Mental health literacy of Chinese nurses from general and psychiatric hospital: a multi-centered survey

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Abstract

This study investigated the level of mental health literacy (MHL) among Chinese nurses, identifying the influential factors and exploring the relationship between mental health literacy and mental health status. A descriptive cross-sectional survey was undertaken of 777 nurses in 13 general hospitals and 12 psychiatric hospitals using the Mental Health Literacy Scale-Chinese version, Patient Health Questionnaire-2, Generalized Anxiety Disorder-2, and a demographic questionnaire, with stratified cluster sampling method employed. The total score on the Mental Health Literacy Scale-Chinese version among the nurses was 93.25 (SD = 10.52). Psychiatric nurses had higher levels of core MHL with more knowledge of mental disorders, higher ability to seek professional help, as well as recognize mental illness than nurses in general hospitals did, while they also had a lower level of acceptance of patients with mental illness. A multiple regression analysis revealed that nurses who have fewer depressive symptoms, being unmarried or divorced, with more education or higher professional titles had higher levels of core MHL, and that those nurses with longer work duration had lower acceptance of patients with mental illness. Therefore, the mental health literacy of Chinese nurses is moderate to low, and more mental health education programs or actions emphasizing knowledge, ability, recognition, and especially acceptance need to be implemented to improve the mental health literacy of nurses, with more focus on core MHL for general nurses and social acceptance for psychiatric nurses. Nurses with more depressive symptoms, less education, lower professional titles, longer work duration, and being married should be the given more attention in promotion programs.

Introduction

Mental health conditions are increasing worldwide and have gradually become one of the top causes of disease in the past 30 years, resulting in one year in five being lived with disability, and significantly impacting the quality of life for individuals and communities [1]. Mental disorders and behavioral problems have also become more common across China in recent decades, with 5.81 million patients with serious mental illnesses by the end of 2017 [2]. The data show that the weighted lifetime prevalence of various mental disorders (excluding dementia) is as high as 16.6% [3]. Mental health problems lead to adverse health outcomes, premature death, and national and global economic losses, which have become an important social and public health issue. Measured by years lived with disability, the burden of mental disorders exceeds 1/5th of the global disease burden (GDB), with depression being one of the top three diseases of the GDB [4].

One of the most important reasons for the prominence of mental health problems is that the public's mental health literacy (MHL) is generally low [5–9]. In the literature on health literacy, Jorm et al. (1997) first proposed the concept of MHL to broadly refer to knowledge and attitudes regarding mental health that aid in recognition, management, and prevention of mental health issues [5]. MHL is a multifaceted concept and consists of following key attributes: the ability to recognize specific disorders, knowing how to seek mental health information, knowledge of risk factors and causes, knowledge of self-treatments, knowledge of professional help available, and attitudes that promote recognition and appropriate help.
seeking [5, 10]. O'Connor et al. further summarized these attributes of MHL into three sub-structures: recognition, knowledge, and attitude [10]. Jiang et al. defined MHL as knowledge, attitudes, and behaviors that aid in mental health promotion and mental illness coping for self and others [11]. Comprehensive definition with multiple components of MHL would provide a basis for research and practice to promote the mental health of whole society.

MHL is considered a prerequisite for early recognition and intervention in mental disorders, with the potential to improve both individual and population health. Accurate recognition of a mental illness and its perceived severity increases the endorsement of the need for care and treatment by psychiatrists and mental health professionals, while poor MHL may prevent or deter individuals from making use of appropriate treatment options [12–14]. Improved knowledge about mental health and mental disorders, better awareness of how to seek help and treatment, and reduced stigmatization of mental illness at individual, community, and institutional levels may promote early identification of mental disorders [15], lead to greater intentions to seek help [7, 16], reduce suicide risk [17], increase the use of health services and positive attitudes toward treatment [7, 18], and improve mental health outcomes and quality of life [15, 19–22]. Low levels of MHL are associated with negative attitudes toward psychological treatment, always coupled with ineffective or non-professional help-seeking preferences [18, 23]. It was found that individuals with conditions such as anxiety and mood disorders often did not receive any treatment in the initial years, and many never sought or received appropriate treatment [14, 24, 25].

