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Identifying cognitive dysfunction using the nurses' rapidly clinical judgment in elderly inpatients

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Abstract

Background/Purpose: The aim of this study was to examine the relationship between nurses' clinical judgment on cognitive function by fall risk assessment and mini-mental state examination (MMSE) scores in elderly inpatients.

Methods: We studied 61 consecutive hospitalized patients who received both comprehensive geriatric assessment (CGA) and fall risk assessment at the department of geriatric medicine in Kyoto university hospital from January, 2006 to June, 2010. On the fall risk assessment at admission, primary nurses evaluated the cognitive function by 4 items (with or without disorientation, impaired judgment, lack of comprehension, and memory loss), while a trained clinical assistant performed CGA including MMSE. Subjects were divided into 3 groups according to the MMSE scores. The association between 4 items of judgment by nurses and MMSE scores was then studied.

Results: The mean age was 80.1 and 55.7% of the subjects were female. The percentage of patients judged to have "impaired judgment", "lack of comprehension", and "memory loss" was higher in patients with lower MMSE scores (impaired judgment, p for trend=0.001; lack of comprehension, p for trend=0.043; memory loss, p for trend=0.001). The percentage of patients judged to have "at least 1 of the 4 abnormalities" was also significantly higher in patients with lower MMSE scores (p for trend<0.001). However, no significant relationship was found between "disorientation" and the MMSE scores. Further, nurses could not detect impaired cognition by the 4 items in one-third of the patients with mild impairment determined by MMSE.

Conclusions: These data indicate that a comprehensive evaluation using all the 4 items on cognitive impairment is better to detect cognitive impairment in elderly than that using each item, although one-third of cognitively impaired elderly patients can be missed despite using the 4 items. Better approaches should be developed to identify cognitively impaired elderly

patients by nurses.

Key words: cognitive function, fall risk assessment, clinical judgment, nursing

1. Introduction

Falls are one of the most common complications of elderly in hospitals, with rates per 1000 patient-days estimates between 1.5 and 7.0,[2-5] and approximately 30% of those lead to physical injury, with 2.4-6.8% being serious.[6-7] Fall are associated with cognitive dysfunction,[8-11] and approximately 60% of elderly with cognitive impairment fall annually; this incidence is approximately twice higher than that those without cognitive impairment.[11-12] The increasing of elderly and the incidence of demented patients in hospital can therefore lead to an increase in falls and fracture events. Accordingly, it is important for nurses to assess cognition in elderly patients to prevent such complications.

Many fall risk screening tools are used as part of fall prevention programs in hospitals. Available screening and fall risk assessment tools used in different settings have been subjected to systematic reviews that revealed considerable differences in practicability and validity, thus raising the question of their usefulness.[13-14] Identifying high-risk patients for falls in institutionalized settings, our hospital developed a fall risk assessment tool. For the assessment, nurses collected information on age, history of falls, visual and hearing disturbance, cognition, transfer, and urinary continence, which are risk factors of falls identified by previous studies. Most items were evaluated by nurses' subjective judgment. The advantage of this tool is that nurses can finish the assessment in a relatively short period of time at an early phase of hospitalization. However, it was not clear how accurate nurses can assess the cognitive function of elderly patients with this tool. To this end, we tried to investigate whether or not nurses can accurately judge cognitive impairment in elderly patients using this tool by comparing the data independently obtained by mini-mental state examination (MMSE) performed by a trained clinical assistant.

The aim of this study was, therefore, to examine the relationship between the clinical judgment of nurses on cognitive function during fall risk assessment and independently

MMSE [15] scores in elderly inpatients.

2. Methods

2.1. Designs

The design of this study was a cross-sectional study.

2.2. Participants and data collection

In this study we collected data in the medical records. *** patients admitted to the Department of Geriatric Medicine of Kyoto University Hospital from January 2006 to June 2010. Of *** inpatients, the data was collected for 63 inpatients who received comprehensive geriatric assessment (CGA) during hospitalization. CGA was done for inpatients, whom attending physicians judged frail. And all inpatients received fall risk assessment as usual care.

Of 63 inpatients, we performed CGA after more than a month of clinical judgment using fall risk assessment tool in 1 patients and 1 patient had missing information. The remaining 61 inpatients were analyzed for this study.

The approval for this study was obtained from Kyoto University Graduate School and Faculty of Medicine, Ethics committee (No. E1042, 2010), and the subjects received information of our study including to use their data on medical chart by notice board in Kyoto University hospital and website of Department of Geriatric Medicine, Kyoto University.

