

Factors Associated with Depression among Thai Female Workers in the Electronics Industry

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Objective: To determine the factors associated with depression among female workers in the electronics industry.

Material and Method: A cross-sectional study was performed during the period of March 2010. A sample of 444 females working in the electronics industry-located in Ayutthaya province, Thailand-were selected by stratified random sampling. Data were collected by a self-administered questionnaire. Depression was assessed through utilization of the Center Epidemiologic Studies Depression scale (CES-D). Data regarding socio-demographics, employment history, personal crises, family relationships, effort-reward imbalance and personal resources were included to assess all factors influencing depression. Logistic regression analysis was used to analyze the predictability of factors.

Results: The prevalence of depression in female workers was 28.8%. Multiple logistic regression analysis showed that those with poor family relationships, low reward and poor social support had 5.83 times (95%CI: 2.66-12.79), 2.58 times (95%CI: 1.20-5.53) and 4.63 times (95%CI: 1.60 to 13.40) higher risk of suffering from depression, respectively.

Conclusion: The results suggest that improving family relationships, rewards and social support can be important strategies in the prevention of depression in female workers. Surveillance on depression in female workers should be conducted in the industry. Existing rewards should be reviewed and family relationships and social support should be enhanced, in order to decrease the impact of depression in female workers.

Keywords: Depression, Female workers, Effort-reward imbalance, Electronic industry

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Depression has been ranked as one of the top chronic health problems of the world and the most important mental health problem⁽¹⁾. The World Health Organization estimated that by 2020, depression would become the third health problem of the world and the burdens on economic and society due to depression will be similar to medical expenses for treatment of cardiovascular diseases⁽²⁾. In terms of gender, females were more likely to suffer from depression than males by a ratio of 2:1^(3,4). Depressed people are introverted, lack social support and they might face relationship problems. For the working population, suffering from depression without receiving treatment could affect their work ability, sick leave, family relationships and lifestyles⁽⁵⁾. In the long run, they might lose their jobs

and incur extra medical expenses. If such problems are not be solved, it would cause people to hurt themselves and commit suicide⁽⁶⁾.

Female workers currently tend to change their roles from housewife to working woman. This is because the local economic structure has increasingly changed from agricultural sector to industry and service sectors. About 80% of the female working population work in the manufacturing sector. Most of them had less education opportunities and come from lower-income families. They carry the burdens of supporting family debts and playing the role of mother and wife⁽⁷⁾.

The electronics industry has contributed to the significant export value and employ a high number of female workers⁽⁸⁾. Working in the electronics industry relies on advance technology. Employees need to wear special uniforms to assure product quality. Parts inspection needs to be done neatly and carefully, which can result in fatigue and work pressure. With mass production, employees have to work overtime to

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achieve required production, cost-reduction and to meet customer demands. Those factors could affect female workers physical, psychological and social conditions⁽⁹⁾.

Previous studies on depression in Thailand had been conducted in children, teenagers, menopausal and postpartum women, older people, disabled people, and patients⁽¹⁰⁻¹⁴⁾. However, there were no studies conducted regarding the female working population. Therefore, the purpose of the present study was to explore the prevalence of depression in female workers in the electronics industry and investigate its possible related factors. Personal factors, family factors, psychosocial factors at work using effort-reward imbalance⁽¹⁵⁾ and social factors were investigated in the present study to examine the risk factors for depression among female workers. Ayutthaya province-where most electronic factories in Thailand are located-was selected as the suitable area for data collection. Findings from the present study could be utilized for planning the surveillance program on depression in female workers in order to improve quality of life and to reduce medical expenses of the individual and organization.

Material and Method

This cross-sectional survey was conducted in March 2010 after approval was obtained from Ethical Committee for Human Research of the Faculty of Public Health, Mahidol University. The population in the present study was limited to those working in large and medium-sized factories ($n = 35,490$) due to its similar work environment and characteristics. Small factories were not included as there were few small factories and most of them were in the household industry. The name list of 69 large enterprises (≥ 200 workers) and 42 medium enterprises (< 200 workers) registered with the Department of Industry was obtained. One large and one medium electronic factory was then randomly selected from the list. After obtaining the informed consent, a self-administered questionnaire was distributed to 444 workers randomly selected at their workplace.

Depressive symptoms were measured by using the Thai version of the Center for Epidemiologic Studies Depression Scale (CES-D)⁽¹⁶⁾. It is a brief, self-reporting questionnaire designed to measure the current state of depression in epidemiological research and has been widely used among Thai populations with good reliability and validity. The CES-D comprises 20 items. Each item had four response categories on

how often the respondents experienced the depressive symptoms during the past week: (0) never, (1) sometimes, (2) frequently and (3) always. Depression group was defined with CES-D ≥ 19 .

