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A Study of Prematurely Discharged from Service and Related Factors in Taiwanese Conscript Soldiers with Mental Illness

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Background: The aim of this study was to analyze the clinical data of Taiwanese conscript soldiers who were prematurely discharged from service due to mental illness and identify factors predictive of psychiatric hospitalization leading to subsequent separation from service. **Methods:** We retrospectively collected medical records of conscript soldiers who were prematurely discharged from service due to mental illness from September 2003 to September 2004. Their demographic data, clinical characteristics, the distribution of main psychiatric diagnoses for medical discharge, and psychiatric comorbidities were registered and statistically described. Furthermore, all participants were subdivided into inpatient and outpatient groups, and the differences between both groups examined. **Results:** During the one-year period, 463 (24.2%) conscript soldiers were prematurely discharged from service due to psychiatric disorders. The first four psychiatric diagnoses for medical discharge were major depression, mental insufficiency, bipolar II depression, and personality disorder. Adjustment disorder and substance use disorder were the common psychiatric comorbidities. The common methods used in suicide attempts after enlistment included drug ingestion, wrist cutting, and carbon monoxide poisoning. There were many significant differences between the inpatient and outpatient groups. Several variables were significantly predictive of psychiatric hospitalization and subsequent separation from service: specific main psychiatric diagnoses, service on offshore islands, family psychiatric history, the presence of a substance-use disorder, postenlistment suicide attempts, and higher educational levels. **Conclusions:** Our study indicated that depressive disorders were the major psychiatric problems to be dealt with in Taiwanese conscript soldiers. Further work is warranted to investigate the role of mental illness in the early attrition of Taiwanese voluntary soldiers.

Key words: military psychiatry, conscript soldiers, psychiatric disorders, premature discharge

INTRODUCTION

Despite efforts to downsize, the Taiwanese military continues to serve a vital role in protecting the national interests of Taiwan. As a result, increased emphasis has been placed on recruiting high-quality enlistees to ensure an optimally functioning fighting force in the context of downsizing of the force and budget restraints. The Taiwanese military has practiced conscription for many years, and most individuals are compelled by law to serve in the armed forces. Soldiers undergo strict training in defending and protecting the safety of individuals and groups; thus, every soldier experiences great physiological and psychological stress, which is associated with a variety of physical and mental health problems[1-5]. Within the major illness categories, mental illness has the greatest impact on soldier readiness and plays a major role in the early military attrition of soldiers[6,7].

A number of psychiatric research projects in Taiwan have been devoted to examining the characteristics of maladaptive military personnel and developing screening instruments pertaining to the suitability of candidates for enlistment and the development of interventions to prevent early attrition due to mental illness[8-10]. However, the system of recruitment in Taiwan started to change when volunteer soldiers were introduced in 2005. In the United States, which mainly recruits volunteer soldiers, mental illness remains the leading cause of high levels of health care utilization and early attrition among U.S. military personne[l6,11]. Therefore, to explore the impact of introducing volunteer soldiers on early military attrition due to mental illness in Taiwanese soldiers, it is imperative to

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establish native baseline data before volunteer soldiers become predominant in the Taiwanese military.

In Taiwan, conscript soldiers diagnosed with some given categories of psychiatric disorders could meet criteria for medical discharge from service. These categories include neurosis, psychosis, major depression, organic brain syndrome, stutter and mutism, personality disorders (PDs), psychosexual disorders, autistic disorder, Tourette's disorder, eating disorders, and mental insufficiency. Among soldiers with the above mental illnesses, some received only outpatient treatment for subsequent separation from military service, but others required hospitalization in psychiatric wards. Such differences also represent a variant potential cost to the defense forces and their medical resources because these soldiers received all of their outpatient and inpatient medical care in military facilities, which provide services without cost to these individuals. However, there has been scant research into what factors differentiate Taiwanese conscript soldiers with mental disorders receiving only outpatient treatment for early leave from service from those requiring inpatient treatment. By identifying the differences between these characteristics, interventions can be planned to optimize the current military mental health service.

Previously published studies have found that older age, lower educational levels, suicidal tendencies, a criminal history, substance use, and depression are associated with a greater risk for hospitalization with a mental illness in the military[12,13]. Therefore, further investigation as to whether these factors are predictive of psychiatric hospitalization for subsequent separation from service is required.

In this study, we investigated the demographic data, clinical characteristics, distribution of main psychiatric diagnoses for medical discharge, and psychiatric comorbidities among conscript soldiers who were prematurely discharged from service due to mental illness in the period before volunteer soldiers were introduced into the Taiwanese armed forces. The differences between soldiers receiving only outpatient treatment for subsequent early leave from service and those requiring hospitalization in psychiatric wards were also compared. Finally, we examined the potential predictors of psychiatric hospitalization for subsequent separation from service.

METHODS

Subjects and procedures

We analyzed conscript soldiers whose medical discharge from service occurred at Tri-Service General Hospital (TSGH), a medical teaching hospital belonging to National Defense Medical Center in Taipei, Taiwan between September 2003 and September 2004. TSGH was annually responsible for a large proportion of Taiwanese conscript soldiers who were prematurely discharged from service due to medical illness. The medical records of conscript soldiers who were prematurely discharged from service due to mental illness were retrospectively collected. Every soldier necessarily has a main psychiatric diagnosis, which represents the reason that he can take early leave from the military. If a soldier had two or more psychiatric diagnoses that simultaneously met the criteria for medical discharge from service, only the diagnosis that he used to petition to leave the military was coded as the main psychiatric diagnosis. Additionally, other coexisting psychiatric diagnoses were coded as psychiatric comorbidities. The psychiatric diagnoses in all subjects were made by the consensus of the attending psychiatrists and psychologists using information generated from a clinical interview according to the DSM-IV[14], family members, psychological testing and observational records provided by responsible military officers. As for those diagnosed with mental insufficiency or personality disorders, the Chinese version of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) IQ test[15] or Ko's Mental Health Questionnaire (KMHQ)[16] were also required. We registered and statistically described their demographic data, clinical characteristics, distributions of main psychiatric diagnoses, and psychiatric comorbidities.

