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Prevalence and correlates of potentially undetected dementia among residents of institutional care facilities in Ontario, Canada, 2009–2011

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Objectives: This study aims to determine the prevalence of potentially undetected dementia among institutional care facility residents in Ontario, Canada, and to identify factors associated with undetection.

Methods: We utilized a population-based secondary data analysis approach, pertaining to data from the Canadian Institute for Health Information's Continuing Care Reporting System, 2009–2011. Potentially undetected dementia was defined as having severely impaired cognitive function and requiring extensive assistance on activity of daily living (ADL) but no records of dementia diagnoses. Cognitive function was measured by the Cognitive Performance Scale (CPS), 0 (intact) to 6 (very severe impairment), and ADL by a hierarchy scale, 0 (independent) to 6 (total dependence).

Results: Of the 242,957 residents who had no records of dementia diagnoses, 11.6% ($n = 28,078$) had a CPS score ≥4 (severe impairment or higher) and ADL score ≥3 (required extensive assistance or more). Data from 11,614 demented residents with corresponding CPS and ADL scores were used for comparison. Residents without dementia diagnosis were younger (77 vs. 84 years), more likely to have never married (20% vs. 6%), and have longer admission (4 vs. 2.8 years). The most significant factors for no diagnoses were never married (adjusted odds ratio = 2.1, 95% confidence interval [CI] = 1.91–2.29), admitted to hospital-based facilities (adjusted odds ratio = 1.58, 95% CI = 1.48–1.69), presence of schizophrenia (adjusted odds ratio = 1.43, 95% CI = 1.22–1.69), depression (adjusted odds ratio = 1.23, 95% CI = 1.16–1.29), and diabetes mellitus (adjusted odds ratio = 1.32, 95% CI = 1.26–1.40).

Conclusions: A large number of residents who had poor cognitive function and inadequate ADL ability did not have dementia diagnoses on record. Social and comorbid conditions were contributing factors to potentially undetected dementia. Copyright © 2013 John Wiley & Sons, Ltd.

Introduction

We are living in a society that is aging at an unprecedented rate. It has been estimated that the number of individuals aged 65 years or older would increase from 420 million in 2000 to 973 million in 2030 worldwide (Centre for Disease Control and Prevention, 2003). Many age-related illnesses including dementia would become more prevalent. Wimo *et al.* (2006) estimated that over 26 million people worldwide were affected by dementia in 2006. By 2050, we could have as many as one in 85 persons living with the condition globally (Brookmeyer *et al.*, 2007). Alzheimer's disease (AD), the most common form of dementia, is now the seventh leading cause of all deaths in the US, and the number of deaths is expected to climb (Alzheimer's Association, 2010).

Canada also has an aging population. Approximately 13% of Canadian population is currently over 65 years of age. The number of older people in Canada

could increase to 11 million in 2036 and to 15 million in 2061, representing 25% and 28% of the projected population, respectively (Statistics Canada, 2010). The Alzheimer's Society of Canada (2010) recently commissioned a study reporting that nearly 500,000 Canadians suffered from dementia in 2008. The number could surpass 1.1 million in 2038.

Cognitive deficits

The spectrum of cognitive deficits comprises a wide variety of conditions, including mild cognitive impairment (MCI), cognitive impairment (CI), cognitive impairment but no dementia (CIND), AD, and other forms of dementia. At one end of the spectrum, MCI is associated with a declining cognitive and memory ability that is beyond typical age-related reduction but has not yet caused significant overall functional reduction in one's daily life (Swanson and Carnahan, 2007). At the other end of the spectrum, individuals suffering from AD experience a slow onset with a continued decline in cognitive ability and in performing everyday activities, and eventually die (Jalbert *et al.*, 2008). Evidence suggests that individuals with CI/MCI and CIND are at increased risk of developing dementia (Hsiung *et al.*, 2006; Lee *et al.*, 2008). Three independent studies, including a Canadian study, all found that as many as half of CI/MCI or CIND progressed to dementia within 5 years (Tuokko *et al.*, 2003; Gauthier *et al.*, 2006; Tschanz *et al.*, 2006).

Under-detection of cognitive problems

The problem of detecting cognitive problems has been documented around the world. Many non-Canadian studies have suggested that the proportions of undetected dementia in primary and other care settings are high (Joray *et al.*, 2004; Magsi and Mallory, 2005; Ferretti *et al.*, 2010). It has been suggested that 40–80% of dementia cases in the primary care setting are undiagnosed (Weimer and Sager, 2009). Koch and Iliffe (2010) put forward a mounting evidence of missed diagnosis of dementia in the primary care settings. Their rapid appraisal implicated a number of barriers to diagnosis, including lack of support, time and financial constraints, stigma, diagnostic uncertainty, and disclosing the diagnosis.

