The Levels of Stress and Depression among Interns and Clerks in Three Medical Centers in Taiwan – A Cross-sectional Study

Yi-Hsuan Hsieh, MD; Chiao-Ying Hsu¹, MD; Chia-Yih Liu, MD; Tsan-Lung Huang², MD

- **Background:** Depression and heavy stress have been reported as two important problems for medical students in previous studies; and stress and depression levels were also related to gender and grades. The aims of this article were to investigate the emotional problems of Taiwanese interns and clerks, and to clarify their relationship to work circumstances, identity of interns and clerks in the hospitals, gender discrepancy and their levels of stress and depression.
- **Methods:** Three medical centers in Taiwan were selected in this study. All interns in the three medical centers and clerks in Chang Gung Memorial Hospital were invited to complete an anonymous self-report questionnaire. The questionnaire included demographic data, levels of various stresses in hospitals recorded with visual analog scales, and a Chinese version of Zung's Self-administered Depression Scale. One-way analysis of variance was also adopted to compare the distress scores, and the Scheffe test was chosen for the post hoc comparisons.
- **Results:** First, working in different medical centers was not a factor influencing levels of stress and depression of interns. Second, interns had higher stress levels of "work loading" and "occupational risks", and more depressive symptoms, such as "poor sleep quality", "poor appetite", "libido loss", "body weight loss", and "anhedonia". However, identity did not significantly impact levels of depression. Third, gender discrepancy showed significant influences on some stress sources and depressed symptoms.
- **Conclusions:** When comparing some depressive symptoms and stress sources among medical students, differences of gender and identities were statistically significant. Further longitudinal studies are needed. (*Chang Gung Med J 2011;34:278-85*)

Key words: clerkships, stress, depression, internships, gender, medical education, Taiwan

Depression and heavy stress have been two important problems for medical students, clerks and interns. Zoccolillo *et al* found that the prevalence rate of depression among medical students was 15%, which was three times higher than the general population.⁽¹⁾ Two studies compared rates of major depression before internships (23% and 40%) and during internships (27% and 30%).^(2,3) Furthermore,

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Correspondence to: Dr. Yi-Hsuan Hsieh, Department of Psychiatry, Chang Gung Memorial Hospital at Linkou. 5, Fusing St., Gueishan Township, Taoyuan County 333, Taiwan (R.O.C.) Tel.: 886-3-3281200 ext. 2485; Fax: 886-3-3280267; E-mail: 8802026@cgmh.org.tw

From the Department of Psychiatry; ²Department of General Surgery, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; ¹Department of Internal Medicine, Chang Gung Memorial Hospital at Keelung, Chang Gung University College of Medicine, Taoyuan, Taiwan.

the other studies suggested that the greatest stress often occurs in the last years of medical education.⁽⁴⁻⁷⁾

The medical education systems are diverse in different countries. In Taiwan, medical students study basic medical knowledge in the first 4 years and then begin clinical practice in the fifth year of their medical education. Clerks, in their fifth and sixth years of study, shadow their tutors, residents and medical doctors, to observe clinical practice and to learn some fundamental procedures, such as nasogastric tube or urinary catheter insertion. Interns, in the seventh year, can practice clinical primary care and medical decisions by themselves, under the supervision of senior physicians.

Since life styles of medical students change significantly after posting in hospitals, such as sleep deprivation and intensive workload,⁽⁸⁾ many studies focused on stress and mood change during clerkships and internships. Baldassin found that the internship period resulted in the highest Beck Depression Inventory scores in both the basic (Grade 1 and 2) and intermediate (Grade 3 and 4) periods among medical students in Brazil.⁽⁹⁾ Also, a lifetime of depression before internship has an adverse effect on psychopathology and the subjective quality of life during internship,⁽¹⁰⁾ thus baseline data collection of mood status and possible intervention for high risk groups are both important.

On the other hand, the gender difference played an important role on depression and stress among medical students. Female medical students showed a higher level of depression than their male counterparts,⁽¹¹⁻¹³⁾ and Hojat *et al* found that female medical students were susceptible to stressful events, such as the death of a family member or personal illness.⁽¹⁴⁾ In addition, there were significant differences in specific depressive symptoms between female and male students: female students scored higher on "easily crying" and "loss of libido".^(1,15,16)

There are few data about the influences of different working circumstances on levels of stress and depression There are also only a few studies addressing the level of stress and depression among medical students in Taiwan. So, we focused on senior medical students with experiences of clinical practice (interns and clerks) in medical centers. The following questions were investigated: do different work circumstances, identity in the hospitals (interns or clerks), and gender, influence levels of stress and depression?

