

Accuracy of initial psychiatric diagnoses given by nonpsychiatric physicians

A retrospective chart review

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Abstract

Despite the increased morbidity and mortality associated with psychiatric illnesses, there remains a substantial level of inaccuracy of the initial psychiatric diagnoses given by nonpsychiatric physicians. This study examines the accuracy of initial psychiatric diagnoses by non-psychiatric physicians at the McGill University Health Center (MUHC).

We conducted a retrospective chart review for all consultations requested from the consultation-liaison psychiatry service at MUHC. We included all the consultations from January 1, 2018, to December 30, 2018, and excluded patient data with established psychiatric diagnoses. In all requested consults, each diagnosis of a referring physician was compared with the final diagnosis given by the C-L psychiatry team. Conformity between the 2 was validated as accurate.

Of the 980 referred inpatients, 875 were enrolled. Patients ranged in age and those older than 70 years constituted the largest group: 54.4% were male. For 467 patients (55.20%), the initial diagnostic impression given by the referring physicians agreed with the final diagnosis made by the C-L psychiatry team, while in 379 patients (44.80%), the initial diagnostic impression was not consistent with the final diagnosis made by the C-L team.

Diagnostic impressions of neurocognitive and substance use disorders were highly accurate, but this was not the case when the referring physicians suspected depression or bipolar, personality, or psychotic disorders. This study shows that around half of the referrals were accurately diagnosed, which evinces that nonpsychiatric physicians' knowledge regarding psychiatric conditions is not optimal and that might negatively impact screening and treating these conditions.

Abbreviations: C-L = Consultation-Liaison, MDE = major depressive episode, MGH = Montreal General Hospital, MUHC = McGill University Health Center, RVH = Royal Victoria Hospital.

Keywords: accuracy, general medical setting, consultation-liaison, nonpsychiatric, psychiatric illnesses

1. Introduction

Psychiatric disorders are prevalent in the inpatient medical setting,^[1,2] with various studies estimating that they occur in 26.5% to 60% of general medical inpatients.^[3–5] The presence of psychiatric disorders has been associated with poorer outcomes.^[6] Further, the accuracy of initial diagnostic impressions

of psychiatric disorders provided by non-psychiatric medical physicians is quite variable.^[7] Inaccurate diagnoses can occur with various psychiatric complaints including, but not limited to, sleep disturbances and depression.^[8,9] Nonetheless, the accuracy varies by clinical setting. For example, staff in medical wards and nonintensive care units are better able to diagnose patients compared to their counterparts in surgical wards and intensive care units.^[10] Among other reasons, the misattribution of specific symptoms to psychiatric illnesses rather than to organic diseases appears to be an important factor in the inaccuracy of diagnoses. For example, delirious patients endorse depressive symptoms such as a low mood, suicidal tendencies, and feeling of worthlessness, which render them susceptible to being misdiagnosed as depressed.^[11] Likewise, different factors have been found to be associated with the accuracy of diagnoses, whether positively or negatively. For instance, being a male and having multiple physical illnesses was associated with a more accurate psychiatric diagnoses.^[12] Similarly, advanced age was significantly associated with an increased risk of misidentification of the actual diagnoses.^[13] Other factors that have been associated with failure to identify the correct diagnoses are the use of past psychiatric diagnoses and the presence of physical symptoms in the patient, such as pain.^[14] Other studies attributed that the treating physicians' lack of knowledge about psychiatric illnesses also leads to inaccurate diagnoses.^[15] Simply put, despite the awareness of the scope of this problem, mental disorders continue to be misdiagnosed in general medical inpatient settings.^[6] Inaccuracy can result in inaccurate screening and failure to ask

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for appropriate consults. For example, delirium is a common disorder and is frequently not recognized by treating physicians. A study by Armstrong et al^[10] found that 46% of patients with delirium were misdiagnosed by the treating physician. Therefore, we conducted a retrospective study to identify the accuracy of diagnoses by nonpsychiatric physicians at 2 adult sites of McGill University Health Center (MUHC), Montreal, Canada: Royal Victoria Hospital (RVH), and Montreal General Hospital (MGH).

2. Methods

2.1. Study design

The study design consisted of a retrospective chart review.

2.2. Setting

The study took place at 2 sites of MUHC, Montreal, Canada: RVH, and MGH. Both are tertiary centers for adults, with 517 and 479 beds, respectively.