2.3. Measurements

The cognitive function was evaluated by 4 items in the fall risk assessment tool on admission, at least within 24 hours after admission by primary nurses, in which nurses clinically judged cognitive function of each patient. The nurses judged the presence or absence of “disorientation”, “impaired judgment”, “lack of comprehension”, and “memory loss”. The fall risk assessment tool including these items was applied to prevent falls for almost all patients

in our hospital.

CGA was conducted less than 30 days of the initial hospital stay. The mean ± standard deviation of the period from admission to evaluation was 8.0±6.0 days. The information was collected on socio-demographic data, living environment, health status and hospitalization data. We collected data to assess functional and cognitive status, and depressed mood by MMSE and geriatric depression scale (GDS), and so forth. MMSE was performed by a trained clinical assistant and the patients were divided into 3 groups according to MMSE scores. Patients with MMSE scores from 0 to17 points were classified as “moderate to severe impairment”, those from 18 to 23 points as “mild impairment”, and those from 24 to 30 points as “slight or no impairment”(文献).

2.4. Statistical analysis

We described mean ± standard deviation or median, minimum and maximum for the continuous variable and numbers and percentages for the discrete variable. Liner regression models were constructed to examine the association of nurse’s judgments on cognitive function with the MMSE scores. Additionally, “At least of the 4 abnormalities” of judgment by nurses was compared in the 2 groups according to the MMSE scores using chi-square test. The cut-off of these groups was 24.

The Statistical Package for Social Sciences, version 18.0J (SPSS Japan Inc., Tokyo, Japan) was used for statistical analysis. All probability values were two-tailed with a significant level of $p<0.05$.

3. Results

Table 1 shows the characteristics and main measurements of the patients. The mean age was 80.1 years and 55.7% of them were female. The median of their hospitalization length was 19 days. Of the 61 subjects, 56 were discharged to home (91.8%). In terms of their cognitive

function, 36% of the patients were judged to have “memory loss”, which was the highest among the 4 items. Twenty six percent of the patients were judged to have “impaired judgment”, 21% “lack of comprehension”, and 13% “disorientation”. Furthermore, forty three percent of the patients were judged to have “at least one of the 4 abnormalities”. The median of MMSE scores was 26.

Table 2 shows the percentage of cognitive impairment judged by nurses in each group of patients classified according to their MMSE scores. Twenty five percent of patients with “moderate to severe impairment”, 21% with “mild impairment”, and 9.3% with “slight or no impairment” were judged to be disoriented, respectively. Although no statistically significant association was found between “disorientation” and MMSE scores (p for trend=0.053), the percentage of patients judged to have “disorientation” in the “moderate to severe impairment” group tended to be higher than those with “slight or no impairment”. In terms of impaired judgment, 75% of the patients with “moderate to severe impairment”, 36% with “mild impairment”, and 19% with “slight or no impairment” were judged to have “impaired judgment”, respectively. As a result, the percentage of patients judged to have "impaired judgment” was significantly higher in patients with lower MMSE scores (p for trend=0.001). In “lack of comprehension”, 50% of the patients with “moderate to severe impairment”, 21% with “mild impairment”, and 19% with “slight or no impairment” were judged to have “lack of comprehension”, respectively. The percentage of patients judged to have “lack of comprehension” was significantly higher in patients with lower MMSE scores (p for trend=0.043). In “memory loss”, 75% of patients with “moderate to severe impairment”, 50% with “mild impairment”, and 28% with “slight or no impairment” were judged to have “memory loss”, respectively. The percentage of patients judged to have “memory loss” was significantly higher in patients with lower MMSE scores (p for trend=0.001). Finally, all patients with “moderate to severe impairment”, 64% with “mild impairment”, and 30% with

“slight or no impairment” were judged to have “at least 1 of the 4 abnormalities”, respectively. The percentage of patients judged to have “at least 1 of the 4 abnormalities” was significantly higher in patients with lower MMSE scores (p for trend<0.001).

In the 14 patients with “mild impairment”, 9 were judged to have “at least 1 of the 4 abnormalities” and 5 were not. Although those 5 patients were not judged to have impaired cognition using the 4 items by nurses at admission, 4 were judged to have “at least 1 of the 4 abnormalities” at the second time of evaluation by nurses during hospitalization. The second evaluation by nurses was performed from 1 to 2 weeks after admission (data not shown).