While MHL is crucial in addressing issues with mental illness, studies have shown low levels of MHL throughout a diverse range of populations, including a lack of knowledge about prevention, development, and feasible treatments for mental illness and about how to seek, help, or assist individuals with mental health problems [7, 16, 26]. From the national mental health assessment carried out by the Psychological Institute of the Chinese Academy of Science, the baseline of MHL in China is 12% [20]. A recent study in China found that national MHL is at a medium-low level in citizens aged 18 and above, with mental health maintenance and promotion literacy being higher than mental illness coping literacy, and with self-help literacy being higher than helping people literacy [27]. In a survey of MHL in three cities in China, it was found that the awareness rate of mental health knowledge was 49.8%, and the understanding of mental diseases and their symptoms was inadequate [28]. Other studies have also shown that the public has a low identification rate for mental illness, a lack of initiative in seeking professional treatment or inappropriate seeking help, and a serious stigma attitude [29–31]. Consequently, given the relatively high prevalence of mental disorders, the low level of MHL in China has imposed a huge challenge and burden on the whole society.

The level of MHL among healthcare professionals (HCPs) is even more important since it shapes the therapeutic relationship in which they work in partnership with patients. As people who are in close contact with patients and their families, the MHL of nurses is crucial not only in providing prompt recognition and appropriate referrals, but also in influencing their attitudes toward people with mental illness [14] and promoting the mental health of the population [32, 33]. Nurses are always expected to
deal with both the physical and psychological consequences accompanying mental disorders, given their academic background and professional training.

However, despite the general perception that HCPs are more equipped and sympathetic toward patients suffering from mental illnesses, knowledge about mental health and illness among them is still lacking, and those HCPs who suffer from mental problems do not seek help or speak to colleagues about their issues because of the stigmatizing culture [34]. A series of studies has revealed that HCPs had limited knowledge of mental health issues, and many practitioners exhibited a common notion of feeling incompetent and discouraged about the management and recovery of individuals who were mentally ill [33]. A recent survey in China showed that the MHL of non-psychiatric nurses is inadequate, with correct recognition rates of schizophrenia, depression, and generalized anxiety being 38.9%, 56.2%, and 17.5%, respectively [14]. Furthermore, the level of MHL among psychiatric nurses and the differences in MHL between psychiatric and non-psychiatric nurses remain unclear.

The present study is the first trial aimed at addressing the level of MHL among Chinese nurses from both general and psychiatric hospitals, identifying the influential factors, and exploring the relationship between MHL and mental health status. The results will aid action plans for improving the MHL and mental health levels of nurses and health professionals.

**Methods**

**Design**

This was a descriptive multi-centered cross-sectional study of MHL among Chinese nurses from general and psychiatric hospitals, with stratified cluster sampling across Shanghai City, China.

**Participants**

Using stratified cluster sampling, a total of 777 nurses from 13 general hospitals and 12 psychiatric hospitals were recruited for the investigation. In each hospital, we randomly selected two to three wards. The inclusion criteria were as follows: (1) registered nurses with working experiences of ≥ 1 year, (2) aged 18–60 years old, and (3) consenting to participate in the study. The exclusion criteria were as follows: (1) nurses with severe mental illness, such as schizophrenia and other psychotic disturbances and (2) trainee nurse or those having nursing student status.

**Measures**

The instruments included the validated Mental Health Literacy Scale-Chinese version (MHLS-C), Patient Health Questionnaire-2 (PHQ-2), Generalized Anxiety Disorder-2 (GAD-2), and a demographic questionnaire.

**MHLS-C:** This scale was developed by Matt O’Connor in 2015, which is based theoretically on the concept of MHL and contains 35 items [35]. Prior to this study, with the consent and suggestions from the original
The MHLS was translated by the research team into a Chinese version (MHLS-C) according to the Brislin translation model to test the cross-cultural validity and measure cultural equivalence and adaptability in nurses. The MHLS-C has 29 items with four factors, which were named “knowledge of mental disorder” (knowledge, 13 items), “ability to seek information and help” (ability, 4 items), “recognition of mental disorder” (recognition, 5 items) and “acceptance of patients with mental illness” (acceptance, 7 items). The factor 1–3 were summarized into MHLS-Core (Core literacy subscale) and factor 4 was taken as MHLS-SA (Social acceptance subscale). The MHLS-C has been found to have good psychometric properties, and is a stable, reliable and validated tool to measure mental health literacy [36]. The total scores ranging from 29 to 132, with higher scores indicating better MHL. The Cronbach’s alpha coefficients of MHLS-C, MHLS-Core and MHLS-SA in this study were 0.85, 0.89 and 0.93 respectively.