All participants were further subdivided into outpatient and inpatient groups according to the following definition. The outpatient group was defined as soldiers receiving only outpatient psychiatric treatment before subsequent early separation from service. That is, the psychiatric diagnoses meeting criteria for medical discharge was established in an outpatient clinical setting, and then they took early leave from service. The inpatient group was defined as soldiers requiring hospitalization in psychiatric wards before subsequent early leave from service, whether they have ever received outpatient psychiatric treatment or not.

Statistical analysis

The data were analyzed using the SPSS for Windows statistical software package. All variables were analyzed as the primary descriptive statistic. Then, independent-sample t values were calculated for continuous variables and Pearson's chi-square values were calculated for categorical variables to compare the differences between the inpatient and outpatient groups. Fisher's exact test was substituted for the Pearson's chi-square test when sample

sizes were smaller than expected (less than five subjects). All tests were two-tailed, with significance set at $p < 0.05$. Data were reported as the mean±SD.

To develop a prediction model of psychiatric hospitalization for subsequent separation from service, several items were selected as potential predictors based on previous research[12,13] and the consensus of the research team. First, basic demographic variables, including age, education levels, and marital status were assessed and force-entered into logistic regression equations. Other variables, including clinical characteristics (lengths and location of military service, medical, surgical, and criminal history, service, preenlistment suicidal attempts/contact with psychiatric services, and postenlistment suicidal ideas/attempts), psychiatric comorbidities, and main psychiatric diagnoses, were entered into the equations using a backward stepwise procedure, using criteria of $p < 0.05$ for entry and $p > 0.10$ for removal. Backward stepwise elimination is a highly acceptable method of selecting variables because it allows the researcher to assess the total predictive picture before excluding nonsignificant variables[17]. The final multiple logistic regression model includes all variables found to significant as well as demographic variables, regardless of significance.

Table 1. The demographic data and clinical characteristics of Taiwanese conscript soldiers prematurely discharged from service due to mental illness during one-year period

Item	Whole patient group	Inpatient group	Outpatient group	p-value[a]
Number	463	339	124	
Mean age ± SD (years)	21.8 ± 2.2	22.0 ± 2.3	21.2 ± 1.8	<0.001*
Mean educational level ± SD (years)	12.0 ± 2.9	12.8 ± 2.7	9.8 ± 2.1	<0.001*
Marital status (%)				0.12[b]
Single	454(98.1)	330(97.3)	124(100)	
Married	9(1.9)	9(2.7)	0(0)	
Length of military service ± SD (weeks)	14.7 ± 10.3	15.1 ± 11.3	13.8 ± 6.7	0.14
Location of military service (%)				<0.001[b,*]
Home island of Taiwan	383(82.7)	260(76.7)	123(99.2)	
Offshore islands	80(17.3)	79(23.3)	1(0.8)	
History of medical illness (%)	106(22.9)	77(22.7)	29(23.4)	0.88
History of surgery (%)	66(14.3)	45(13.3)	21(16.9)	0.32
Family psychiatric history (%)	78(16.8)	76(22.4)	2(1.6)	<0.001[b,*]
Criminal history (%)	6(1.3)	6(1.8)	0(0)	0.35[b]
Service (%)				0.15[b]
Army	371(80.1)	268(79.1)	103(83.1)	
Navy	42(9.1)	28(8.3)	14(11.3)	
Air force	20(4.3)	19(5.6)	1(0.8)	
Military police	11(2.4)	9(2.7)	2(1.6)	
Coast guard	19(4.1)	15(4.4)	4(3.2)	
Pre-enlistment contact with psychiatric services (%)	27(5.8)	24(7.1)	3(2.4)	0.07[b]
Pre-enlistment suicidal attempts (%)	37(8.0)	37(10.9)	0(0)	<0.001[b,*]
Post-enlistment suicidal ideas (%)	297(64.1)	223(65.8)	74(59.7)	0.23
Post-enlistment suicidal attempts (%)	142(30.7)	119(35.1)	23(18.5)	0.001*
Post-enlistment suicidal methods (%)				
Drug ingestion	57(40.1)	38(31.9)	19(82.6)	
Cutting wrist	35(24.6)	32(26.9)	3(13.0)	
Charcoal burning	15(10.6)	15(12.6)	0(0)	
Jumping from a height	11(7.7)	11(9.2)	0(0)	
Swallowing toxic liquor	6(4.2)	6(5.0)	0(0)	
Crashing the wall	5(3.5)	4(3.4)	1(4.3)	
Hanging	2(1.4)	2(1.7)	0(0)	
Suffocating	1(0.7)	1(0.8)	0(0)	

SD, standard deviation; Family psychiatric history indicated one or more first-degree relatives with a history of contact with psychiatric services with a diagnosis of psychiatric disorder.
[a]Inpatient group compared with outpatient group.
[b]Statistical analysis was performed by Fisher's exact test.
*$p < 0.05$.

RESULTS

Demographic data and clinical characteristics

The medical discharge from service of 1912 conscript soldiers occurred at TSGH during the one-year period examined. Among them, 463 (24.2%) were prematurely discharged from service due to mental illness. Their demographic data and clinical characteristics are described in Table 1. All subjects were biological males and most of them were single (98.1%). The mean age was 21.8±2.2 years and the mean educational level was 12.0±2.9 years. The mean length of hospitalization of the inpatient group was 27.7±9.0 days. Most soldiers served on the home island of Taiwan (82.7%) and in the army (80.1%). A proportion of subjects had a family psychiatric history (16.8%), preenlistment contact with psychiatric services (5.8%), and preenlistment suicide attempts (8.0%). The main psychiatric diagnoses of those soldiers having a family psychiatric history (78, 16.8%) included major depresion (37, 8.0%), bipolar disorder (17, 3.7%), schizophrenia (9, 1.9%), and other disorders (15, 3.2%), while most of their family members were reported to have depression, psychosis, and alcohol-use disorder. Six soldiers with criminal records were all diagnosed with antisocial personality disorder (ASPD) and were hospitalized because of their violent behavior. Among the 142 subjects who attempted suicide after enlistment, 120 (87.3%) had a diagnosis of major depression; 14 (9.9%), bipolar II depression; and eight (5.6%), a PD. Drug ingestion (57, 40.1%), wrist cutting (35, 24.6%), and CO poisoning (15, 10.6%) were the most common suicide methods tried after enlistment.