METHODS

Procedure

All enrolled interns and clerks voluntarily participated in this study and personal information was kept confidential, except for group data. According to a previous study, anonymity is quite important when assessing sensitive psychological states of medical students,⁽¹⁷⁾ so this questionnaire was conducted anonymously. This study was approved by the Institutional Review Board of Chang Gung Memorial Hospital.

Study participants

This study was carried out during the academic year 2004. Three medical centers in Taiwan were selected: National Taiwan University Hospital (NTUH), National Cheng Kung University Hospital (NCKUH), and Chang Gung Memorial Hospital (CGMH). All interns in these medical centers (253 interns in NTUH, 60 interns in NCKUH, 88 interns in CGMH) and clerks in CGMH (total 110 clerks) were enrolled and completed a self-report questionaire.

The self- reported questionnaire

The 2-pages of self-reported questionnaire included 4 sections. Introduction, the goal of this study, confidentiality reassurance, the authors' names, affiliations and telephone numbers were included in section I. The demographic data of respondents (gender, birth year, marital status, physical illness (if applicable), and affiliations (schools and hospitals)) were listed in section II.

Section III included Visual Analog Scales to record levels of various stresses in hospitals: "Dealing with the patients' complaints", "Workload", "Occupational risks", "Interaction with the other medical staffs", "Academic loadings", "Hospital administration" and "Overall stress". Each question could be rated on a 100 mm visual analog scale (VAS) from 0 mm (feeling no distress) to 100mm (feeling the highest possible distress). The respondents marked their grade with a vertical line according to the level of distress during the past one year. The length from the zero point to the vertical line was recorded as the score, from 0 to 100. Section IV was the Chinese version of Zung's Self-administered Depression Scale questionnaire to measure depression levels. Zung's Self-administered Depression Scale (Zung-SDS) consists of 20 items that describe symptoms of depression and is generally compatible with the other studies.⁽¹⁸⁾ Each item could be rated on a four-point scale: "never or seldom", "sometimes", "often" and "usually or always". This Chinese edition of the instrument has also good validity and norms for college students in Taiwan with fair reliability coefficient (= 0.73) and efficiency coefficient (= 0.37).⁽¹⁹⁾ Higher scores indicate a higher level of depression, so the participants could be divided into four categories: "Normal range" (score 20-40), "Mildly depressed" (score 41-47), "Moderately depressed" (score 48-55), and "Severely depressed" (score 56-80).

Data analysis

The results were analyzed by the Statistical Package for the Social Sciences. Data analysis included descriptive statistics for the psychometric test and questionnaires, one-way analysis of variance to compare the distress scores, and the Scheffe test for the post hoc comparisons. Distress scores between different genders were compared with the independent t test. Scores of the Zung-SDS were also analyzed to determine the relationship of the levels of depression and differences of working circumstances, identities and genders.

RESULTS

Demographic data

We invited all interns from the chosen medical centers (253 interns in NTUH, 60 interns in NCKUH, 88 interns in CGMH) and all clerks in CGMH (total 110 clerks). The response rates were 49.8% in NTUH interns (94 male interns and 32 female interns), 50% in NCKUH interns (24 male interns and 6 female interns), 61% in CGMH interns (38 male interns and 21 female interns) and 79% in CGMH clerks (60 male clerks and 27 female clerks). Average response rate of this study is 59%.

Visual analog scale of stress

Interns in 3 different medical centers

The mean scores of stress graded on VAS by interns are shown in Table 1. The scores of 6 stress

sources and overall stress among interns were not significantly different. Interns of these three medical centers showed the highest score on "Academic loading" during their internships.

Different identities: Clerks and interns in CGMH

Comparing the VAS scores of stress of clerks with those of interns in CGMH, the mean scores of "Workload" and "Occupational risks" of interns were significantly higher than those of clerks in CGMH (p < 0.01). The scores of "Dealing with patients' complaints", "Interaction with other medical staffs", "Academic loading", "Hospital administration" and "Overall stress" were not significantly different between interns and clerks.

Gender difference

Table 1 showed the mean VAS scores of stress in interns and clerks with different genders. In NTUH, female interns were significantly more stressful when facing "Dealing with patients' complaints", "Interaction with other medical staffs", "Academic loading" and "Overall stress" than male interns. This phenomenon also existed in the other two medical centers but was not statistically significant. There were no significant differences between female and male clerks in these sources of stress.