**PHQ-2:** The PHQ-2 is composed of the first two questions from the PHQ-9, which was specifically developed as a screening instrument for depressive symptoms experienced during the preceding two weeks. Questions are measured using a 4-point Likert scale (0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day). The total score of the PHQ-2 ranges from 0 to 6, with higher scores indicating greater severity of depressive symptoms [37]. In this study, the Cronbach’s alpha coefficient for the PHQ-2 was 0.83.

**GAD-2:** The GAD-2 is composed of the first two questions from the GAD-7, which was specifically developed as a screening instrument for anxiety symptoms experienced during the preceding two weeks. Questions were measured using a 4-point Likert scale (0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day). The total GAD-2 score ranges from 0 to 6, with higher scores indicating more anxiety symptoms [38]. In this study, the Cronbach's alpha coefficient of the GAD-2 was 0.87.

The demographic questionnaire contained the following items: gender, age, education, marital status, work duration, professional title and position, sleep quality, and physical conditions.

**Procedures**

The study was a cross-sectional online survey conducted with the approval and assistance of the nursing department of each hospital. A link to the online survey was made available using the software Questionnaire Star and sent to the recruited nurses, who were able to complete the questionnaires online. All respondents electronically provided their informed consent and were made aware of the confidentiality and voluntary nature of the study prior to participation. The average time of completion was 5–10 minutes. No individually identifiable information was collected or stored during the process. Data were collected between March and May in 2021.

**Statistics**

Data were analyzed using SPSS version 22.0. Data were exported from the software Questionnaire Star and initially examined for distribution normality and outliers. Questionnaires with a completion time of less than 2 minutes were excluded. Frequency, means, and standard deviations (SDs) were calculated for
demographic data and the cores of MHLS-C, PHQ-2, and GAD-2. Independent sample t-tests, Chi square
tests and Pearson correlations were used to examine relationships between nurses’ characteristics,
mental health, and MHL, and to compare the MHL of nurses between general hospitals and psychiatric
hospitals. A multiple linear regression model was used to explore the factors influencing nurses’ MHL in
both general and psychiatric hospitals. For all statistical analyses, alpha was set to 0.05.

Results

Characteristics of participants

A total of 777 nurses were recruited with 476 from general hospitals and 301 from psychiatric hospitals.
The mean age of participants was 35.19 years (SD = 8.74), with nurses in psychiatric hospitals being a
little older and worked longer than those in general hospitals. The majority of nurses were female (751,
96.7%), and there were more male nurses in psychiatric hospitals. Two-thirds of the nurses (516, 66.4%)
were married. More than half of the nurses had a bachelor’s degree or above (476, 61.3%), with their work
duration ranging from 1 to 37 years. Most nurses (660, 84.9%) were involved in clinical practice, while the
others were engaged in nursing management. A majority of nurses (573, 73.7%) had a junior-level
professional title. Around a quarter of nurses (196, 25.2%) reported poor quality of sleep, while others
reported moderate or good quality. More than one-third (299, 38.5%) had at least one chronic health
problem, such as diabetes or hypertension. There were no differences between nurses in general and
psychiatric hospitals in terms of education, marital status, professional title and position, chronic
problems, and sleep quality (Table 1).

The MHL level and mental health of nurses in general and
psychiatric hospitals

The MHLS-C score of all nurses was 93.25 (SD = 10.52), with MHLS-Core and MHLS-SA being 73.57 (SD
= 9.19) and 19.68 (SD = 5.33). Pearson correlation analysis showed that knowledge, ability, recognition,
MHLS-Core and MHLS-SA were positively correlated with MHLS-C, three factors of MHLS-Core were
significantly positively correlated with each other. The relationships between MHLS-SA and knowledge,
recognition and MHLS-Core were non-significant (Table 2).

The MHLS-C and MHLS-Core with the dimensions of knowledge, ability, and recognition of psychiatric
nurses were significantly better than those of general nurses, while the MHLS-SA was lower than that of
general nurses. General nurses had higher levels of anxiety than psychiatric nurses did (Table 3).