Figure 1 shows how many of the patients with “mild to severe impairment” or “slight to no impairment” can be judged to have at least 1 abnormality by nurses. The patients with “mild to severe impairment” determined by MMSE were more likely to be judged to have “at least 1 of the 4 abnormalities” than those with “slight or no impairment” (p=0.002). However, nurses could not detect impaired cognition using the 4 items in one-third of the patients with “mild to severe impairment” determined by MMSE, while they judged to have some kind of cognitive impairment in one-third of the patients with “slight to no impairment”.

Figure 2 shows the number of items judged to have abnormality in 4 items on cognitive function by nurses in each group of patients classified according to their MMSE scores. There was no relationship between the number of items judged to have abnormality and the level of cognitive function according to MMSE scores.

4. Discussion

In the present study, we demonstrated that the percentage of patients judged by nurses to have cognitive impairment were higher in elderly patients with lower MMSE scores than those with higher MMSE scores. Despite using the 4 items to detect cognitive impairment, our study demonstrated that the assessment used by nurses was not completely successful to

evaluate the cognitive function of elderly patients.

According to our data, nurses could not detect impaired cognition with the 4 items in one-third of the patients with mild impairment determined by MMSE. This percentage was unexpectedly high. We assume that it is difficult for nurses to accurately assess patient's cognitive function at admission; however, nurses could detect impaired cognition in patients with mild impairment at the second assessment, which was done 1 to 2 weeks after admission. Thus, it is conceivable that nurses may not have obtained sufficient information for the assessment at admission. However, most falls in hospital occur within a week.[16-17] In addition, demented patients have a markedly increased fall and fracture risk, almost two times more in comparison with non-demented elderly.[18-20] Further, diminished motor control is related to cognitive status in older adults. Thus, changes in cognitive function may contribute to an increased fall risk. Accordingly, it is necessary for nurses to assess even mild cognitive impairment as well as severe impairment at an early stage of admission. [21] According to these results, it is conceivable to think that we should develop a better fall assessment tool to detect mild cognitive impairment and should educate nurses to assess patients with cognitive impairment more accurately. On the other hand, we thought the cognitive impairment in 30.2% with "slight to no impairment" was not so important. They might be involved patients diagnosed mild cognitive impairment. Additionally the screening will be prioritized higher sensitivity over higher specificity.

Although all patients with "moderate to severe impairment" were judged to have "at least 1 of the 4 abnormalities", they were not completely judged to have each abnormality. It is suggested that a comprehensive evaluation using all of the 4 items of cognitive impairment is better to evaluate than using each item at admission. The percentage of patients judged by nurses to have "memory loss" was the highest among the 4 items. In contrast, the percentage of patients judged by nurses to have "disorientation" was the lowest. Nurses obtain

information of patients during nursing care including active daily life assistance. It is extremely unnatural to confirm whether a patient recognizes date, a day of the week, and a place during active daily life assistance. On the other hand, it is easy to assess whether or not a patient forgets recent episodes, to repeat the same questions and talks, and forgets where he or she puts something. The most likely explanation is that the judgment of "disorientation" is more difficult to assess than "memory loss". Therefore, the judgment of "disorientation" might be unnecessary in this tool.

Many studies have shown the development of effective several assessment tools to identify fall risk in the elderly at high risk in institutionalized settings.[13-14] Many hospitals have implemented routine screening to assess fall risk for a patient, followed up with a more focused assessment of those deemed to be at "high risk".[13-14] In addition, previous study showed that nurses' clinical judgments could predict falls of a patient as well as fall risk assessment tool.[22-24] However, these studies did not indicate how nurses made successful predictions. They only implicated that the intuition by nurses can predict falls. Because of this, we thought it necessary to show the validity of nurses' clinical judgment by performing MMSE in frail geriatric patients.

Several potential limitations should be considered when interpreting these results. First, 2 measurements used in this study, which are 4 items of cognitive impairment in the fall risk assessment tool and MMSE, were not evaluated at same time. Therefore, information bias may occur. However, large error of evaluation date was drop from analysis subjects. Clinical judgment by nurses was also performed at admission, and all patients were judged by nurses before MMSE. Nurses did not know their MMSE scores. Thus, evaluation of MMSE did not affect nurses' clinical judgment. Second, we did not investigate the experience of nurses, which might have affected the results. Finally, the subjects were limited to the patients who admitted only to the department of geriatric medicine in one university hospital. It might be

difficult to generalize these results.