Bradford *et al.* (2009) agreed that the number of dementia diagnoses that were missed is substantial. The authors suggested that this problem is likely the result of our current diagnostic practice, which is largely relied on clinical suspicions provided by the patient's caregiver.

The problem may be further complicated by the use of assessment scales for dementia screening. There are ample choices among these scales, and they are frequently misunderstood and misused (Sheehan, 2012). For example, the most widely used screening tool, the Mini mental state examination (MMSE), has been criticized for its modest specificity and positive predictive value, and thus limits its utility as a screening tool (Kaufer *et al.*, 2008). Other authors (O'Bryant *et al.*, 2008; Spering *et al.*, 2012) also argued that the conventional cutoff of MMSE <24 is too low and that it should be raised to 27.

Furthermore, a number of non-Canadian studies have investigated missed diagnosis at the institutional level. MacDonald and Carpenter (2003) found that only one-third of nonspecialist nursing home residents in the UK who were classified as cognitive impaired were acknowledged by the staff. Among those with an MMSE <16, less than half were acknowledged to have dementia. Even for those who would be classified as having a severe impairment, less than half were recognized. The authors concluded that their study provided strong evidence of a very low recognition rate of dementia in the nursing homes they examined.

A Danish study by Sorensen *et al.* (2001) found evidence that residents who were perceived by staff to have behavioral problems are more likely to be labeled "demented." This study also found that nursing home staff incorrectly diagnosed 32% of the demented residents as not demented. A Norwegian study by Nygaard and Ruths (2003) found that one-third of the nursing home residents who were diagnosed with dementia by a visiting geriatrician had no indications of dementia in their medical records. A recent study involving nursing home residents in Dublin, Ireland, also found that staff members tended to underestimate the severity of CI of their residents. The authors concluded that there were likely to have a number of undiagnosed dementia within their study setting (Cahill *et al.*, 2010). Ferretti *et al.* (2010) examined 1764 post-acute care patients in Lausanne, Switzerland. The study found that of all the dementia cases ($N = 425$) in the sample, 301 (71%) were new diagnoses made only during their post-acute stay. The authors further noted that the oldest age group appeared especially at risk for under-recognition and that individuals who lived alone and had better functional status upon admission were also more likely to be undiagnosed.

A large-scale population-based survey in Germany found that only 27% of the demented nursing home residents were formally acknowledged (Weyerer and Schäufele, 2006). In Jerusalem, Feldman *et al.* (2006) conducted a cross-sectional survey of a representative

sample of long-term care wards. They found that 27.9% of the residents with a modified MMSE (3MS) score <78/100 had no record of dementia. When comparing staff's perception to the 3MS score, 28.4% of the residents with a 3MS score <78/100 were judged by staff members as not demented. The authors concluded that there was a high prevalence of dementia in geriatric institutions, and a significant number of CI was likely to be under-reported in the residents' medical records.

Similar results were also noted in the US (Magsi and Mallory, 2005, Maust et al., 2006). Magsi and Mallory (2005) conducted a study on residents of non-dementia-designated assisted living facilities in Omaha, Nebraska. The authors compared the residents' MMSE scores with their medical charts and found that only half of the individuals with severe CI had a diagnosis of dementia on their medical charts. Furthermore, Maust and colleagues (2006) found that male gender, number of neuropsychiatric symptoms, and the severity of an individual's cognitive and functional impairment were all independent predictors of caregiver's unawareness of dementia.

The Canadian context

In Canada, institutional care facilities provide accommodation and 24-h supervised care for the residents. Types of facilities include hospital-based and residential continuing care facilities. The latter are composed of supportive housing and group homes, retirement homes, nursing homes, chronic care facilities, and hospice (Stamler-Leeseberg and Yiu, 2012).

Canada is likely to have the same problem of diagnosing dementia among institutional care facility residents. Unfortunately, there are no studies that we are aware of that have directly dealt with this issue. A Canadian landmark study on aging and dementia was initiated by the Canadian Study on Health and Aging (CSHA) working group in 1991, with follow-up studies conducted in 1996 and 2001 (Lindsey et al., 2004). A principal focus of the study was to establish the prevalence and incidence of dementia. In their earlier report (CSHA Working Group, 1994), CSHA estimated that approximately 1 in 13 individuals aged 65 years and over had dementia. A subsequent report suggested that there were approximately 2% new cases every year (CSHA Working Group, 2000). Of particular relevance to our study is the study by Sternberg et al. (2000), where the authors estimated that 64% of the 252 community-dwelling older adults had undetected dementia. This finding is similar to a US study that involved 411 African Americans who participated in a community-based in-home cognitive assessment program (Wilkins et al., 2007), which found that 56% of the participants were not diagnosed.