The Pearson correlation analysis also showed that, for general nurses, both PHQ-2 and GAD-2 were
significantly negatively correlated with MHLS-Core and its dimensions of ability and recognition. For
psychiatric nurses, the PHQ-2 was significantly negatively correlated with MHLS-C, MHLS-Core, MHLS-SA,
ability and recognition, and GAD-2 was significantly negatively correlated with ability and MHLS-SA
(Table 4).
Influential factors of MHL in nurses of general and psychiatric hospitals

A multiple regression analysis was used to determine the influential factors of MHL in nurses of general and psychiatric hospitals, with MHLS-Core and MHLS-SA being the dependent variable, demographics (age, gender, education, marital status, hospital type, working duration, professional title and position, sleeping quality, and chronic health problem) and mental health (PHQ-2 and GAD-2) as the independent variables. It was shown that those who worked in psychiatric hospital, had higher professional title or more education, was unmarried or divorced, had higher MHLS-Core; while those with more depressive symptoms had lower MHLS-Core (Table 5). However, nurses with longer work duration, or worked in psychiatric hospital had lower MHLS-SA (Table 6).

Discussion

Nurses are medical staff members who are in direct contact with patients and their families and have more opportunities to observe them; therefore, the MHL of nurses is essential in promoting the mental health of patients, their families, and the community.

The overall MHL and each dimension level in Chinese nurses

The current study measured the main constituents of MHL in Chinese nurses, with moderate level of Core MHL, and relatively low level of social acceptance of patients with mental illness, a finding that coincided with that of other studies [14, 33, 34]. The results showed that nurses’ knowledge of mental illness was relatively good, and this knowledge advantage helps identify a range of common mental disorders, such as depression and anxiety. In view of the low recognition rate of mental disorders in nurses [14], this should be a particular focus of attention in future educational campaigns.

This study found that nurses’ “recognize mental illness” and “ability to seek help” was at a moderate level. These results reflected that the negative social stigma towards mental illness among Chinese populations might contribute to a reluctance to associate symptoms with mental illness and to label the individual as having a mental disorder [28–31]. Instead, there is a greater tendency to attribute socially or culturally appropriate labels (e.g., work problems) to mental symptoms [3]. Although early help seeking for mental illness has been shown to promote timely intervention and improve long-term outcomes [1, 31], the main intrapersonal barriers to mental health help-seeking have existed, because those with mental illness or symptoms feel ashamed and opt to conceal their condition, preferring to handle their problems by themselves [39, 40]. The inadequate ability of nurses to seek help may lead to a delay in the effective treatment of mental illness and an inability to provide help for patients with mental illness symptoms.

Moreover, it was found that nurses had a low acceptance of psychiatric patients, which was not related to their MHLS-Core, knowledge and recognition as we had anticipated. The public always holds some
negative attitudes toward patients with mental health problems, especially with regard to engaging in closer personal relationships with these patients [41]. One aspect of such attitudes is the strong preconception that people with mental illness are dangerous, violent, and unpredictable. As a microcosm of social acceptance, nurses shared these discriminatory ideas with the public [42], which were not necessarily connected with their core MHL. This would decrease their ability to provide adequate mental health services, which poses a huge challenge to the successful treatment of mental illnesses.

**Differences of MHL level between general and psychiatric nurses**

It was shown that psychiatric nurses had higher levels of core MHL, with its elements of knowledge, ability, and recognition than general nurses. A survey of the non-mental health departments in four hospitals in China also found that the MHL of non-psychiatric nurses was inadequate, with the correct identification rates for schizophrenia, depression, and GAD vignettes reaching 38.9%, 56.2%, and 17.5%, respectively [14]. Given that many mental disorders are often manifested as somatic discomforts, such as depressive and anxiety disorders, patients may seek help in internal medicine (neurology, gastroenterology, or cardiology) or emergency departments [14, 43]. Therefore, since they have one of the most important roles in physical treatment in general hospitals, nurses’ early identification and timely transfer of patients with mental disorders is crucial to avoid serious consequences. There is evidence that people experiencing mental disorders are more likely to seek professional help if someone else suggests it [13]. In such cases, nurses are the right professionals to facilitate recognition and help-seeking.

On the other hand, this study showed that nurses in psychiatric hospitals had lower social acceptance than their fellow colleagues in general hospitals, which might be related to occupational burnout after a long time with patients with mental illness, for psychiatric nurses in this study had longer work duration. Another study revealed that psychiatrically disabled patients also reported experiencing negative attitudes from mental health providers [44]. The results suggested that the overall MHL of non-psychiatric nurses in general hospitals needs to be strengthened, while more support needs to be provided to psychiatric nurses to improve their acceptance of patients with mental illness.