Zung's Self-administered Depression Scale (SDS)

Difference in working circumstances and identities

The levels of depression were presented in Table 2. According to Zung-SDS, about half of the interns were in the normal range, and so were 56.3% of clerks of CGMH. There were 17.5% (NTUH), 22.1% (CGMH), 33.4% (NCKUH) of interns (average: 20.9%) and 17.2% of CGMH clerks were moderately and severely depressed. No significant differences were disclosed among the interns in the different medical centers, or between interns and clerks in CGMH (Pearson Chi-square tests).

When analyzing sub-scores of Zung-SDS, interns of CGMH showed significantly higher scores than interns of NTUH for 2 items of Zung-SDS: fatigue (p = 0.017) and body weight loss (p = 0.024), and there were no significant differences among interns of the 3 medical centers for the other 18 subscores of Zung-SDS. When comparing interns with clerks, interns got significantly higher scores of

Table 1. Gender Difference in the Mean Scores of Visual Analog of Stress

| | NTUH interns | | | 1 | NCKUH interns | | |
|---------------------------------------|------------------|--------------------|-------------------|------------------|-------------------|--------|--|
| | Male (n = 94) | Female (n = 32) | Sig. | Male (n = 24) | Female $(n = 6)$ | Sig. | |
| Dealing with patients' complaints | 37.7 | 50.1 | 0.007^{\dagger} | 41.0 | 63.0 | 0.027* | |
| Workload | 55.3 | 62.3 | 0.126 | 58.6 | 58.0 | 0.956 | |
| Occupational risks | 53.4 | 62.0 | 0.059 | 52.5 | 58.5 | 0.560 | |
| Interaction with other medical staffs | 44.3 | 56.4 | 0.018* | 53.1 | 60.3 | 0.559 | |
| Academic loading | 70.4 | 80.3 | 0.023* | 74.4 | 74.5 | 0.995 | |
| Hospital administration | 48.2 | 39.1 | 0.081 | 52.6 | 48.8 | 0.773 | |
| Overall stress | 54.2 | 65.3 | 0.008^{\dagger} | 57.9 | 55.0 | 0.775 | |
| | CGMH interns | | | CGMH clerks | | | |
| | Male (n = 38) | Female $(n = 21)$ | Sig. | Male (n = 60) | Female $(n = 27)$ | Sig. | |
| Dealing with patients' complaints | 38.7 | 41.6 | 0.638 | 42.2 | 38.6 | 0.491 | |
| Workload | 62.3 | 66.8 | 0.402 | 44.3 | 46.7 | 0.649 | |
| Occupational risks | 50.4 | 51.0 | 0.933 | 36.1 | 34.9 | 0.847 | |
| Interaction with other medical staffs | 40.8 | 47.3 | 0.310 | 40.6 | 37.0 | 0.509 | |
| Academic loading | 72.8 | 83.3 | 0.063 | 72.3 | 70.7 | 0.724 | |
| Hospital administration | 57.8 | 50.1 | 0.295 | 57.7 | 60.4 | 0.619 | |
| Overall stress | 58.2 | 64.0 | 0.299 | 58.0 | 55.1 | 0.512 | |

Independent t test

*: $p < 0.05; \dagger: p < 0.01$

Table 2. Depression Level of Interns and Clerks in Three Medical Centers

| | The level of depression | | | | |
|---------------------|-------------------------|------------------|----------------------|--------------------|-------|
| | Normal range | Mildly depressed | Moderately depressed | Severely depressed | Total |
| NTUH interns count | 62 (49.2%) | 42 (33.3%) | 16 (12.7%) | 6 (4.8%) | 126 |
| NCKUH interns count | 13 (43.3%) | 7 (23.3%) | 8 (26.7%) | 2 (6.7%) | 30 |
| CGMH interns count | 32 (54.2%) | 14 (23.7%) | 8 (13.6%) | 5 (8.5%) | 59 |
| CGMH clerks count | 49 (56.3%) | 23 (26.4%) | 11 (12.6%) | 4 (4.6%) | 87 |

Pearson Chi-square tests

"poor sleep quality", "poor appetite", "libido loss", "body weight loss", "being angry easily", and "anhedonia". The results were shown in Table 3.

Gender difference

Comparing male with female, 19.2% of male interns, 25.4% of female interns, 11.7% of male clerks and 29.6% of female clerks revealed moderate

and severe depression (Table 4). Female interns and clerks both presented higher levels of depression, but only the clerk group was statistically significant (Pearson Chi-square tests: p = 0.016).

When considering the gender difference in subscores of Zung-SDS, female interns got significantly higher scores than male interns at "Crying" (p < 0.001) and "libido loss" (p = 0.001). Female clerks only got significantly higher score at "crying" (Table 3).