Table 2 Distributions of main psychiatric diagnoses of Taiwanese conscript soldiers prematurely discharged from service due to mental illness during one-year period

Diagnosis	Whole patient group (n=463)	Inpatient group (n=339)	Outpatient group (n=124)	p-value[a]
Axis I psychiatric diagnoses (%)	332(71.7)	297(87.6)	35(25.8)	<0.001[b,*]
Mood disorde	300(64.8)	268(79.1)	32(25.8)	<0.001[c,*]
Major depression	215(46.4)	185(54.6)	30(24.2)	
Bipolar II depression	67(14.5)	65(19.2)	2(1.6)	
Bipolar I disorder, manic episode	18(3.9)	18(5.3)	0(0)	
Psychotic disorder	26(5.6)	5(7.4)	1(0.8)	0.005[d,*]
Schizophrenia	20(4.3)	20(5.9)	0(0)	
Schizoaffective disorder	4(0.9)	3(0.3)	1(0.8	
Delusional disorder	1(0.2)	1(0.3)	0(0)	
Psychotic disorder, NOS	1(0.2)	1(0.3)	0(0)	
Anxiety disorder	5(1.1)	4(1.2)	1(0.8)	1.00
Obsessive-Compulsive disorder	5(1.1)	4(1.2)	1(0.8)	
Sexual and gender identity disorder	1(0.2)	0(0)	1(0.8)	0.27
Gender identity disorder	1(0.2)	0(0)	1(0.8)	
Axis II psychiatric diagnoses (%)	131(28.3)	42(12.4)	89(71.8)	<0.001[e,*]
Personality disorder (PD)	27(5.8)	24(7.0)	3(2.4)	0.07
Personality disorder, NOS	12(2.6)	12(3.5)	0(0)	
Antisocial PD	6(1.3)	6(1.8)	0(0)	
Passive-aggressive PD	4(0.9)	3(0.3)	1(0.8)	
Schizotypal PD	2(0.4)	1(0.3)	1(0.8)	
Histrionic PD	1(0.2)	1(0.3)	0(0)	
Borderline PD	1(0.2)	0(0)	1(0.8)	
Dependent PD	1(0.2)	1(0.3)	0(0)	
Mental insufficiency	104(22.5)	18(5.3)	86(69.4)	<0.001[f,*]
Borderline intelligence	61(13.2)	11(3.2)	50(40.3)	
Mild mental retardation	40(8.6)	6(1.8)	34(27.4)	
Moderate mental retardation	3(0.6)	1(0.3)	2(1.6)	

[a] Inpatient group compared with outpatient group.
[b] Inpatient group has a significantly higher tendency to leave the military due to Axis I psychiatric diagnoses.
[c] Inpatient group has a significantly higher tendency to leave the military due to mood disorder.
[d] Inpatient group has a significantly higher tendency to leave the military due to psychotic disorder, obtained by Fisher's exact test.
[e] Outpatient group has a significantly higher tendency to leave the military due to Axis II psychiatric diagnoses.
[f] Outpatient group has a significantly higher tendency to leave the military due to mental insufficiency.
[*] $p < 0.05$.

Main psychiatric diagnoses for premature discharge from service

The distribution of diagnoses is described in Table 2. The four main diagnoses were major depression (46.4%), mental insufficiency (22.5%), bipolar II depression (14.5%), and a personality disorder (5.8%). Every soldier with bipolar II disorder was having a depressive episode. Among those soldiers diagnosed with mental insufficiency, the mean WAIS-R full IQ was 72.3±2.9; verbal IQ, 80.4±8.2; and performance IQ, 68.1±4.9. PD, not otherwise specified (NOS) (12, 2.6%); and ASPD (6, 1.3%) were the most common subtypes of PDs. All diagnoses were grouped into six broad mental disorder categories, which were regarded as variables in the prediction model.

Psychiatric comorbidities

One hundred and ninety-six (42.3%) of 463 subjects had psychiatric comorbidities: adjustment disorder (20.1%) and substance use disorder (19.2%) were the most common (Table 3). Adjustment disorder was a primary psychiatric comorbidity associated with mental insufficiency (66 out of 104 subjects, 63.5%), and PD was seen in all subjects in this group (100%). Substance use disorder (SUD) was the psychiatric comorbidity associated with major depression (45 out of 215 subjects), bipolar disorder (10 out of 85 subjects), PD (4 of 27 subjects), and the other main psychiatric diagnoses (30 out of 136 subjects).

Differences between inpatient and outpatient groups

There were many significant differences in the demographic data and clinical characteristics of the inpatient and outpatient groups (Table 1). The inpatient group had a significantly higher tendency to leave the military due to Axis I psychiatric diagnoses, specifically, mood disorder and psychotic disorder (Table 2). The outpatient group had a significantly higher tendency to leave the military due to Axis II psychiatric diagnoses, i.e. mental insufficiency. Compared with the inpatient group, the outpatient group had significantly more psychiatric comorbidities, in particular, adjustment disorder (Table 3). However, the inpatient group had a significantly higher percentage of SUD than the outpatient group did.