**The relationship between mental health and MHL**

Our results were in line with previous studies where participants experiencing higher levels of depressive symptoms had lower core MHL and always preferred non-professionals as their first help-seeking choice [16, 23, 44] or were less likely to recommend help-seeking [39]. More specifically, core MHL with its two factors (ability and recognition) were positively correlated to mental health status of non-psychiatric nurses. For psychiatric nurses, total MHL with its core dimension and social acceptance was associated with their depressive symptoms. These facts indicate that it is imperative to improve nurses’ ability to seek help, and recognition and acceptance of mental illness, which may help to promote mental well-being. Moreover, for psychiatric nurses, acceptance of patients with mental illness is important during daily work, contributing to their MHL and mental health.
Influencing factors of MHL in nurses of general and psychiatric hospitals

In this study, marital status was found to be an independent influencing factor of MHL, with nurses who were unmarried or divorced having higher core MHL, which was consistent with a previous study [41]. In line with other studies, the current study found that all nurses with higher levels of education (e.g., graduate education) showed higher core MHL levels than those who had less education [21, 41, 44]. The results illustrate that more education increased the opportunity to learn about mental health [29]. For nurses, more professional education, such as a master's degree, is an effective way to improve their MHL. It was also shown that all nurses with higher professional titles had better core MHL. This indicates that, with professional improvement, nurses are more competent in understanding and dealing with mental problems.

Despite the high rates of mental illnesses among females, our study did not find gender differences in the level of MHL, albeit based on a very small group of male nurses, which is consistent with a previous study of Chinese people [45]. Some studies have found that males have significantly more negative mental health attitudes, greater self-stigma about mental illness, and less mental health knowledge than females [40, 44]. More male nurses need to be recruited to explore gender differences in MHL in the future.

Conclusion

This study showed MHL in Chinese nurses to be inadequate, especially of core MHL in non-psychiatric nurses, and social acceptance dimension in psychiatric nurses. There is an urgent need for MHL promotion programs to improve the MHL of clinical nurses, with more focus on the core MHL with the knowledge of mental illness, ability of seeking professional help and recognition of mental illness for general nurses, and on the acceptance of patients with mental illness for psychiatric nurses. Nurses with more depressive symptoms, less education, lower professional titles, longer work duration, and being married should be the given more attention in promotion programs.

Implications for practice and policy

Describing the level of MHL, exploring the relationship between MHL and mental health status, and finding the influential factors helps in identifying the important dimensions and target nurse groups in both general and psychiatric hospitals. This study found that there is room and a need for enhancement of the MHL of clinical nurses. Mental health education programs or actions emphasizing knowledge, ability, recognition, and especially acceptance need to be implemented to improve the overall MHL of nurses, with more focus on core MHL for general nurses and social acceptance for psychiatric nurses.

Cultural attitudes toward mental health and illness have served as barriers among the public, so health professionals, especially nurses, should be conscientious in explaining that seeking professional help is
not a sign of personal weakness in the presence of mental symptoms or disorders. Improving the MHL of nurses would promote early identification and intervention, as well as improve mental health outcomes at the individual, institutional, and community levels, which may aid mental health practice and support policy development.

Limitations

First, due to the cross-sectional design of this study, causality between MHL and mental health or other variables could not be determined. Second, this study was conducted in Shanghai, a modern metropolis with certain demographic and socioeconomic characteristics. Therefore, not all results can be generalized to other regions. Third, MHL has many components and is an evolving concept; besides the four main domains involved in the current study, positive mental health promotion [6, 7, 19] and first aid skills in a mental health crisis [26] have also been explored and need to be considered in further research.

Declarations

Ethics approval and consent to participate

The study was reviewed and approved by the Institutional Review Board of School of Nursing, Fudan University, and informed consent was obtained from all participants. Data were downloaded, and only the researchers had access to them. All methods were carried out in accordance with relevant guideline and regulations.

Consent for publication

Nurse consent for publication is not required in this study.

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Conflict of Interest

The authors declare no conflicts of interest.