DISCUSSION

Visual analog scale of stress

Differences between groups of interns and clerks

No significant differences among interns of NTUH, NCKUH and CGMH with 6 sources of stress and overall stress being observed. In different circumstances, interns faced similar levels of stress; "Dealing with patients' complaints", "Workload", "Occupational risks", "Interaction with other medical staffs", "Academic loading", "Hospital administration", and "Overall stress".

Among these sources of stress, "Workload" and "Occupational risks" significantly brought more stress to interns than clerks. This is reasonable because clerks took less responsibility than interns at the bedside. Although interns prepared for their

Table 3. Differences between Interns and Clerks in Sub-scores of Zung-SDS

| | Mean score (b | Statistics | |
|--------------------|----------------------|--------------------|-------|
| | Interns (n = 215) | Clerks (n = 87) | Sig. |
| Poor sleep quality | 1.71 | 1.41 | 0.001 |
| Poor appetite | 2.05 | 2.42 | 0.004 |
| Libido loss | 2.06 | 1.74 | 0.006 |
| Body weight loss | 1.40 | 1.25 | 0.032 |
| Being angry easily | 2.10 | 1.72 | 0.000 |
| Anhedonia | 1.92 | 1.70 | 0.033 |

Independent t test

Table 4. Gender Difference in Level of Depression

National Examination of Medical Practice License, they neither experienced more stress in academic loadings than clerks, nor did they in overall stress.

As a whole, both interns and clerks felt the highest levels of stress on academic loading. This result was supported by Saipanish who found that academic problems were the top priority of Thai medical students and the leading cause of personal problems.⁽¹⁴⁾ So heavy academic loadings can't be ignored when exploring the sources of stress in medical students. On the other hand, interns gave the second highest score to "Workload" while clerks in CGMH gave "Hospital administration". The results may be related to their different duties and life patterns; interns take responsibility for their "work" and already have coping skills towards the hospital culture, but clerks are students regulated by schools and hospitals, which indicated they had more rules to follow.

Gender differences exist in interns but not in clerks

Archer *et al* and Smith *et al* found that women reported higher levels of stress than men.^(20,21) In our study, female interns reported higher scores at "Dealing with patients' complaints", "International relationship", "Academic loadings" and "Overall stress" than males, and especially in NTUH where significant gender differences in stress sources were found. However, clerks in CGMH did not express similar gender differences in the four sources of stress. The contradictory results may be related to different lifestyles. Further studies are recommended.

Levels of depression according to Zung-SDS Level of depression in interns and clerks are high

Zoccolillo *et al* reported that the lifetime prevalence of depression for medical students was 15%.⁽¹⁾

| | | Level of depression | | | | m . 1 |
|---------------|--------|---------------------|------------------|----------------------|--------------------|--------------|
| | | Normal range | Mildly depressed | Moderately depressed | Severely depressed | Total |
| Interns count | male | 83 (53.2%) | 43 (27.6%) | 20 (12.8%) | 10 (6.4%) | 156 |
| | female | 24 (40.7%) | 20 (33.9%) | 12 (20.3%) | 3 (5.1%) | 59 |
| Clerks count | male | 32 (53.3%) | 21(35.0%) | 6(10.0%) | 1 (1.7%) | 60 |
| | female | 17 (63.0%) | 2 (7.4%) | 5 (18.5%) | 3 (11.1%) | 27 |

Pearson Chi-square tests

Clark *et al* and Valko *et al* found higher rates of major depression before internships (23% and 40%) and during internships (27% and 30%).^(2,3) Different eras and races may be influential factors, but insufficient Taiwanese data on depression among medical students as references was available. No significance difference in levels of depression among interns of the 3 medical centers and clerks was disclosed, so it implied that working circumstances were not an important factor of depression.

The relationship of gender difference and level of depression

Chan reported a significantly higher proportion of females than males suffering depression,⁽¹⁵⁾ but Beston *et al* found no difference between males and females with regards to the prevalence of depression in Chinese medical students in Hong Kong.⁽²²⁾ Our study showed that, in interns and clerks, females were more depressed than males, but only clerks had significant gender difference. Changes in lifestyle may lead to depression in female medical students, so further researches with a larger sample size and less selective bias are recommended.

The scores of twenty items of Zung-SDS

Comparing interns with clerks, interns had significantly higher scores with "poor sleep quality", "poor appetite", "libido loss", "body weight loss", "anhedonia", and total scores of Zung-SDS. Apparently, interns experienced more somatic symptoms of depression.

