., 2003). Long working hours has also been linked to hypertension among Japanese white-collar workers (Stassen, 2001). In the study of Lee & Krause in 2002 among room cleaners, they found that physical job demands and constant pressure led to work-related pain and disability. Torp, et al., in 2001 also reported that social and organizational factors contributed to the development of musculoskeletal disorders among garage workers. It is to be noted that these relationships hold for those who are full time as well as part-time and seasonal workers (Bardasi & Francesconi, 2004).

4. *That even newer types of industries such as those that have accommodated information technology (IT) are confronted with health and work issues attendant in traditional industries.*

This study has shown that IT produces fast-paced work, the need for benchmarking, as well as heavy physical load for workers who have to do overtime work. This caused body pains among the women ($P.=0.00$). Other studies confirm the similar health problems. For instance, those in the Video-Display terminals reported video blues which consists of syndromes of eye problems, varicose veins, headaches, nausea, skin allergies, and persistent coughs and colds including reproductive problems at the extreme such as abortion, infertility, stillbirths and birth defects (Spivack, 1995 in Mitter, et.al.,

1995). As regards the work environment and hazard exposures of women in the industrial sector, the Bureau of Working Conditions reported the following problems in the Philippines: isolation and fatigue from decreased communication, reproductive-associated problems such as spontaneous abortion from chemical exposures, injuries and disabilities from unsafe machines, allergies and chemical burns, headaches and loss of sight from working with video terminal displays and localized muscular and back pains due to prolonged standing and repetitive and strenuous work. (BLES, DOLE 1994).

Women working in semiconductor industries are also exposed to solvent exposures. Women dip their hands in open containers containing acids where they lose whole fingers. In Malaysia, reports of "mass hysteria" among women workers were deemed by employers as "evil spirit derision" when in fact it was a response to the highly stressful work and quota production (Webster, 1996).

In the past, stress has been ranked as one of the 10 leading work-related problems. Brief &Weiss in 2002 has reported that claims of stress-related disabilities in the workplace have increased from 1980 to 1989, and that stress reactions are presently among the most disabling conditions in terms of lost work time, averaging 25 days lost per incident in 1993. In a 1990 survey of 600 full-time employees, 7 out of 10 workers stated that job stress caused lowered productivity and led to frequent health problems.

Certain gender differences in the response to stress have been found. Song, et al. in 2004, found that occupational stress was more severe in women, and that they exhibited a more intense stressful psychological reaction than men. The major factor associated with physical illness in women was workload, as opposed to support strategy and physical exercise in men. Lastly, stress level was mainly determined by support strategy in women and coping strategy in men. This is a promising area for further study in the field of occupational health.

There is now growing literature on the relationship between psychological and physical health in the workplace. The role of psychosocial factors in the manifestation of ill-health has been well-documented, and certain modifying factors have been identified. These include: the attitudes and belief systems of the concerned individuals, personality and behavior patterns, and the presence of stress or previous psychological distress. Social factors may also play a part, such as workers' perceptions of the competence and credibility of their superiors, and the influence of the media and pressure groups (Spurgeon, et al., 1997).

This was seen in the study of Escriba & Tenias in 2004. They found that hospital staff who were exposed to high psychological demands had a higher probability of having poor mental health. In addition, those with low job social support presented with the same risk plus increased chances of low vitality and limitation in social function. Meanwhile, Serra & Corrias in 2001 postulated that the visual health problems of VDT workers which stemmed from personal and organizational factors were probably indirect indicators of psychological discomfort. Lastly, psychological stress has been reported to be related to higher blood pressure and unfavorable cardiovascular profile (Quelin, et.al., 2001).

Kato, et al. in 2004 were able to identify job-related factors that were significantly associated with psychological stress. These were high job demand, poor human relationships at work, low job suitability, low social support from supervisors and

colleagues, and being dissatisfied with life. Their work also suggested that psychological stress was more common than physical stress among workers.

Boredom was also considered a source of psychological stress. It is the combined effect of high job demand and low job control such as low decision latitude and low skill discretion which leads to feelings of boredom. This very repetitive, unchallenging work has been found to be associated with both physical and psychological problems, and is aggravated by lack of social support from both colleagues and supervisors.