Acknowledgments

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Author Contribution
AW: design, data collection, data analysis, and writing. SJ: design, data collection, data analysis, and writing. ZS, XS, YZ, and MS: design, and data collection. DT and XC: data collection, data analysis and writing. All authors listed meet the authorship criteria according to the latest guidelines of the International Committee of Medical Journal Editors and are in agreement with the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

References


http://www.nhc.gov.cn/guihuaxxs/s3585u/201907/e9275fb95d5b4295be8308415d4cd1b2.shtml


Tables

Table 1 Demographics of nurses in general and psychiatric hospitals (n=777)
<table>
<thead>
<tr>
<th>Items</th>
<th>Total</th>
<th>General hospitals (n=476)</th>
<th>Psychiatric hospitals (n=301)</th>
<th>( T/\chi^2 )</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>35.19±8.74</td>
<td>34.48±8.45</td>
<td>36.33±9.08</td>
<td>-2.836</td>
<td>0.005</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>26(3.3%)</td>
<td>8(1.7%)</td>
<td>18(6.0%)</td>
<td>10.539</td>
<td>0.001</td>
</tr>
<tr>
<td>Female</td>
<td>751(96.7%)</td>
<td>468(98.3%)</td>
<td>283(94.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Technical secondary school degree</td>
<td>35(4.5%)</td>
<td>16(3.4%)</td>
<td>19(6.3%)</td>
<td>6.156</td>
<td>0.104</td>
</tr>
<tr>
<td>College diploma</td>
<td>266(34.2%)</td>
<td>155(32.6%)</td>
<td>111(36.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>462(59.5%)</td>
<td>296(62.2%)</td>
<td>166(55.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate degree</td>
<td>14(1.8%)</td>
<td>9(1.9%)</td>
<td>5(1.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unmarried/ Divorced</td>
<td>261(33.6%)</td>
<td>166(34.9%)</td>
<td>95(31.6%)</td>
<td>0.907</td>
<td>0.341</td>
</tr>
<tr>
<td>Married</td>
<td>516(66.4%)</td>
<td>310(65.1%)</td>
<td>206(68.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No more than 5 years</td>
<td>176(22.7%)</td>
<td>116(24.4%)</td>
<td>60(19.9%)</td>
<td>18.607</td>
<td>0.000</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>159(20.5%)</td>
<td>97(20.4%)</td>
<td>62(20.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 to 20 years</td>
<td>229(29.5%)</td>
<td>157(33.0%)</td>
<td>72(23.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 20 years</td>
<td>213(27.4%)</td>
<td>106(22.3%)</td>
<td>107(35.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional title</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior level nurse</td>
<td>573(73.7%)</td>
<td>347(72.9%)</td>
<td>226(75.1%)</td>
<td>5.499</td>
<td>0.064</td>
</tr>
<tr>
<td>Medium level nurse</td>
<td>184(23.7%)</td>
<td>121(25.4%)</td>
<td>63(20.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior level nurse</td>
<td>20(2.6%)</td>
<td>8(1.7%)</td>
<td>12(4.0%)</td>
<td></td>
<td></td>
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<tr>
<td>Professional position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management nurse</td>
<td>117(15.1%)</td>
<td>79(16.6%)</td>
<td>38(12.6%)</td>
<td>2.275</td>
<td>0.132</td>
</tr>
<tr>
<td>Clinical nurse</td>
<td>660(84.9%)</td>
<td>397(83.4%)</td>
<td>263(87.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>478(61.5%)</td>
<td>295(62.0%)</td>
<td>183(60.8%)</td>
<td>0.474</td>
<td>0.789</td>
</tr>
<tr>
<td>One health problem</td>
<td>226(29.1%)</td>
<td>139(29.2%)</td>
<td>87(28.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two or more health problems</td>
<td>73(9.4%)</td>
<td>42(8.8%)</td>
<td>31(10.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>196(25.2%)</td>
<td>108(22.7%)</td>
<td>88(29.2%)</td>
<td>4.203</td>
<td>0.122</td>
</tr>
<tr>
<td>Moderate</td>
<td>402(51.7%)</td>
<td>254(53.4%)</td>
<td>148(49.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>179(23.0%)</td>
<td>114(23.9%)</td>
<td>65(21.6%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 The relationships of MHLS-C and its dimensions (n=777)