Personal factors including age, marital status, education level, income, personal illness and work characteristics (12 items) were obtained using a checklist format. Crisis Life Event was measured using 10-items visual analog scale with the continuous measure of problem severity according to the perception of subject about stressors during the past six months. For each item, a zero score referred to the problem that was not severe or had not happened and ten referred to the problem that was very severe.

Effort-Reward Imbalance was measured using the 16-item ERI questionnaire⁽¹⁷⁾ consisting of three scales. The Thai version of the ERIQ⁽¹⁸⁾ was shortened from 23 items to 16 items. The three scales are termed 'extrinsic effort' (3 items), 'reward' (7 items), including money, esteem, job security and promotion prospects), and 'over commitment' (6 items). Responses to the items of 'extrinsic effort' and 'reward' are scored on a 4-point scale where a value of 1 indicates no respective stressful experience and a value of 4 indicates very high stressful experience. The items of the scale 'over commitment' are scored on a 4-point scale (1 = disagree, 4 = agree). Consequently, with such a scoring, the range for the scale 'effort' is 3 to 12, for the scale 'reward' 7 to 28 and for the scale 'over commitment' 6 to 24. Moreover, according to a predefined algorithm, a ratio between the two scales 'effort' and 'reward' is calculated to quantify the degree of mismatch between high cost and low gain known as effort-reward imbalance⁽¹⁸⁾.

Family relationship scale was developed based on the family relationship theory of Friedman⁽¹⁹⁾. There were 20 questions including 4 aspects of love and care (12 items), family relaxation (6 items), mutual respect (9 items) and harmony (6 items).

Social support was measured by the 25-items of Thai version of Personal Resource Questionnaire⁽²⁰⁾ (PRQ 85 part 2) including provision for attachment/intimacy (5 items), social integration (5 items), opportunity for nurturance (5 items), reassurance of worth (5 items) and assistance/guidance (5 items).

Before collecting data, the instrument was examined for its content validity and pre-tested on 30 workers with similar characteristics as the subjects. The reliability test indicated that all scales had good levels of internal consistency; depressive symptoms ($\alpha = 0.89$), effort ($\alpha = 0.70$), reward ($\alpha = 0.75$), over commitment ($\alpha = 0.83$), family relationship ($\alpha = 0.97$) and social support

($\alpha=0.93$).

Descriptive statistics were used to describe the sample characteristics. Logistic regression analysis was conducted to examine the association between potential factors and depression. Mean \pm standard deviation (SD) of effort, reward, over commitment, family relationship and social support scales were used to classify subjects into 3 groups (< mean-1SD as low/poor, mean \pm 1SD as moderate/fair and > mean + 1SD as high/good).

Results

Almost half of female workers were aged between 40-49 years (44.8%) with an average age of 38 years. Most of them obtained high school education (47.9%) and almost half of them were married (45%). Their monthly income was < 10,000 bahts (72%) with an average income of 9,286 bahts. More than half of them had adequate income without savings (58%). As for their health status, it was found that about two thirds of the female workers had no personal illnesses (64%). Regarding their work, it was found that most female workers were involved in shift work (91%). They mostly worked for about 12 hours/day and worked overtime for six days/week with an average overtime of four hours/day (92%). As for period of time they have worked in the industry, it was found that 26% of female workers had worked in the industry for 6-10 years, with an average working period of 12 years (Table 1, 2).

Regarding psychosocial factors at work, it was found that 43.7% of female workers had effort-reward imbalance; ERI ratio > 1 with an average score of 1.22 (Min 1.00 and Max 2.14).

More than half of female workers had faced stressful situations during the past six months (54.4%), the most frequent situation reported was sudden death of their family members (25.5%), followed by sudden severe illness of their family members (24.8%), while two thirds had a low level of critical events (66%). Most of subjects had social support at fair level (63.4%). Prevalence of depression among subjects was 28.8%. Logistic Regression Analysis showed that factors predicting depression with a statistical significance (p -value < 0.05) were family relationships, reward and social support (Table 3). Female workers with poor and fair family relationships were 5.83 and 2.21 times more likely to have depression (95% CI 2.66-12.79 and 1.15-4.28) respectively when compared to those with good family relationships. Similarly, female workers with low rewards were 2.58 times more likely to have depression (95% CI 1.20-5.53). Significant association was also found

between social support and depression, workers with poor social support were 4.63 times more likely to suffer