Predictors of psychiatric hospitalization and subsequent separation from service

Table 4 shows the results of the multiple logistic regression analysis. Those subjects with higher education levels, service on offshore islands, a family psychiatric history, postenlistment suicide attempts, the presence of SUD, and specific main psychiatric diagnoses were at higher risk for psychiatric hospitalization and subsequent separation from service.

DISCUSSION

The purpose of this study was to examine the data from conscript soldiers who were prematurely discharged from service due to mental illness and to examine the differences between soldiers receiving outpatient treatment and those requiring hospitalization in psychiatric wards before sub-

Table 3 Psychiatric comorbidity of Taiwanese conscript soldiers prematurely discharged from military service due to mental illness during one-year period

Psychiatric comorbidity	Whole patient group (n=463)	Main reasons for premature discharge from service (Whole patient group)	Inpatient group (n=339)	Outpatient group (n=124)	p-value[a]
No comorbid psychiatric diagnoses	267(57.7)	Not listed	206(60.8)	61(49.2)	
Comorbid psychiatric diagnoses	196(42.3)		133(39.2)	63(50.8)	0.026[b,*]
Adjustment disorder	93(20.1)	Mental insufficiency (66 subjects)	33(9.7)	60(48.4)	<0.001[c,*]
		Personality disorder (27 subjects)			
Substance use disorder	89(19.2)	Major depression (45 subjects)	86(25.4)	3(2.4)	<0.001[d,*]
		Bipolar disorder (10 subjects)			
		Personality disorder (4 subjects)			
		Other main psychiatric diagnoses (30 subjects)			
Panic disorder[e]	5(1.1)	Major depression (3 subjects)	5(1.5)	0(0)	
		Bipolar II depression (1 subject)			
		Schizophrenia (1 subject)			
Posttraumatic stress disorder[e]	4(0.9)	Major depression (2 subjects)	4(1.2)	0(0)	
		Bipolar II depression (2 subjects)			
Conversion[e]	2(0.4)	Major depression (2 subjects)	2(0.6)	0(0)	
Social phobia[e]	1(0.2)	Major depression (1 subject)	1(0.3)	0(0)	
Generalized anxiety disorder[e]	1(0.2)	Major depression (1 subject)	1(0.3)	0(0)	
Dissociative amnestic disorder[e]	1(0.2)	Major depression (1 subject)	1(0.3)	0(0)	

[a]Inpatient group compared with outpatient group.
[b]The probability that there is no significant difference in the presence of psychiatric comorbidity between inpatient and outpatient groups ($\chi^2 = 4.98$, df =1, p=0.026).
[c]The probability that there is no significant difference in the percentage of adjustment disorder between inpatient and outpatient groups ($\chi^2 = 84.5$, df =1, p< 0.001).
[d]The probability that there is no significant difference in the percentage of substance use disorder between inpatient and outpatient groups ($\chi^2 = 30.8$, df =1, p< 0.001).
[e]If there were detailed medical records available and/or evidence of disorder-associated impairment of function, such psychiatric diagnosis could also meet criteria for medical discharge from service.
$^*p < 0.05$.

sequent separation from service. The demographic data in our study group were similar to those in previous studies regarding conscript soldiers[8-10]. In the clinical characteristics, some soldiers were found to have a family psychiatric history, preenlistment contact with psychiatric services, and preenlistment suicide attempts. As would be expected, a minority of such susceptible recruits are inevitably conscripted into military service even though they are routinely screened for mental illness before enlistment. However, these clinical features should be viewed as risk factors for soldiers to take early leave from service. For example, a previous study performed in U.S. Air Force basic military training found that about one-fourth to one-third of those trainees recommended for mental health-related discharge grew up in households where other family members had mental health problems[11]. Therefore, the armed forces should enhance their identification of these characteristics before individuals begin their service. The military could then guide and follow up those individuals to prevent early separation from service.

Among the soldiers who attempted suicide after enlistment, depressive disorders and personality disorders were the major psychiatric diagnoses. This result was in accordance with most other research that has investigated

Table 4. Multiple logistic regression analysis on the comparison of inpatient and outpatient groups

Variable	**B**	**Odds Ratio**	**95% CI**	**p-value[a]**
Age	-0.19	0.83	0.66-1.03	0.09
Educational levels	0.48	1.62	1.45 -1.81	<0.001*
Marital status	— [b]	— [b]	— [b]	— [b]
Location of military service				
Offshore islands	3.62	37.37	5.14-271.76	<0.001*
Home island of Taiwan (reference)		1.00		
Family psychiatric history	2.51	17.63	4.26-72.95	<0.001*
Post-enlistment suicidal attempts	0.87	2.38	1.43-3.94	0.001*
Psychiatric comorbidity				
Presence of adjustment disorder	-2.16	0.12	0.07-0.19	<0.001*
Presence of substance use disorder	2.62	13.71	4.25-44.23	<0.001*
Main psychiatric diagnoses				
Mood disorder	3.13	22.90	7.52-69.41	<0.001*
Psychotic disorder	4.17	64.82	6.12-687.01	0.001*
Anxiety disorder	2.08	8.04	0.19-332.35	0.27
Sexual and gender identity disorder	— [b]	— [b]	— [b]	— [b]
Personality disorder	3.30	27.05	4.37-167.35	<0.001*
Mental insufficiency (reference)		1.00		

CI = confidence interval. Confidence intervals that do not include 1.0 indicate a statistically significant predictor ($p < 0.05$).
[a]Reference category is outpatient group.
[b]Variable was not retained in the final model because it was not statistically significant.
$^*p < 0.05$.

the phenomena of suicide attempts in soldiers and showed a significant percentage of individuals displaying various psychiatric dysfunctions, especially depression and personality disorders[18-21]. Although the origins and circumstances of suicide attempts among soldiers are numerous and complex, it was suggested that the combination of psychiatric disorders and psychosocial factors may intensify such behaviors and push an individual to the extreme[20,22]. Overall, conscripts should be encouraged to use health and social services when they have psychosocial problems or even minor psychiatric symptoms.