The findings of this study imply that strategies aimed at curbing work-related illnesses must focus on two factors- controlling exposure to occupational hazards such as noise, temperature changes, chemicals, and ergonomics; and making work arrangements and organizational processes more accommodating to workers' needs. Safety guidelines and regulations for workers must be formulated and enforced, and a smooth and productive relationship between workers and supervisors must be cultivated. Work must be made less boring and repetitive, and employees must be given autonomy in accomplishing their work. In general, there is a need for more worker-friendly policies and management styles in the workplace.

Based on their findings, others have suggested further means of improving working conditions and lessening its undesirable health effects. Kato, et al. in 2004 advised mental health check-ups, counseling and education on stress-coping skills in the early stages of psychological stress in order to retard the development of stress-related mental health disorders. Fort & Voltero in 2004 outlined five key factors which influence performance outcomes that must be provided by the workplace: job expectations, performance feedback, environment and tools, motivation and incentives, knowledge, and skills. The electronic and garments industry were selected for this study so as to show the changes in work organization accompanying the introduction of IT in various work processes. The use of information technology has made skills obsolete in an organization that adopts ever-changing equipment. Therefore, the worker is expected to adapt to the novel situation, and must have skills training in order to operate and use the new information and technology. Advances in computer technology have also had tremendous impact in the way management organizes its workplace and how workers organize themselves.

Employees reported that their tasks have been facilitated by IT, but it has also intensified their work and increased their production quota, leading to more stress. There is also an added need to upgrade their skills to keep up with the demands of IT and changing technology. The use of computers and machines has also made work boring, repetitive, and fast-paced. Lack of familiarity and skill to deal with new technologies has also been shown to be a source of tension among workers. Beutel, et al. in 2004 has shown that a high degree of stress was associated with the introduction of computer technology at the workplace in older employees aged 50-59 years. Even machinery used in farming and harvesting have been associated with increased physiological and psychological work load and increased tempo of work (Scopinho, et al., 1999).

In this study, quantitative overload was significantly related to a number of symptoms or indicators of exposure to psychological health problems, such as poor work motivation, low self-esteem, absenteeism, and tardiness. With the introduction of rapid technological innovations, many work organizations have, 'streamlined, downsized or rightsized' in order to meet the demands of a very competitive market. With this, many

employees were made redundant. Contemporary work organizations now place a high level of demand on workers within the new framework of lean production. In understanding this restructuring of the work organization, it is important to look into how industrial work has evolved.

Conclusion and Recommendation

This study has shown that there exists an intricate relationship between subjective and objective occupational conditions in the attribution of health. Organizational factors that have been identified to contribute to adverse health effects among women workers were the nature of the task, lack of job autonomy, hazard exposure, content of work, and difficult relationships with supervisors and management. Moreover, these factors have been shown to be significantly associated with body pains, skin allergy, wounds, deafness, cough and colds, headaches and UTI (P=0.10).

Certain differences also existed between the electronics and garment industry, and among the small, medium, and large-scale industries. The differences lie in the nature of production, and the organizational structures and processes. For instance, the electronics and garment industries differ in the products they make, in their health and safety policies, and in the consequent nature of operation that produces various work conditions and terms of employment.

It has been clearly shown above that health of women workers is related to new technologies, consequent organizational restructuring, adoption of new innovative management styles, and the changes in work processes necessitating the use and handling of new hazardous agents, tools and facilities. The adoption of IT in the workplace has intensified and increased work for employees, producing both physical and psychological ill health. The need to cope with the pace of growing technology and changing work environments has contributed to the experience and perception of health among workers. New work arrangements, organizational structure and new technological applications brought with it new hazards and illnesses.

These factors need to be considered in the formulation of a broader and friendlier policy framework for women workers. Health and safety should not be subordinated to purely economic considerations. This means that employers should adopt a proactive and preventive approach to health and safety, rather than reacting only after complaints have been made. A coherent policy that considers the way work is to be organized, and health and safety considerations that adapt work to the individual needs of the employee (particularly in the design of workplaces, choice of work equipment, and working and production methods) should be formulated and implemented. This should be done in order to protect the physical and mental health of workers who, in the end, determines the heart of an industry.

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