Table 1. Demographic characteristics of female workers in electronic industry (n = 444)

| Personal factors | n | % |
|---|-----|------|
| Age | | |
| < 30 years | 62 | 14.0 |
| 31-39 years | 172 | 38.7 |
| 40-49 years | 199 | 44.8 |
| \bar{x} = 38 years, Median = 39, SD = 7.1, Min = 18 years, Max = 52 years | | |
| Education level | | |
| Elementary | 14 | 3.2 |
| Secondary | 145 | 32.7 |
| High school | 213 | 47.9 |
| Diploma | 43 | 9.7 |
| Bachelor degree | 29 | 6.5 |
| Marital status (n = 443) | | |
| Single | 150 | 33.9 |
| Married & staying together | 234 | 52.7 |
| Widowed/Divorced/Seperated | 59 | 13.4 |
| Income (baht/month) | | |
| < 10,000 | 326 | 72.4 |
| 10,001-20,000 | 67 | 15.1 |
| 20,001-30,000 | 5 | 1.1 |
| > 30,001 | 46 | 10.4 |
| \bar{x} = 9,285.6, Median = 8,500, SD = 3,503.7, Min = 4,000, Max = 40,000 | | |
| Personal illness | | |
| Unknown | 79 | 17.8 |
| None | 283 | 63.9 |
| Yes | 81 | 18.3 |

Table 2. Work characteristics of female workers in electronics industry (n = 444)

| Work information | Number (person) | % |
|--|-----------------|------|
| Shift work | | |
| No | 38 | 8.6 |
| Yes | 406 | 91.4 |
| Work hours/day (n = 439) | | |
| Normal (8 hours) | 44 | 10.0 |
| Normal + OT (12 hours) | 395 | 90.0 |
| Work duration in the factory (years) | | |
| \leq 5 | 85 | 19.3 |
| 6-10 | 117 | 26.4 |
| 11-15 | 102 | 23.0 |
| 16-20 | 75 | 16.9 |
| \bar{x} = 12.2 years, Median = 11, SD = 6.6, Min = 8 months, Max = 25 years | | |

Table 3. The association between potential factors and depression among female workers (n = 444)

| Variable | Crude | | Adjusted ^a | |
|----------------------|----------|--------------|-----------------------|--------------|
| | OR | 95% CI of OR | OR | 95% CI of OR |
| Family relationship | | | | |
| Poor | 12.80*** | 6.55-25.00 | 5.83*** | 2.66-12.79 |
| Fair | 3.49 | 1.97-6.20 | 2.21** | 1.15-4.28 |
| Good | 1 | | 1 | |
| Effort | | | | |
| High | 2.43** | 1.28-4.61 | 1.84 | 0.84-4.04 |
| Moderate | 1.42 | 0.74-2.73 | 1.23 | 0.57-2.66 |
| Low | 1 | | 1 | |
| Reward | | | | |
| Low | 3.63*** | 1.88-6.99 | 2.58** | 1.20-5.53 |
| Moderate | 1.55 | 0.80-2.99 | 1.38 | 0.65-2.96 |
| High | 1 | | 1 | |
| Overcommitment | | | | |
| High | 2.70*** | 1.57-4.65 | 1.63 | 0.83-3.19 |
| Moderate | 1.09 | 0.58-2.05 | 0.96 | 0.46-1.97 |
| Low | 1 | | 1 | |
| Stressful life event | | | | |
| High | 2.62*** | 1.37-5.01 | 1.59 | 0.74-3.44 |
| Moderate | 1.93 | 1.20-3.10 | 1.56 | 0.89-2.73 |
| Low | 1 | | 1 | |
| Social support | | | | |
| Poor | 15.24*** | 5.97-8.93 | 4.63** | 1.60-13.40 |
| Fair | 4.37 | 1.82-10.47 | 2.31 | 0.90-5.91 |
| Good | 1 | | 1 | |

OR : odds ratio, 95% CI, confidence interval, *p < 0.05, **p < 0.01, ***p < 0.001

from depression (95% CI 1.60-13.40). While workers with low reward were 2.58 times higher risks of depression (95% CI 1.20-5.53).

Discussion

The findings of the present study revealed that, over one-fourth of female workers suffered from depression (28.8%). This is considerably higher than that reported in general female population (4%)⁽²¹⁾ but similar to previous studies conducted in industrial employees^(22,23). There are several factors that could affect mental health problems in employees of industrial sectors such as shift work, working overtime, customers' requirements, harmful work environment and poor working conditions. In addition, the electronics industry enforces work rules strictly, applies high and modern production technologies and requires high concentration to work with small pieces of products. Such conditions could cause workers to have higher risk of depression than workers in other sectors.