2.3. Protocol

The consultation-liaison (C-L) psychiatry service in both sites receives consults from medical (including ICU) and surgical teams for their hospitalized patients. All referred patients are evaluated by the C-L psychiatry team, which consists of attending (staff) psychiatrists, psychiatry fellows, senior and junior psychiatry residents, medical students, and clinical nurses. For all cases, a full psychiatric assessment is conducted to determine the diagnosis and to make the appropriate management recommendations. The psychiatric diagnoses are made according to the Diagnostic and Statistical Manual of Mental Disorders (DSM5). During the psychiatric assessment, all demographic and clinical data are documented. The information includes the reason for the consultation, history of present illness, and past medical and psychiatric history of the patient.

For this study, we adopted the method of classification of the reasons of consultations from previous studies with some modifications.^[6,16] The reasons for consultations are grouped into 9 categories: depressive disorder, bipolar disorder, schizophrenia spectrum and other psychotic disorders, anxiety disorder, adjustment disorder, substance use or dependency, neurocognitive disorder, personality disorder, or other.

Most of the referring physicians use broad descriptive terms, for example, psychosis or depression, instead of specific DSM diagnoses, for example, schizophrenia or major depressive disorder. Therefore, in this study, the initial impression stated by the referring physician was validated as accurate as long as the final diagnosis made by the C-L psychiatry team was listed in the chapter of DSM that implies the broadly used term. For example, the primary treating physician's use of "psychosis" was validated as accurate if the impression of the C-L psychiatry team included any of the following: schizophrenia, schizoaffective disorder, schizophreniform disorder, brief psychotic disorder, delusional disorder, substance-induced psychotic disorder, psychotic disorder due to general medical condition, etc. The same was applied for the other categories listed above. No restriction for gender, reason for the consultation, or source of referral was applied. As per the exclusion criteria, we excluded the consultations wherein the patient was previously known to have a psychiatric diagnosis.

Using the C-L psychiatry records at both sites of MUHC, we collected and retrospectively reviewed all the psychiatric consultations that were requested during the 12-month period from January 1, 2018, to December 30, 2018. If there was a lack of clarity in the paper records, we reviewed the electronic charts as well. The referring physician's initial diagnostic impression was compared with the impression of the C-L psychiatry team. As detailed earlier, the referring physician's initial diagnostic impression was considered accurate if it matched the C-L psychiatry team's final diagnosis. A Chi-squared test was used to determine if differences in accuracy across diagnostic categories reflected statistically significant differences in the observed levels of agreement between initial and final diagnoses. P value $< .05$ was considered statistically significant. Statistical analyses were performed using the SPSS software (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). The confidentiality of the anonymously collected data was maintained. Ethical approval to conduct the study was obtained from the Research Ethic Board at MUHC.

2.4. Results

The C-L psychiatry service saw 980 patients over the study interval, with an average of 2.7 consultations per day. Among these patients, 109 patients were excluded because they were already known to have psychiatric diagnoses, bringing the total number of patients in the study to 875. All the patients were adults. Table 1 summarizes their ages, divided into 6 age groups. Patients aged 70 years or older constituted the largest group ($n = 242$), and 476 patients (54.4%) were male.

A Chi-squared test of independence indicated that there were no differences in accuracy of the diagnosis among the age groups ($P > .05$). The results showed that for the initial impression, the most commonly given impressions were those of depressive ($n = 299$), neurocognitive ($n = 167$), and anxiety disorders ($n = 134$). For the final impressions given by the C-L psychiatry team, the most common diagnoses (Table 2) were those of neurocognitive disorders ($n = 272$), "other" (e.g., consult sent for capacity assessment or no primary psychiatric disorder) ($n = 193$), and depressive disorders ($n = 126$) (see Fig. 1).

A multiple analysis of variance (ANOVA) test showed that there were no effects of age ($P > .05$), initial diagnostic impression ($P > .05$), or final diagnosis ($P > .05$) on the length of stay. In addition, a Chi-squared test of independence showed that complexity (3 or more psychiatric diagnoses present) had no effect on the accuracy of diagnosis ($P > .05$).

Table 1
Number of patients by age group, gender, and site.