Our data indicated that drug ingestion was the most common suicide method attempted after enlistment, followed by wrist cutting. This finding was similar to the results in a study examining attempted suicide in Norwegian conscripts[23] and in the French professional armed forces[24]. Intentional CO poisoning using burning charcoal was the third most common suicide method. Because this form of suicide has been highly publicized, is easily carried out, and is culturally acceptable, it has also recently appeared to become more prevalent in Hong Kong[25,26]. However, it should be pointed out that those conscript soldiers who committed suicide with methods that are more violent were not included in this study. Most retrospective analysis of successful suicide attempts in military service consistently indicate that the most common suicide method was with firearms in both conscript soldiers[22] and regular-duty military personnel[27-30]. The data describing methods of suicide in Taiwanese soldiers are limited and need further investigations in order to facilitate preventive measures.

In this study, mental illness in Taiwanese conscript soldiers was shown to represent an important reason for premature discharge from the army (24.2% of discharges annually). This finding was similar to those from previous studies in the U.S. military[6,31]. Within this illness category, major depression was the leading psychiatric diagnosis (Table 2). Major depression results in socioeconomic burdens, limitations in physical[32] and social functioning[33], and even suicide[34]. Moreover, there are cross-national trends that the rate of major depression is gradually increasing[35], especially in young adults[36]. In addition, bipolar II depression plays an important role in causing soldiers to be prematurely discharged from service. Interestingly, every soldier with bipolar II disorder was exclusively diagnosed during a depressed episode. As for hypomania, the defining feature of bipolar II disorder, it was determined by both clinical interview and collateral information from family members. This phenomenon is in accordance with the common finding that, during hypomanic episodes, patients seldom have contact with psychiatric services[37,38]. However, bipolar II disorder is well known to have more severe depressive symptoms, higher rates of substance abuse, and a higher lifetime suicidal risk than unipolar depression[39,40]. Failure to recognize bipolar II disorder could delay treatment, worsen prognosis, and there is the risk of antidepressant-induced mania or cycle acceleration during treatment with antidepressants[41]. Furthermore, bipolar II disorder appears to be much more common than previously thought because diagnostic criteria sensitive to hypomanic symptoms have been identified, and it is suggested that bipolar II disorder is at least as prevalent as major depression[38], particularly in younger populations[37].

Taking major depression and bipolar II depression together, depressive disorders account for a large proportion of psychiatric diagnoses leading to early military attrition in Taiwanese conscript soldiers. This result is also similar to our previous survey in military officers and sergeants[42], suggesting that these two psychiatric disorders have a great impact on the armed forces of Taiwan. Therefore, strategies to improve the effectiveness of screening for depressive symptoms should be considered to better identify recruits at risk of depression. The Department of Defense of the United States noted that among 1,138 Air Force recruits referred for a mental health evaluation while in basic military training, 349 trainees were recommended for discharge because of psychiatric disorders; similarly, depressive disorders (31% of total) were the most common diagnoses11. We should therefore pay attention to tracing the variations in the rate of major depression and bipolar II depression leading to premature discharge from service in conscripts in the period after volunteer soldiers were introduced in Taiwan.

Mental insufficiency was the second leading psychiatric diagnosis resulting in early attrition of conscript soldiers. Because the current system of recruiting volunteer soldiers in Taiwan has minimal education level requirement (junior high school for a very small number of amphibious and special forces; senior high or trade school for the others) and intelligence quotient (Full IQ > 90), it is reasonable to anticipate that the proportion of mental insufficiency should decrease in the future when volunteer soldiers predominate.

We found that PDs were the fourth most common psychiatric diagnosis. Clinical studies have shown that individuals with a PD have difficulty in adjusting to military life, limited coping skills, and a higher rate of hospitalization and early attrition[43,44]. It was also the major reason for mental health-related early attrition in the U.S. Navy[45] and in Polish active servicemen[46]. Considering the diagnostic subtypes, PD, not otherwise specified (NOS)

was the most frequent subtype of PD in this study. In U.S. Navy personnel first hospitalized for PDs, other PDs and PD, unspecified, were also the leading subtypes[45]. These consistent results imply that there is still considerable uncertainty regarding the specific features of these conditions when using current categories of PD. The addition of new diagnostic subcategories may be helpful to reduce this ambiguity[47]. Antisocial personality disorder (ASPD) was also a common subtype in this study, and all soldiers with ASPD had criminal records, presented violent behavior, and required inpatient evaluation. This finding is understandable because military personnel with ASPD have difficulty conforming to the emphasis in the military on obedience, compliance with rules, and teamwork[44]. They tend to have aggressive, impulsive behavior, criminal records, and even higher rates of psychiatric hospital utilization[48,49].

Of note, 42.3% of all participants had psychiatric comorbidity (Table 3). Because military service is highly formalized, and the hierarchical conditions make it impossible to express emotions, to arrange one's own time, and to choose the position or place of work, some conscript soldiers experience problems adjusting to military life[50]. The intelligence quotient (IQ) possibly affects the ability to cope with crises and life events. Specifically, a low IQ score may be associated with adjustment disorder in young men[51]. In addition, soldiers with traits associated with several types of PDs have difficulty in conforming to the requirements of military life and also have an increased risk of suffering from an adjustment disorder[8,43]. Therefore, it is not surprising that most soldiers with mental insufficiency (63.5%) and all soldiers with PD (100%) were comorbid with adjustment disorder in this study. Our study demonstrated that substance-use disorder (SUD) was the second most common psychiatric comorbidity. Among U. S. active duty military personnel, SUD also represented a major public health problem and provides common psychiatric diagnoses resulting in separation from military service[6,52,53]. Nevertheless, SUD does not meet the criteria for medical discharge from service in Taiwan. In a 10-year retrospective study in the Royal Australian Navy, although psychiatric disorders were overall related to a 19% greater risk of separation from military service, SUDs appeared not to elevate annual risk of military separation[54]. Therefore, further studies are needed to investigate the influence of SUD on the military service in Taiwan.