The present study confirms that low reward is a risk factor for depression, consistent with previous studies^(17,18). However, other psychosocial factors at work including effort, over commitment and effort-reward imbalance were not significantly related to depression. This may be due to the effect of social factors especially in the economic context of Thailand on the electronic industry in Ayutthaya Province. During the past few years, global economic downturn resulted in reduced foreign orders. Consequently, some factories in the electronic industry had to close down or adjust themselves by downsizing, leading to an increased unemployment rate. The samples of female workers in the present study, however, did not face the unemployment problem when other workers were laid-off for the industry survival. This might be a social compensation that encouraged female worker samples to put more effort and commitment in their work, without considering it as an imbalanced workload, in order to assure their employment.

Consistent with other studies, findings

suggest that female workers with poor family relationships and poor social support have higher risks of depression^(24,25). Because most of female workers in the present study are married and are on shift-work, they might face problems of family and social relations. Enhancing family relationship and social support could have positive effects on mental health and may buffer the negative effects of stressful life events⁽²⁶⁾.

In the present study, psychosocial factors at work, family factors and social factors are associated with depression among female workers. Consistently with the Social ecological theory⁽²⁷⁾, the multi-level environment has influence on health. As female workers also have to interact with their family and social environments, multi-level approach interventions are needed to prevent depressive symptoms. Mental health surveillance should be conducted in the workplace. Proper work rewards should be provided. Mental health intervention, including social and family activities, should be promoted to prevent the impact of depression in female workers.

Conclusion

The present study explores the prevalence of depression and its related factors among female workers. Improving family relationships, rewards and social support could be an important strategy in the prevention of depression. In further studies, intervention to prevent depression should be designed based on findings in the present study and tested for its effectiveness.

Potential conflicts of interest

None.

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ปัจจัยที่มีอิทธิพลต่อภาวะซึมเศร้าในแรงงานสตรีภาคอุตสาหกรรมอิเล็กทรอนิกส์

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วัตถุประสงค์: เพื่อศึกษาปัจจัยที่มีความสัมพันธ์กับภาวะซึมเศร้าในแรงงานสตรีภาคอุตสาหกรรม

วัสดุและวิธีการ: การวิจัยเชิงพรรณนาแบบภาคตัดขวาง กลุ่มตัวอย่างเป็นแรงงานสตรีที่ทำงานในอุตสาหกรรมอิเล็กทรอนิกส์ที่อยู่ในจังหวัดพระนครศรีอยุธยา จำนวน 444 คน เลือกโดยการสุ่มเก็บข้อมูลโดยแบบสอบถามชนิดตอบด้วยตนเอง การศึกษาภาวะซึมเศร้าใช้แบบวัดภาวะซึมเศร้า CES-D ข้อมูลส่วนบุคคล ข้อมูลเกี่ยวกับการทำงาน เหตุการณ์เครียดในชีวิต สัมพันธภาพในครอบครัว ความไม่สมดุลของความไม่สมดุลของความทุ่มเทในงาน และผลตอบแทนจากงาน และแรงสนับสนุนทางสังคมเป็นปัจจัยที่ใช้ ทดสอบความสามารถในการทำนายภาวะซึมเศร้าโดยใช้สถิติวิเคราะห์ถดถอยโลจิสติก

ผลการศึกษา: พบว่าความทุกข์ของภาวะซึมเศร้าในแรงงานสตรีคิดเป็นร้อยละ 28.8 ผลการวิเคราะห์ การถดถอยโลจิสติกพบว่า ผู้ที่มีสัมพันธภาพในครอบครัวไม่ดี (95%CI 2.66-12.79) ผลตอบแทนจากงานต่ำ (95% CI: 1.20-5.53) และขาดแรงสนับสนุนทางสังคม (95% CI: 1.60-13.40) มีโอกาสเสี่ยงต่อการเกิดภาวะซึมเศร้าเพิ่มขึ้น 5.83, 2.58 และ 4.63 เท่า ตามลำดับ

สรุป: ผลการศึกษาแสดงให้เห็นว่าสัมพันธภาพในครอบครัว ผลตอบแทนจากงานและแรงสนับสนุนทางสังคม เป็นปัจจัยสำคัญในการป้องกันภาวะซึมเศร้าในแรงงานสตรี ในสถานประกอบการควรมีการเฝ้าระวัง ภาวะซึมเศร้า ตลอดจนทบทวนความเหมาะสมของผลตอบแทนจากงานที่แรงงานสตรีได้รับ ส่งเสริมสัมพันธภาพในครอบครัว และพัฒนาแรงสนับสนุนทางสังคม เพื่อป้องกันผลกระทบของภาวะซึมเศร้าในแรงงานสตรี