Additionally, female interns had significantly higher scores than male interns for 3 items; "crying", "loss of libido" and "constipation", as did female clerks with "crying". This result was compatible with the studies of Clark *et al* and Chan,^(2,15) who indicated that female medical students had higher scores for crying than males, and loss of libido was another depressive symptom influenced by gender difference.⁽¹⁵⁾ According to Taiwanese culture, "crying" is not encouraged in males, so the score in this item was lower in male students.

Conclusion

First, different working institutes did not impact the levels of stress and depression in interns. Second, different identity in the hospital (as interns or clerks) had various experiences of stress: compared to clerks, interns experienced higher stress levels of "work loading" and "occupational risks", as well as of depressive symptoms, such as "poor sleep quality", "poor appetite", "libido loss", "body weight loss", "anhedonia". However, identity did not influence the level of depression. Third, gender difference significantly impacted stress and some depressive symptoms; female interns felt more stressful at "dealing with patients' complaints", "interaction with other medical staffs", "academic loadings" and gave higher scores to the items of "crying", "loss of libido" and "constipation" in Zung-SDS.

This study had some limitations. First, poor response rate would lead to a selective bias, thus better response rates should be pursued in future studies. Second, a longitudinal study is required to explore these results in depth. Third, further studies to identity possible depressive disorders in medical students through diagnostic interview are recommended. To date, there are few researches investigating stress and depressive levels in Taiwanese medical students, so more comprehensive studies are necessary to address the problems. Longitudinal studies (screening from pre-school medical students through residents in medical centers and regional hospitals) may be appropriate. Psychological well-being plays an important role in medical practice training, so classes assisting the fresh healthcare staffs to adapt more quickly and easily, and to develop strategies of handling stressful events are necessary.

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三間台灣醫學中心之見實習醫師的壓力與憂鬱程度—— 一個橫切面研究

謝依璇 許巧榮 劉嘉逸 黃燦龍2

- 背景: 憂鬱和壓力一直是醫學生的兩大問題,之前不同國家的醫學教育研究中皆多有探討。這些研究指出憂鬱和焦慮與性別和級別有關。在這篇研究中,我們將焦點放在 台灣三間醫學中心的七年級實習醫學生和五、六年級實習醫學生上,討論不同的工作環境、不同的職場身分和不同性別是否會造成壓力與憂鬱程度的相異。
- 方法: 選取三間台灣的醫學中心(台灣大學附設醫院、林口長庚紀念醫院、成功大學附設醫院)的七年級實習醫學生和林口長庚紀念醫院的五、六年級實習醫學生,發予匿名自填問卷填答。問卷內容包含基本資料、感受壓力的視覺類比分析量尺(visual analog scale of stress)和曾氏心理健康量表(憂鬱量表)。受試者填答時間約10分鐘。統計分析方法包括單因子變異分析(one way ANOVA)、雪費測試(Scheffe test)、獨立樣本 t 檢驗(independent t test)。
- 結果:不同的工作環境並不影響七年級實習醫學生的憂鬱和壓力狀態。其次,七年級實習 醫學生在「工作負荷」和「職業風險」方面較五、六年級實習醫學生感受較大壓力,且在某些憂鬱症狀表現上明顯高於五、六年級實習醫學生。但整體而言,七年級實習醫學生的憂鬱程度(依據曾氏憂鬱量表分級)並未較五、六年級實習醫學生顯著提高。從性別角度考慮,女性七年級實習醫學生在某些壓力和憂鬱分項上,亦高於男性七年級實習醫學生。
- 結論:工作環境對七年級實習醫學生和五、六年級實習醫學生的壓力和憂鬱程度影響較小,但性別差異和職級差異則造成憂鬱症狀和壓力程度的不同。本研究受限於有限的樣本數,以及僅爲橫斷式研究,未來針對台灣的七年級實習醫學生和五、六年級 實習醫學生,需要更長期與更廣泛的追蹤研究。 (長庚醫誌 2011;34:278-85)
- 關鍵詞:五、六年級實習醫學生,壓力,憂鬱,七年級實習醫學生,性別,醫學教育,台灣

長庚醫療財團法人林口長庚紀念醫院 精神科系,²一般外科; 長庚醫療財團法人基隆長庚紀念醫院 內科系;長庚大學 醫 學院

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通訊作者:謝依璇醫師,長庚醫療財團法人林口長庚紀念醫院 精神科系。桃園縣333龜山鄉復興街5號。

Tel.: (03)3281200轉2485; Fax: (03)3280267; E-mail: 8802026@cgmh.org.tw