Age group	Percentage
18–30	10.40% (n=91)
31–39	12.00% (n=105)
40–49	13.83% (n=121)
50–59	17.14% (n=150)
60–69	18.97% (n=166)
70+	27.66% (n=242)
Gender	Percentage
Male	54.40% (n=476)
Female	45.60% (n=399)
Site	Percentage
RVH	49.26% (n=431)
MGH	50.74% (n=444)

Table 2
Final psychiatric diagnoses of 875 consults referred to a consultation-liaison service over a 12-month period.

Diagnosis	n	%
Neurocognitive disorder	272	31.09%
Other (e.g., sent for capacity assessment or no primary psychiatric disorder)	193	22.05%
Depressive disorder	126	14.40%
Adjustment disorder	78	8.91%
Anxiety disorder	78	8.91%
Substance use disorder	73	8.34%
Personality disorder	20	2.29%
Bipolar disorder	19	2.17%
Schizophrenia spectrum and other psychotic disorders	16	1.83%

Data were collected from 2 sites, RVH and MGH. It was important to clarify if the data collected were influenced by the site. Therefore, the accuracy in both sitting was tested by using Chi-squared test of independence and it confirmed that the site had no effect on the accuracy of the diagnosis ($P > .05$).

The data regarding accuracy of diagnoses were analyzed using a Chi-squared test of independence, which tested whether there were differences in the ratio (percentage) of accuracy of one diagnosis against another. All the diagnoses were tested against the diagnosis of neurocognitive disorder, because it was the diagnosis most often given by the C-L psychiatry team.

For 467 patients (55.20%), the initial diagnostic impression given by the referring physicians was in concordance with the final diagnosis made by the C-L psychiatry team, while in 379 patients (44.80%), the initial diagnostic impression was inaccurate. The accuracy of psychiatric diagnosis was the highest for substance use disorder (88.14%) and neurocognitive disorder (85.03%) (Table 3). A Chi-squared test revealed no significant differences between the 2 percentages ($P > .05$). The accuracies of all other disorders were lower than those of neurocognitive disorders at a statistically significant level ($P < .05$), as shown by a Chi-squared test of independence.

The accuracy of adjustment disorder was quite high (71.93%); 57 patients were referred by physicians with an initial impression of adjustment disorder, and for 41 of the cases, the initial diagnostic impression was in concordance with the final diagnosis of the C-L psychiatry team. Of the remaining patients, half were deemed without a formal psychiatric diagnosis and the rest were diagnosed with a neurocognitive, bipolar, or personality disorder.

For the 134 patients who were referred with an initial impression of anxiety disorder, the accuracy of the diagnosis was only 50%, and half of those inaccurately diagnosed did not have a primary psychiatric disorder when they were assessed by the C-L psychiatry team. Psychotic disorder was accurately diagnosed only in 28.5% of the referrals, and most of the remaining patients with incorrectly diagnosed referrals were evaluated by the C-L psychiatry team either as having a neurocognitive disorder (15 of remaining 35 cases, or 42.86% of all cases) or not having a primary psychiatric diagnosis (12 of remaining 35 cases, or 34.29% of all cases).

It is worth noting that the initial diagnostic impression of depressive disorder accounted for one-third of the total number of referrals, among which only 40.13% were accurate diagnoses. The remaining incorrectly diagnosed patients were mainly diagnosed by the C-L psychiatry team as either having a neurocognitive disorder (71 of 179 remaining cases, or 23.75% of all cases) or not having a primary psychiatric disorder (72 of 179 remaining cases, or 24.08% of all cases).

Although constituting a small number of the total referrals, impressions of bipolar disorder, personality disorder were accurate only in 48.00% and 27.78% of the referrals, respectively (Table 3).

In 151 referrals, patients were found to not have a primary psychiatric disorder when they were assessed by the C-L psychiatry team (Table 4).

3. Discussion and conclusion

In this study, we tried to address the accuracy of initial psychiatric impressions given by nonpsychiatric physicians at two adult sites