<table>
<thead>
<tr>
<th></th>
<th>Knowledge</th>
<th>Ability</th>
<th>Recognition</th>
<th>MHLS-Core</th>
<th>MHLS-SA</th>
<th>MHLS-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.682**</td>
</tr>
<tr>
<td>Ability</td>
<td>0.222**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>0.559**</td>
</tr>
<tr>
<td>Recognition</td>
<td>0.301**</td>
<td>0.261**</td>
<td>1</td>
<td></td>
<td></td>
<td>0.597**</td>
</tr>
<tr>
<td>MHLS-Core</td>
<td>0.819**</td>
<td>0.573**</td>
<td>0.709**</td>
<td>1</td>
<td></td>
<td>0.862**</td>
</tr>
<tr>
<td>MHLS-SA</td>
<td>-0.066</td>
<td>0.115**</td>
<td>-0.045</td>
<td>-0.023</td>
<td>1</td>
<td>0.487**</td>
</tr>
</tbody>
</table>

*P<0.05  **P<0.01

Table 3 The MHL and mental health of nurses in general and psychiatric hospitals (n=777)

<table>
<thead>
<tr>
<th>Items</th>
<th>Total score</th>
<th>Average score</th>
<th>General hospitals (n=476)</th>
<th>Psychiatric hospitals (n=301)</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHLS-C</td>
<td>Knowledge</td>
<td>52</td>
<td>41.11±5.66</td>
<td>40.35±5.55</td>
<td>-4.802</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Ability</td>
<td>20</td>
<td>14.90±2.96</td>
<td>14.41±2.85</td>
<td>-5.876</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Recognition</td>
<td>25</td>
<td>17.56±4.04</td>
<td>16.93±3.97</td>
<td>-5.497</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>MHLS-Core</td>
<td>97</td>
<td>73.57±9.19</td>
<td>71.70±8.37</td>
<td>-7.378</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>MHLS-SA</td>
<td>35</td>
<td>19.68±5.33</td>
<td>20.19±5.43</td>
<td>3.336</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Total score</td>
<td>132</td>
<td>93.25±10.52</td>
<td>91.89±9.79</td>
<td>-4.613</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PHQ-2</td>
<td>6</td>
<td>1.95±1.47</td>
<td>2.01±1.47</td>
<td>1.86±1.46</td>
<td>1.382</td>
<td>0.168</td>
</tr>
<tr>
<td>GAD-2</td>
<td>6</td>
<td>1.91±1.53</td>
<td>2.01±1.50</td>
<td>1.76±1.56</td>
<td>2.254</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Table 4 The relationship between MHLS-C and mental health (n=777)
Table 5 Multiple linear regression analysis of MHLS-Core in nurses of general and psychiatric hospitals (n=777)

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>Std. Error</th>
<th>Satanized β</th>
<th>T</th>
<th>P</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Hospital type</td>
<td>2.500</td>
<td>0.316</td>
<td>0.265</td>
<td>7.912</td>
<td>0.000</td>
<td>1.880</td>
</tr>
<tr>
<td>Professional title</td>
<td>1.856</td>
<td>0.355</td>
<td>0.189</td>
<td>5.226</td>
<td>0.000</td>
<td>1.159</td>
</tr>
<tr>
<td>Education</td>
<td>1.817</td>
<td>0.531</td>
<td>0.120</td>
<td>3.423</td>
<td>0.001</td>
<td>0.775</td>
</tr>
<tr>
<td>PHQ-2</td>
<td>-0.721</td>
<td>0.210</td>
<td>-0.115</td>
<td>-3.430</td>
<td>0.001</td>
<td>-1.134</td>
</tr>
<tr>
<td>Marital status</td>
<td>-1.471</td>
<td>0.673</td>
<td>-0.076</td>
<td>-2.186</td>
<td>0.029</td>
<td>-2.791</td>
</tr>
</tbody>
</table>

R2 0.144, Adjusted R2 0.128, F=25.933, P<0.001

Table 6 Multiple linear regression analysis of MHLS-SA in nurses of general and psychiatric hospitals (n=777)

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>Std. Error</th>
<th>Satanized β</th>
<th>T</th>
<th>P</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Work duration</td>
<td>-0.851</td>
<td>0.169</td>
<td>-0.178</td>
<td>-5.036</td>
<td>0.000</td>
<td>-1.183</td>
</tr>
<tr>
<td>Hospital type</td>
<td>-0.558</td>
<td>0.193</td>
<td>-0.102</td>
<td>-2.889</td>
<td>0.004</td>
<td>-0.937</td>
</tr>
</tbody>
</table>

R2 0.045, Adjusted R2 0.043, F=18.423, P<0.001