Military life is definitely an identifiable stressor for most soldiers. It is therefore reasonable to first consider the diagnosis of adjustment disorder in soldiers presenting with psychiatric symptoms. Surprisingly, our study demonstrated a low prevalence of adjustment disorder (20.1%). One possible explanation is that a diagnosis of adjustment disorder in conscript soldiers sometimes represents a transitional illness category and may change after follow up[10]. Some of the soldiers in this study were initially found to have symptoms of adjustment disorder. However, when the stress-related disturbances indeed met the criteria for another Axis I disorder, for example, major depression, only the diagnosis of major depression was retained. Another possible explanation is that adjustment disorder itself could not meet criteria for medical discharge from service in Taiwan. Thus, conscript soldiers have difficulty in taking early leave from service due to a pure diagnosis of adjustment disorder. Furthermore, psychotic disorders and anxiety disorders are also possibly underrepresented in the main psychiatric diagnoses of this patient population, being only 5.6% and 1.1% of the study population, respectively. This finding may be attributable to the possibility that most men with psychosis tended to have an early age of onset and are therefore screened out before enlistment. It is also possible that most soldiers with anxiety disorders have shown responsiveness to nondrug treatment in the military[55] and generally are less likely than most with other psychiatric diagnoses to have extended disability and separation from service[12]. Only one soldier was discharged from service due to gender identity disorder (GID) during the one-year period examined. Presentation of GID is a rarity during recruitment and servicemen with GID also have high rate of premature discharge from military service[56]. Male Taiwanese patients with GID were reported to have more psychopathology and dissociative experiences compared to healthy controls[57], suggesting that they may have more difficulty in adjusting to military life.

A striking finding of this study is that there are several significant differences between inpatient and outpatient groups. First, we found that the inpatient group had a significantly older age and higher educational levels than did the inpatient group (Table 1). However, by logistic regression analysis, there was a statistically significant difference only in educational levels between the two groups (Table 4). That is, a higher educational level seems to be a predictive risk factor for psychiatric hospitalization and subsequent separation from service. However, this finding is contradictory to the findings from a recent study in the U.S. Navy, which indicated that a lower educational level is a risk factor for mental health problems and psychiatric hospitalization in general[13]. Further studies are needed to verify whether a lower educational level increases overall risk for psychiatric hospitalization and

subsequent separation from service in Taiwanese soldiers.

Second, the inpatient group tended to have more soldiers serving on offshore islands than did the outpatient group (Table 1). Furthermore, logistic regression analysis consistently found that service on offshore islands is a predictive risk factor for psychiatric hospitalization and subsequent separation from service (Table 4). This finding may reflect a real-world situation that psychiatric resources on offshore islands are less adequate and accessible compared with those on the home island of Taiwan. When these offshore-island soldiers presented psychiatric symptoms, they tended to be referred to the military hospital on the home island of Taiwan.

Third, there were significant differences in family psychiatric history, preenlistment suicide attempts, postenlistment suicide attempts, and the presence of SUD between the inpatient and outpatient groups. Except for preenlistment suicidal attempts, these factors gave an increased risk for psychiatric hospitalization and medical discharge in the prediction model (Table 4). This finding is to some extent in agreement with the findings from a recent U.S. Navy study, which indicated that suicidal tendencies and problems with alcohol are risk factors for different mental disorder categories and psychiatric hospitalization in general[13]. Thus, when conscript soldiers are found to attempt suicide and have problems of substance use, it increases their risk of psychiatric hospitalization and subsequent separation from service. Similarly, a family psychiatric history was suggested to be a predictor in the study. The bulk of soldiers with a family psychiatric history found to have major psychoses (major depression, bipolar disorder, and schizophrenia) may contribute to this result because major psychoses critically disturbs soldiers from performing their daily work and may lead to them being hospitalized in psychiatric wards. However, the rate of soldiers with a positive family psychiatric history in the outpatient group may be underrepresented, being only 1.6%. Given that family psychiatric history seemed reliable in the inpatient group but not the outpatient group, this result should be interpreted cautiously.

Fourth, there were significantly different distributions of main psychiatric diagnoses between the inpatient and outpatient groups (Table 2). In the prediction model, specific main psychiatric diagnoses were strong predictors of psychiatric hospitalization for medical discharge (Table 4). Among them, psychotic disorder was the strongest variable (OR = 64.82), followed by PD (OR = 27.05) and mood disorder (OR = 22.9). This result is understandable because subjects with PD and major psychoses tend to have greater impairment of occupational function in the military and therefore higher rate of hospitalization[45,52] than those with other mental disorders.

Furthermore, we noted that the outpatient group had more psychiatric comorbidities than did the inpatient group (Table 3). A possible explanation was the significantly higher rate of adjustment disorder as a comorbidity in the outpatient group (48.4%), which overwhelms the total psychiatric comorbidities in the inpatient group (39.2%). However, this finding may merely represent the different distribution of main psychiatric diagnoses for medical discharge between the two groups because nearly seventy percent of the outpatient group were soldiers with mental insufficiency and most of them had comorbid adjustment disorder. From the logistic regression analysis, the presence of psychiatric comorbidities did not increase the risk for psychiatric hospitalization for medical discharge. From this study, this factor itself seemed does not appear to be an independent predictive factor for psychiatric hospitalization and subsequent separation from service. Altogether, the data obtained here provides for better understanding of the potential predictors of psychiatric hospitalization for subsequent separation from service in Taiwanese conscript soldiers.

There are several limitations in this study, including data only covering a single year, the retrospective study design, and the lack of a healthy control group for comparison. Subdividing our samples into inpatient and outpatient groups for comparison also resulted in loss of statistical power, with the best method of confirming the positive findings by using a much larger study group. In addition, all participants in this study were conscript male soldiers. The number of female volunteer soldiers has increasing since volunteer soldiers were introduced, while female soldiers have been reported in previous literature[58] to be more susceptible to psychiatric disorders than male soldiers. Further studies investigating the prevalence of psychiatric disorders in female soldiers may assist military and medical strategists targeting differential health care to male and female soldiers in Taiwan.