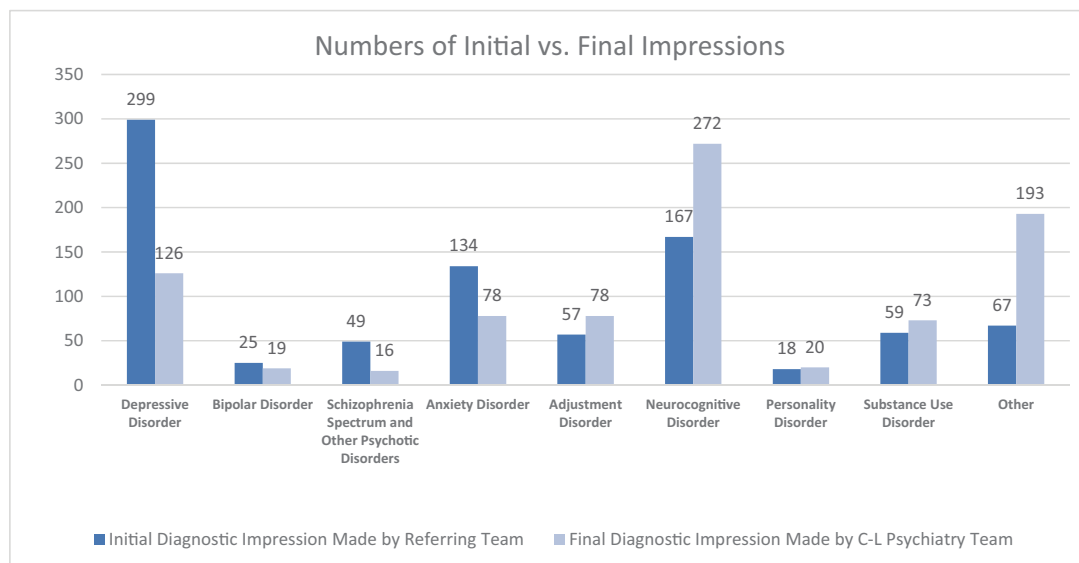


Figure 1. Initial and final diagnoses of 875 consults referred to the consultation-liaison service over the 12-month study period.

Table 3
Accuracy rate of psychiatric referral diagnoses of 875 general medical inpatients referred to a consultation-liaison psychiatry service.

Initial diagnostic impression	Referral diagnosis confirmed by consultation-liaison service		
	N	Percentage	Final diagnosis of remaining patients
Substance Use Disorder (n=59)	52.0	88.14%	Neurocognitive disorder (n=3), Other (e.g., no primary psychiatric disorder) (n=3), Mood Disorder - Depression (n=1)
Neurocognitive disorder (n=167)	142.0	85.03%	Other (e.g., no primary psychiatric disorder) (n=11), Anxiety Disorder (n=5), Substance Use Disorder (n=4), Adjustment Disorder (n=3), Mood Disorder - Bipolar (n=2)
Adjustment disorder (n=57)	41.0	71.93%	Other (e.g., no primary psychiatric disorder) (n=9), Neurocognitive Disorder (n=5), Mood Disorder - Bipolar (n=1), Personality Disorder (n=1)
Anxiety disorder (n=134)	67.0	50.00%	Other (e.g., no primary psychiatric disorder) (n=34), Neurocognitive Disorder (n=16), Adjustment Disorder (n=9), Substance Use Disorder (n=3), Mood Disorder - Depression (n=2), Bipolar Disorder (n=1), Personality Disorder (n=1), Psychotic Disorder (n=1)
Bipolar disorder (n=25)	12.0	48.00%	Neurocognitive Disorder (n=7), Other (e.g., no primary psychiatric disorder) (n=4), Substance Use Disorder (n=2)
Depressive disorder (n=299)	120.0	40.13%	Other (e.g., no primary psychiatric disorder) (n=73), Neurocognitive Disorder (n=71), Adjustment Disorder (n=19), Personality Disorder (n=8), Substance Use Disorder (n=4), Anxiety Disorder (n=3), Mood Disorder - Bipolar (n=1)
Psychotic disorder (n=49)	14.0	28.57%	Neurocognitive Disorder (n=15), Other (e.g., no primary psychiatric disorder) (n=12), Substance Use Disorder (n=3), Personality Disorder (n=2), Anxiety Disorder (n=1), Mood Disorder - Bipolar (n=1), Mood Disorder - Depression (n=1)
Personality disorder (n=18)	5.0	27.78%	Neurocognitive Disorder (n=3), Other (e.g., no primary psychiatric disorder) (n=3), Adjustment Disorder (n=2), Mood Disorder - Depression (n=2), Anxiety Disorder (n=1), Mood Disorder - Bipolar (n=1), Substance Use Disorder (n=1)
Other (n=67)*	11.0 (Out of n=38)	28.94%	Adjustment Disorder (n=4), Substance Use Disorder (n=3) Personality Disorder (n=3), Anxiety Disorder (n=1), Neurocognitive Disorder (n=10), Other (no primary psychiatric disorder) (n=4), Psychotic Disorder (n=1), Substance Use Disorder (n=1)

* Out of the (n=67), 38 consults sent for capacity assessment that have not been included during the calculation of the accuracy.

of MUHC, Montreal, Canada: RVH and MGH. We did not intend to assess other physicians but rather to determine how familiar nonpsychiatric physicians are with psychiatric diagnoses, given the strong relationship between medical illnesses and mental conditions.^[17–19] We assumed that physicians other than psychiatrists are not familiar with the DSM, and it was not expected that they would make their psychiatric impressions based on it.