Tuokko et al. (2003) conducted a five-year longitudinal follow-up study involving dementia-free individuals from the first phase of CSHA. This study found that those who were identified as having CIND at baseline were five times more likely to develop dementia within 5 years than those who were identified as not cognitively impaired. Overall, almost half of the individuals with CIND developed dementia within 5 years. Since CSHA, two Canadian research groups also made significant contributions to dementia research: the Canadian Cohort Study of Cognitive-Impairment and Related Dementias (ACCORD) and the Canadian Outcomes Study in Dementia (COSID). ACCORD was initiated to investigate changes in cognitive function from normal to dementia (Hsiung et al., 2006). The authors found that 34% of the study participants with CIND progressed to dementia within a 2-year period. The COSID study, involving 766 community-based individuals from 31 Canadian sites, was conducted to track treatment choices and outcomes with a focus on the economic burden of dementia (Sambrook et al., 2004; Herrmann et al., 2006a; Herrmann et al., 2006b; Herrmann et al., 2010).

Study aims

The primary aim of our study was to investigate the prevalence of CI and potentially undetected dementia among residents of institutional care facilities in Ontario, Canada. To build upon earlier investigations (Maust et al., 2006; Ferretti et al., 2010) on the effects of correlates on undetection, we further aimed to identify factors associated with the undetection. This study focused mainly on an individual's social, psychiatric, and non-psychiatric health conditions.

Methods

A population-based secondary data analysis approach was used in this investigation. Our study population included all institutional care facility residents in Ontario, Canada, between 2009 and 2011. These institutions include both hospital-based long-term care facilities and residential continuing care facilities that provide 24-h nursing care. This study has received an institutional review board approval.

Data source

We employed data from the Canadian Institute for Health Information's Continuing Care Reporting System (CCRS) between the years 2009 and 2011 for analysis. The nature and scope of the system are extensive, including demographic, administrative, clinical, and resource utilization information on clients who receive continuing care services in hospitals or long-term care homes (CIHI, 2012). The information gathered from the Resident Assessment Instrument – Minimum Data Set (RAI-MDS) 2.0$^{©}$ was used to generate CCRS (CIHI, 2010). The RAI-MDS 2.0 system is a comprehensive standardized tool used to assess long-term care residents. It is designed to collect minimum amount of information that permits residents monitoring and to devise care plans that meet individual residents' needs (Hutchinson *et al.*, 2010). A number of studies have demonstrated the validity and reliability of the instrument (e.g., Vincent *et al.*, 2011). All residents were assessed upon admission to the institutional care program. Once admitted, residents also received subsequent assessments every 3 months or more frequently if the individual experienced significant changes in their clinical status.

Statistical analysis

We employed SPSS version 19 (SPSS Inc., Chicago, Illinois, USA) for data analysis. Only data from a resident's most recent assessment were used. Dementia has been defined as a global deterioration of cognitive function that impairs an individual's ability to perform activities of daily life (Magsi and Mallory, 2005). It is by using this definition that potentially undetected dementia was identified under two criteria: (i) one with severe CI (CPS $\geq$ 4); and (ii) inability to perform activity of daily living (ADL) without extensive assistance (ADL $\geq$ 3). ADL performance was rated by a seven-point hierarchy scale (Table 1).

Cognitive function was determined by the Cognitive Performance Scale (CPS), derived from a resident's assessments using information on memory, decision-making skills, communication, and eating. The scale has been validated against the MMSE by a number of researchers (e.g., Paquay *et al.*, 2007). The score describes the cognitive status of a resident. (Table 2)

In addition to residents' CPS and ADL scores, independent variables extracted also included basic demographic variables (age, sex, marital status, and family income), social environment variables (types of facilities and engagement level), and health-related variables (sensory, non-psychiatric, and psychiatric illnesses). The latter are of particular interest as there has been evidence to suggest that psychiatric illness delays cancer diagnosis (O'Rourke *et al.*, 2008) as well as the association between CI and comorbidity (Tay *et al.*, 2006; Duthie *et al.*, 2011; Freitas *et al.*, 2012; Wallin *et al.*, 2012). Univariate comparisons were performed using *t*-tests for continuous variables and chi-square tests for categorical variables. Multivariable logistic regression models were used to assess the adjusted effects of the noted independent variables on potential undetection. Adjusted odds ratios are reported along with their 95% confidence intervals.