CONCLUSIONS

Mental illness plays a major role in the early attrition of conscript soldiers. Our study demonstrated that depressive disorders were the major psychiatric problems to be dealt with in Taiwanese conscript soldiers. Soldiers receiving only outpatient treatment for subsequent early leave from service had many different characteristics from those requiring hospitalization in psychiatric wards. Several variables were significantly predictive of psychiatric hospital-

ization for subsequent separation from service: specific main psychiatric diagnoses, service on offshore islands, family psychiatric history, presence of SUD, postenlistment suicide attempts, and higher educational levels. Further work on early attrition of volunteer soldiers because of mental illness, in comparison with the presented baseline data, is needed to understand the impact of the introduction of volunteer soldiers on mental health-related premature discharge from service and provide future directions for early detection and prevention of mental illness in the Taiwanese military.

REFERENCES

1. MacDonald C, Chamberlain K, Long N, Pereira-Laird J, Mirfin MK. Mental health, physical health, and stressors reported by New Zealand Defence Force peacekeepers: a longitudinal study. Mil Med 1998; 163:477-481.
2. Pflanz S, Sonnek S. Work stress in the military: prevalence, causes, and relationship to emotional health. Mil Med 2002;167:877-882.
3. Pflanz S. Occupational stress and psychiatric illness in the military: investigation of the relationship between occupational stress and mental illness among military mental health patients. Mil Med 2001;166:457-462.
4. Booth CK, Probert B, Forbes-Ewan C, Coad RA. Australian army recruits in training display symptoms of overtraining. Mil Med 2006;171:1059-1064.
5. Hourani LL, Williams TV, Kress AM. Stress, mental health, and job performance among active duty military personnel: findings from the 2002 Department of Defense Health-Related Behaviors Survey. Mil Med 2006;171:849-856.
6. Hoge CW, Lesikar SE, Guevara R, Lange J, Brundage JF, Engel CC, Jr., Messer SC, Orman DT. Mental disorders among U.S. military personnel in the 1990s: association with high levels of health care utilization and early military attrition. Am J Psychiatry 2002;159: 1576-1583.
7. Nicholson PT, Mirin SM, Schatzberg AF. Ineffective military personnel. II. An ethical dilemma for psychiatry. Arch Gen Psychiatry 1974;30:406-410.
8. For-Wey L, Fei-Yin L, Bih-Ching S. The relationship between life adjustment and parental bonding in military personnel with adjustment disorder in Taiwan. Mil Med 2002;167:678-682.
9. Ko HC, Lu RB, Shen JJ, Shyu LY. Construction of a screening inventory for major mental disorder in the Army. Ann Acad Med Singapore 1997;26:8-12.
10. Lin JC, Shiah IS, Shen LJ, Pan NC, Yang SN. A follow up study of soldiers with adjustment disorders. Taiwanese J Psychiatry 2001;15:310-319.
11. Cigrang JA, Carbone EG, Todd S, Fiedler E. Mental health attrition from Air Force basic military training. Mil Med 1998;163:834-838.
12. Gunderson E, Hourani LL. The epidemiology of mental disorders in the U.S. Navy: the neuroses. Mil Med 2001;166:612-620.
13. Booth-Kewley S, Larson GE. Predictors of psychiatric hospitalization in the Navy. Mil Med 2005;170:87-93.
14. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed.ds. Washington, DC: American Psychiatric Press, 1994.
15. Wechsler D, ed.The Wechsler Adult Intelligence Scale. 3rd ed. San Antonio: Psychological Corporation, 1997.
16. Huang CY, Liao HY, Chang SH. Social desirability and the clinical self-report inventory: methodological reconsideration. J Clin Psychol 1998;54:517-528.
17. Draper N, Smith H. Applied regression analyses. 2nd ed. New York: John Wiley& Sons, 1981.
18. Apter A, Bleich A, King RA, Kron S, Fluch A, Kotler M, Cohen DJ. Death without warning? A clinical postmortem study of suicide in 43 Israeli adolescent males. Arch Gen Psychiatry 1993;50:138-142.
19. Grigg JR. Imitative suicides in an active duty military population. Mil Med 1988;153:79-81.
20. Florkowski A, Gruszczynski W, Wawrzyniak Z. Evaluation of psychopathological factors and origins of suicides committed by soldiers, 1989 to 1998. Mil Med 2001;166:44-47.
21. Schroderus M, Lonnqvist JK, Aro HM. Trends in suicide rates among military conscripts. Acta Psychiatr Scand 1992;86:233-235.
22. Marttunen M, Henriksson M, Pelkonen S, Schroderus M, Lonnqvist J. Suicide among military conscripts in Finland: a psychological autopsy study. Mil Med 1997; 162:14-18.
23. Mehlum L. Attempted suicide in the armed forces: a retrospective study of Norwegian conscripts. Mil Med 1990;155:596-600.
24. Desjeux G, Lemardeley P, Vallet D, Pascal B, Labarere J. Suicide and attempted suicide in the armed forces in 1998. Encephale 2001;27:320-324.
25. Chung WS, Leung CM. Carbon monoxide poisoning as a new method of suicide in Hong Kong. Psychiatr Serv 2001;52:836-837.
26. Leung CM, Chung WS, So EP. Burning charcoal: an indigenous method of committing suicide in Hong Kong. J Clin Psychiatry 2002;63:447-450.