A retrospective chart review was conducted for all the consultations given during the period of January 1, 2018, to December 30, 2018. The results of this study may positively impact patients with psychiatric disorders and direct them to the appropriate mental health resources. This could be brought about through further education for nonpsychiatric physicians in psychiatric illnesses commonly found in the inpatient medical population.

Table 4
Frequency of initial referrals for which the patient was eventually found not to have a psychiatric illness.

Diagnosis	n	Percentage
Anxiety disorder	34	25.37%
Schizophrenia spectrum and other psychotic disorders	12	24.49%
Depressive disorder	72	24.08%
Personality disorder	3	16.67%
Bipolar disorder	4	16.00%
Adjustment disorder	9	15.79%
Neurocognitive disorder	11	6.59%
Substance use disorder	3	5.08%
Other disorders	3	5.08%

In this study, 3 diagnostic categories, neurocognitive disorders, depressive disorders, and anxiety disorders, formed the large majority of both the initial and final impressions. The diagnoses of neurocognitive disorder and substance use disorder were the most accurate, indicating that the referring nonpsychiatric physicians were likely to be correct when they suspected a neurocognitive or substance use disorder. Nevertheless, there was a significant likelihood of inaccuracy when the referring physicians suspected depression, bipolar, personality, or psychosis, which is in line with previous findings.^[6]

Although the initial diagnostic impressions of neurocognitive disorders were highly accurate, there were many patients who had a neurocognitive disorder but were mistakenly diagnosed with depression, or less commonly with anxiety disorder or psychotic disorder, which is similar to what has been found in previous studies.^[6,19,20] Such inaccuracies are not uncommon because symptoms of cognitive impairment manifests in various psychiatric disorders, for example, cognitive deficits are a core feature of schizophrenia, and they can be present even before the emergence of the hallmark positive symptoms of the illness.^[21] Similarly, in depression, symptoms of cognitive impairment are very common complaints and considered a core symptom of acute major depressive episode (MDE).^[22,23] Studies have demonstrated that delirium is associated with a high mortality rate, increased costs and length of hospital stays, and increased likelihood of nursing home placement.^[24–29] Further, delirium is of great distress not just for patients but also for their caregivers, including the treating team, nurses, and patient's families.^[30,31] The referring physicians diagnosed only 142 of 277 patients ultimately found to have neurocognitive disorder, or 51% [compared with 71% (n=52 of 73 patients) for substance use disorder]. This may mean that the detection rate for neuro-

cognitive disorders is poor, but once detected by the primary providers, the likelihood of accuracy when compared with the diagnosis given by the CL psychiatrist is high.^[32–37] Neurocognitive disorders are a broad classification in DSM5. It describes those with a significant impairment of cognition that represents a marked deterioration from a previous level of function. The subsections of neurocognitive disorder in DSM5 include delirium, mild neurocognitive disorder, and major neurocognitive disorder. For the purpose of this study, all the subsections were classified as neurocognitive disorders without further classification. Therefore, a further carefully designed study looking at these subcategories is needed.

Several factors were found to contribute to the misdiagnosis of delirium: strictly relying on past psychiatric history, which may affect the primary doctors' medical decisions, and the presence of pain.^[14] In addition, patients who are younger and not disoriented may have an increased association with a missed diagnosis of delirium.^[38]

Anxiety disorder was accurately diagnosed in half of the patients. This is similar to the results of previous studies,^[6,16,19] which showed accuracy rates of 40%, 50%, and 46%, respectively. It is worth mentioning that the results of this study could be more precise, as the 3 aforementioned studies had fewer patients diagnosed with anxiety by the referral physicians (10, 40, and 24, respectively), in comparison to our study wherein 134 patients were referred for anxiety. For the remaining patients who were incorrectly diagnosed, after they were assessed by the C-L psychiatry team, most the diagnoses changed to neurocognitive disorder or it turned out that the patients had no primary psychiatric disorder or, less commonly, adjustment disorder.