Results

There were a total of 242,957 residents who had no records of dementia. The mean age was 80.1 years (standard deviation = 12.9) and 33.9% were men. In terms of cognitive function, we found that 31.4% ($n = 76,380$) of the residents had intact function (CPS = 0, MMSE equivalent average = 25), 20.4% ($n = 49,677$) had borderline intact function (CPS = 1, MMSE equivalent average = 22), 35.9% ($n = 87,441$) had mild to moderate impairment (CPS = 2–3, MMSE equivalent average = 15–19), and 12.1% ($n = 29,459$) had moderately severe

Table 1 Description for activity of daily living (ADL) score

ADL score	Description
0	Independent
1	With supervision
2	Limited ability
3	Extensive assistance required, stage I
4	Extensive assistance required, stage II
5	Dependent
6	Total dependence

Table 2 Description for Cognitive Performance Scale (CPS) score and the Mini-mental state examination (MMSE) equivalence

CPS	Description	MMSE equivalent average
0	Intact	25
1	Borderline intact	22
2	Mild impairment	19
3	Moderate impairment	15
4	Moderately severe impairment	7
5	Severe impairment	5
6	Very severe impairment	1

to very severe impairment (CPS = 4–6, MMSE equivalent average ≤ 7). Of the latter group, there were 10,719 residents who had the lowest CPS score of 6 (MMSE equivalent average = 1) (Figure 1).

Using the definition of potentially undetected dementia diagnoses stated earlier, we found that among residents with no records of dementia, 11.6% of the residents (n = 28,078) had severe CI (CPS ≥ 4) and were not able to perform ADL without extensive assistance (ADL ≥ 3). To further investigate factors that were associated with potentially undetected dementia, we referred to this group of residents as "no diagnosis group." For comparison, we extracted data from a group of residents during the same study period, who also had a CPS score of 4 or above at the time of their dementia diagnosis, and ADL performance score of 3 or above. We referred to this group of residents as "diagnosed group." To ensure further compatibility between groups, only residents in the diagnosed group whose diagnoses were made after their admission to a facility were included for analysis. A resident was considered to have diagnosis after admission when the diagnosis date was after admission date. There were 11,614 residents in the diagnosed group and 28,078 residents in the no diagnosis group (Figure 2).

Our results showed that residents without dementia diagnosis were younger (77 vs. 83.8 years of age, p = 0.0001), more likely to be men (36.4% vs. 31.8%, p = 0.0001), and to have never been married (20.1% vs. 5.8%, p = 0.0001). We also found that residents of hospital-based facilities were less likely to have a diagnosis than those of residential continuing care facilities (21.0% vs. 14.9%, p = 0.0001), and the average length of time since admission was longer for those without diagnosis (4 vs. 2.8 years, p = 0.0001). When we examined the distribution of other neuropsychiatric conditions, we found that residents with depression (27.2% vs. 23.7%, p = 0.0001) and schizophrenia

(3.7% vs. 1.6%, p = 0.0001) were more likely to have no diagnosis, whereas no difference was found for Parkinson's disease or anxiety disorder. Furthermore, their most recent assessment also indicated that residents with no dementia diagnoses were more likely to have adequate vision (43.8% vs. 41.2%, p = 0.0001) and hearing (62.5% vs. 57.2%, p = 0.0001) (Table 3).

Multivariable logistic regression modeling was used to identify factors associated with no diagnosis. The most noticeable result was that of marital status. We found that residents who were never married were twice as likely to have no diagnosis (adjusted odds ratio = 2.10, 95% CI = 1.91–2.29), as compared with residents who were ever married. Furthermore, we found that residents of hospital-based facilities were more likely to have no diagnosis (adjusted odds ratio = 1.58, 95% CI = 1.48–1.69), as compared with residents of residential continuing care facilities. We also noted a positive association between presence of other neuropsychiatric conditions and no dementia diagnoses, such as schizophrenia (adjusted odds ratio = 1.43, 95% CI = 1.22–1.69) and depression (adjusted odds ratio = 1.23, 95% CI = 1.16–1.29). This positive association was also significant among residents with other health problems, most notably, diabetes mellitus (adjusted odds ratio = 1.32, 95% CI = 1.26–1.40) and hearing problems (adjusted odds ratio = 1.06, 95% CI = 1.01–1.10) (Table 4).