27. Hourani LL, Warrack AG, Coben PA. Suicide in the U. S. Marine Corps, 1990 to 1996. Mil Med 1999;164: 551-555.
28. Schuckit MA, Gunderson EK. Suicide in the naval service. Am J Psychiatry 1974;131:1328-1331.
29. Dennett DE, Howard NS. Suicide in the Naval service. Part I: Demographics. Navy Med 1988;79:24-28.
30. Mahon MJ, Tobin JP, Cusack DA, Kelleher C, Malone KM. Suicide among regular-duty military personnel: a retrospective case-control study of occupation-specific risk factors for workplace suicide. Am J Psychiatry 2005;162:1688-1696.
31. Talcott GW, Haddock CK, Klesges RC, Lando H, Fiedler E. Prevalence and predictors of discharge in United States Air Force Basic Military Training. Mil Med 1999;164:269-274.
32. Wells KB, Golding JM, Burnam MA. Psychiatric disorder and limitations in physical functioning in a sample of the Los Angeles general population. Am J Psychiatry 1988;145:712-717.
33. Fredman L, Weissman MM, Leaf PJ, Bruce ML. Social functioning in community residents with depression and other psychiatric disorders: results of the New Haven Epidemiologic Catchment Area Study. J Affect Disord 1988;15:103-112.
34. Sainsbury P. Depression and suicide prevention. Bibl Psychiatr 1982;162:17-32.
35. The changing rate of major depression. Cross-national comparisons. Cross-National Collaborative Group. Jama 1992;268:3098-3105.
36. Weissman MM, Bland RC, Canino GJ, Faravelli C, Greenwald S, Hwu HG, Joyce PR, Karam EG, Lee CK, Lellouch J, Lepine JP, Newman SC, Rubio-Stipec M, Wells JE, Wickramaratne PJ, Wittchen H, Yeh EK. Cross-national epidemiology of major depression and bipolar disorder. Jama 1996;276:293-299.
37. Cassano GB, McElroy SL, Brady K, Nolen WA, Placidi GF. Current issues in the identification and management of bipolar spectrum disorders in "special populations". J Affect Disord 2000;59 Suppl 1:S69-S79.
38. Angst J, Cassano G. The mood spectrum: improving the diagnosis of bipolar disorder. Bipolar Disord 2005; 7 Suppl 4:4-12.
39. Piver A, Yatham LN, Lam RW. Bipolar spectrum disorders. New perspectives. Can Fam Physician 2002; 48:896-904.
40. Akiskal HS, Maser JD, Zeller PJ, Endicott J, Coryell W, Keller M, Warshaw M, Clayton P, Goodwin F. Switching from "unipolar" to bipolar II. An 11-year prospective study of clinical and temperamental predictors in 559 patients. Arch Gen Psychiatry 1995;52: 114-123.
41. Nassir Ghaemi S, Goodwin FK. Introduction to special issue on antidepressant use in bipolar disorder. Bipolar Disord 2003;5:385-387.
42. Chen YJ, Shiah IS, Chen CK, Yang SN, LJ S. Characteristics and diagnoses of military officers and sergeants prematurely discharged from service because of psychiatric disorders. Taiwanese J Psychiatry 2004; 18:251-260.
43. Kilbourne B, Goodman J, Hilton S. Predicting personality disorder diagnoses of hospitalized Navy personnel. Mil Med 1991;156:354-357.
44. Fiedler ER, Oltmanns TF, Turkheimer E. Traits associated with personality disorders and adjustment to military life: predictive validity of self and peer reports. Mil Med 2004;169:207-211.
45. Gunderson EK, Hourani LL. The epidemiology of personality disorders in the U.S. Navy. Mil Med 2003; 168:575-582.
46. Florkowski A, Caban J, Zboralski K. Mental disorders in active service men as a reason for premature discharge from the army. Psychiatr Pol 1994;28:321-327.
47. Pagan JL, Oltmanns TF, Whitmore MJ, Turkheimer E. Personality disorder not otherwise specified: searching for an empirically based diagnostic threshold. J Personal Disord 2005;19:674-689.
48. Conard R, Emanuel R. Aggressive and impulsive behavior in military psychiatric inpatients. Mil Med 1998;163:594-598.
49. Williams W, Weiss TW, Edens A, Johnson M, Thornby JI. Hospital utilization and personality characteristics of veterans with psychiatric problems. Psychiatr Serv 1998;49:370-375.
50. Cheok CS, Ang YG, Chew WM, Tan HY. Adjusting to military life–servicemen with problems coping and their outcomes. Singapore Med J 2000;41:218-220.
51. Mortensen EL, Sorensen HJ, Jensen HH, Reinisch JM, Mednick SA. IQ and mental disorder in young men. Br J Psychiatry 2005;187:407-415.
52. Hoge CW, Toboni HE, Messer SC, Bell N, Amoroso P, Orman DT. The occupational burden of mental disorders in theU.S. military: psychiatric hospitalizations, involuntary separations, and disability. Am J Psychiatry 2005;162:585-591.
53. Stout RW, Parkinson MD, Wolfe WH. Alcohol-related mortality in the U.S. Air Force, 1990. Am J Prev Med 1993;9:220-223.
54. Creamer M, Carboon I, Forbes AB, McKenzie DP,

McFarlane AC, Kelsall HL, Sim MR. Psychiatric disorder and separation from military service: a 10-year retrospective study. Am J Psychiatry 2006;163:733-734.
55. Schmidt NB, Staab JP, Trakowski JH, Jr., Sammons M. Efficacy of a brief psychosocial treatment for panic disorder in an active duty sample: implications for military readiness. Mil Med 1997;162:123-129.
56. Brown GR. Transsexuals in the military: flight into hypermasculinity. Arch Sex Behav 1988;17:527-537.
57. Shiah IS, Yang SN, Shen LJ, Chang AJ, Gau YC, Chen YJ, Chen CK. Psychopathology and dissociative experiences of male Taiwanese patients with gender identity disorder. J Med Sci 2004;24:135-140.
58. Hines JF. A comparison of clinical diagnoses among male and female soldiers deployed during the Persian Gulf War. Mil Med 1993;158:99-101.