Having a psychiatric comorbidity such as depression for example, is associated with a prolonged hospital stay and/or readmission, poor compliance, and increased morbidity.^[39] Such factors are known to increase the health care cost of caring for the medically ill population.

It is interesting that many previous studies conducted in medical settings have reported that the low accuracy rate of diagnoses of depression is due to the tendency of the primary treating physicians to underestimate depression.^[40] On the contrary, in this study, depression was overestimated by the primary treating physicians. Still, however, the accuracy of diagnosis was quite comparable to the findings of previous research,^[6,16,19] which showed accuracies of 50%, 43%, and 53.6%, respectively. Furthermore, in this study, almost one-fourth of the patients referred for depression were eventually deemed not to have a psychiatric diagnosis. Diagnosis of depression in the medically ill patient can be a challenge. Depressive symptoms often overlap with the physical symptoms because of the illness and/or treatment. Also, it is often difficult to determine whether somatic symptoms are entirely secondary to a medical condition.^[41] Nevertheless, DSM-5 suggests that "clinician judgment" should determine if specific symptoms are "counted" toward the criteria of MDD.^[42] As such, the clinician's judgment is the current gold standard for determining if a patient meets specific somatic symptom criteria as part of a current MDE.^[43] Suicide risk was also overestimated by the referring physicians: 14 patients were referred for suicide risk, of whom only 2 were actively suicidal.

Around 20% of initial referrals were deemed by the C-L psychiatry team as having no primary psychiatric disorder. This was relatively common in the initial impressions with depressive, anxiety, and psychotic disorder (Table 4). It may be that the

initial diagnostic impressions were based on a brief assessment of symptoms, and the physicians were not aware of the number of symptoms needed for a person to be diagnosed with a certain condition. Thus, validated screening scales can be a useful tool in assessing for common mental disorders in medical settings.^[44] It is also possible that they interpreted some of the patients' statements as symptoms of disorders rather than indicators of the patients' current state. For example, a study conducted on patients over 60 years old showed that severity of symptoms was the major predictor of accurate diagnoses of depression.^[45] Therefore, when symptoms are less severe, the probability of nonaccurate initial diagnostic impressions of depression is higher.

As this study used a relatively large sample size, the results are considered reliable. Further, as it drew data from 2 centers, the results may be generalized. The sample included different age groups as well as different diagnoses. Also, patients who already had psychiatric diagnoses were excluded to minimize bias. The patients who were referred for capacity assessment only without any given diagnosis were also excluded from the calculations of accuracy.

Nevertheless, there are some limitations to our study. First, the study did not strictly rely on the DSM5 diagnoses because most referrals did not build on specific DSM5 classifications but rather for general problem categories; thus, future studies should attempt to study the accuracy of specific DSM5 diagnoses. To date, however, the DSM-5 has some limitations, such as its diagnostic system lacks validity and reliability. Second, as a retrospective design was used, an information bias is possible, and it was difficult to overcome some obstacles, such as insufficient documentation, inconsistencies, or interpretations. Third, all the data concerned patients who were referred for evaluation. Patients who were not referred but should have potentially been referred were not examined, so there might have been a significant number of nonaccurate diagnoses of various conditions among them (i.e., which might have been diagnosed differently by a psychiatrist). Future studies could improve this study design by relying on the DSM5 classification. This study relied on a simple univariate analysis; thus, future studies could improve this study design and use other, slightly more complex, approaches.

In conclusion, the initial diagnostic impressions of neurocognitive disorder and substance use disorder were highly accurate, indicating that the referring nonpsychiatric physicians were likely to be correct when they suspected them, but this was not the case when the referring non-psychiatric physicians suspected depression, bipolar disorders, personality disorders, or psychosis. This study shows that around half of the referrals were incorrectly diagnosed, which evinces that the knowledge of nonpsychiatric physicians about psychiatric conditions is not optimal and that might negatively impact screening and treatment of these conditions. It is important that nonpsychiatric doctors have comprehensive psychoeducation regarding different psychiatric illnesses commonly found as a comorbid within the inpatient medical population. This possibly allows for appropriate screening and use of mental health support with regard to pharmacological and nonpharmacological interventions for the patient.

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