In conclusion our data indicated that a comprehensive evaluation using all the 4 items on cognitive impairment is better to detect cognitive impairment in elderly than using each item, although one-third of cognitively impaired elderly patients which was mild impairment determined by MMSE could be missed despite using the 4 items on cognition and only "disorientation" assessed by nurses is not able to predict cognitive impairment assessed by MMSE. Therefore, it is important to develop a tool to better assess cognitive impairment and to educate nurses to assess patients with cognitive impairment more accurately.

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Figure legends

Figure 1. The percentage of patients to be judged to have at least 1 abnormality by nurses in patients with mild to severe cognitive or slight to no impairment by MMSE. The difference was determined by chi-square test.

Figure 2. The number of items judged to have abnormality in 4 items on cognitive function by nurses in each group of patients classified according to their MMSE scores.

Table 1. Characteristics and main measurements of the inpatients

	All n=61
Age; years	80.1±6.0
Gender, female (%)	34 (55.7)
Length of stay in the hospital, days	19 [5, 56]
Place after discharge from the hospital	
Home	56 (91.8)
Other hospitals	3 (4.9)
Other departments	2 (3.3)
Cognitive function of judgment by nurses	
Disorientation	8 (13.1)
Impaired judgment	16 (26.2)
Lack of comprehension	13 (21.3)
Memory loss	22 (36.1)
At least one of the 4 abnormalities	26 (42.6)
Mini-Mental State Examination scores	26 [13, 30]

Number(%)
Mean±standard deviation or median [minmum, maximum]
All patients were divided into 3 groups according to MMSE scores.
0-17points: moderate to sever imparement
18-23points: mild impairment
24-30points: slight or no impairment

Table 2. Relationship between nurses' clinical judgment and Mini-Mental State Examination scores

	Moderate to severe impairment n=4	Mild impairment n=14	Slight or no impairment n=43	p for trend
Cognitive function of judgment by nurses				
Disorientation	**1 (25.0)**	**3 (21.4)**	**4 (9.3)**	**0.053**
Impaired judgment	**3 (75.0)**	**5 (35.7)**	**8 (18.6)**	**0.001**
Lack of comprehension	**2 (50.0)**	**3 (21.4)**	**8 (18.6)**	**0.043**
Memory loss	**3 (75.0)**	**7 (50.0)**	**12 (27.9)**	**0.001**
At least one of the 4 abnormalities	**4 (100)**	**9 (64.3)**	**13 (30.2)**	**< 0.001**

Number (%)

All patients were divided into 3 groups according to MMSE scores.

0-17points: moderate to sever impairment

18-23points: mild impairment

24-30points: slight or no impairment

A liner trend test was used with the discrete value in each groups according to the MMSE scores in liner regression models.

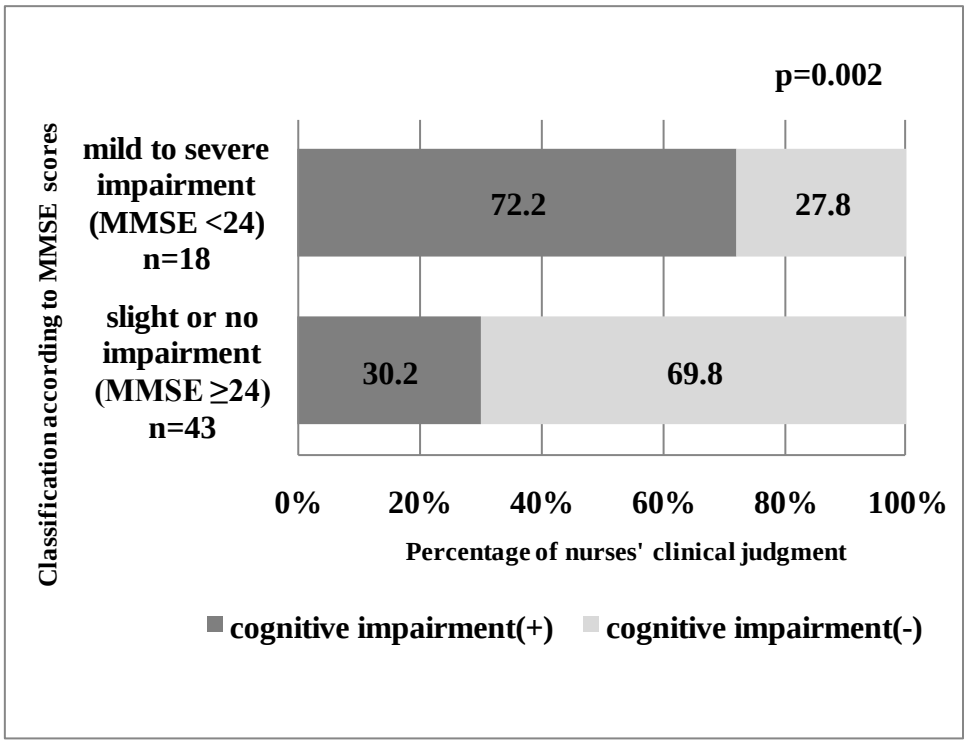
p=0.002
Classification according to MMSE scores
mild to severe impairment (MMSE <24) n=18
slight or no impairment (MMSE ≥24) n=43
72.2
27.8
30.2
69.8
0%
20%
40%
60%
80%
100%
Percentage of nurses' clinical judgment
cognitive impairment(+)
cognitive impairment(-)

Figure 1.

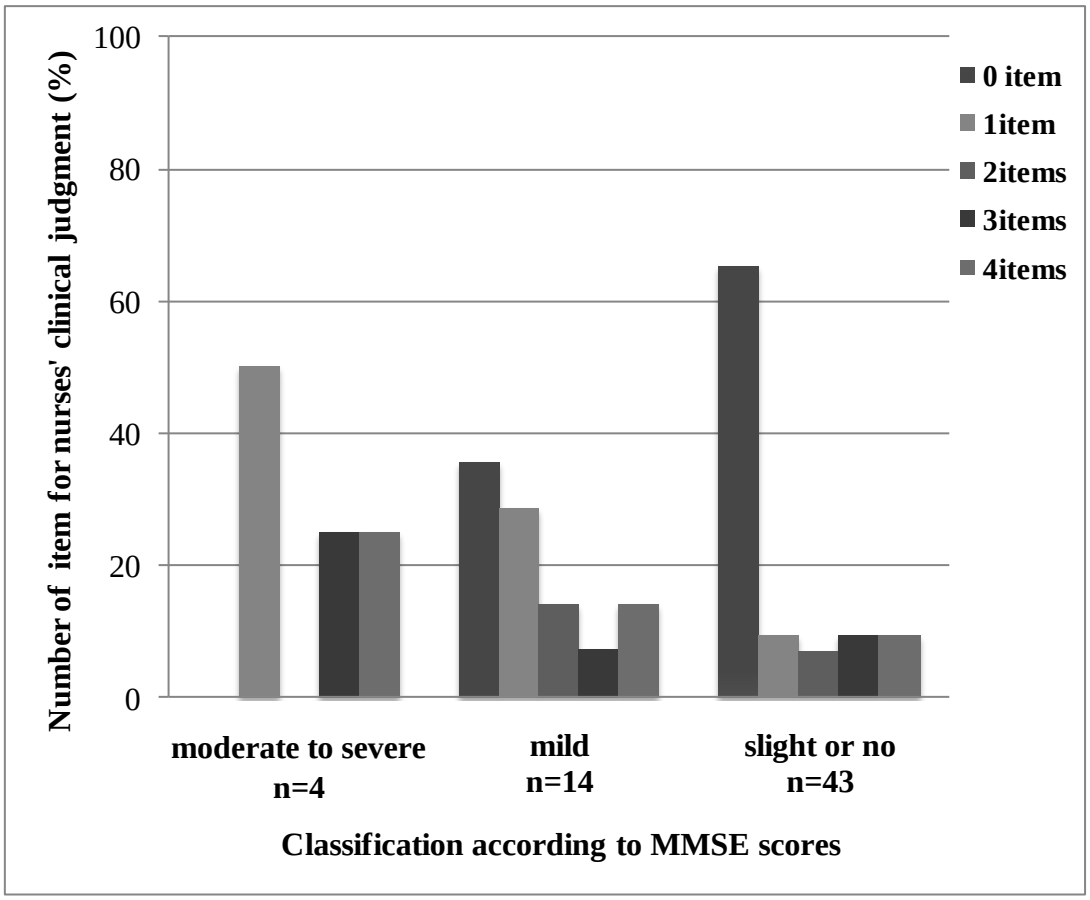
Number of item for nurses' clinical judgment (%)
100
80
60
40
20
0
0 item
1item
2items
3items
4items
moderate to severe
n=4
mild
n=14
slight or no
n=43
Classification according to MMSE scores

Figure 2.