Discussion

Dementia has been defined as a global deterioration of cognitive function that impairs an individual's ability to perform activities of daily living (Magsi and Mallory, 2005). Our findings reveal that a large number of institutional care facility residents who had no records of dementia were cognitively impaired. Among them, 36% were mildly or moderately impaired, and 12% were severely impaired. Although moderate to severe CI is not synonymous with dementia, cognitive function scales have been shown to be an effective screening tool (Folstein *et al.*, 1975). To mitigate the concern of depending solely on cognitive function, our study incorporated two factors to identify potentially undetected dementia: (i) those with moderately severe to very severe impairment (CPS score ≥ 4); and (ii) those who required extensive assistance in ADL performance including those who were totally dependent on others (ADL score ≥ 3). Using this definition, we found that the prevalence of potentially undiagnosed dementia was quite high. Overall, 28,078 of the 242,957 "dementia-free" residents (11.6%) were found to have severe CI and were unable to perform
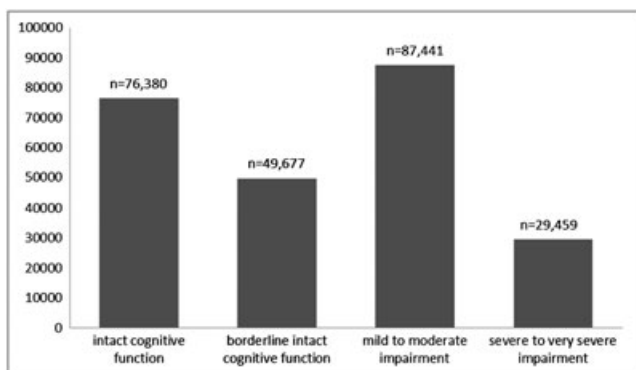

Figure 1 Distribution of cognitive function impairment among residents without dementia diagnosis.
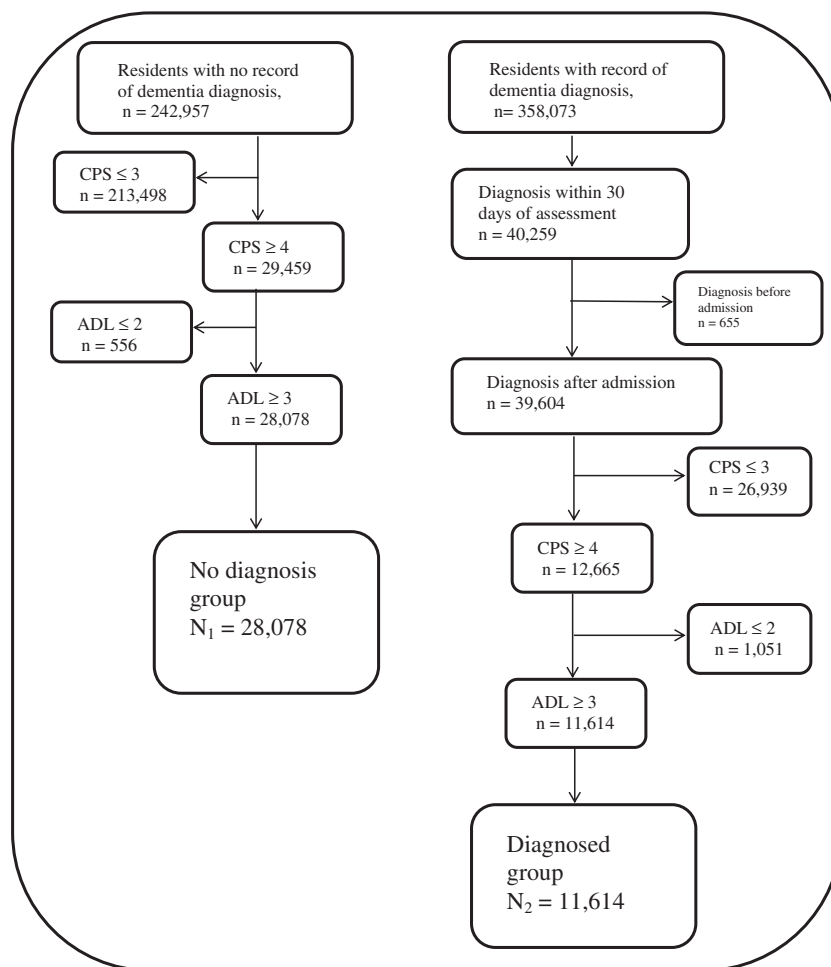
Figure 2 Inclusion process for study participants by dementia diagnosis. CPS, Cognitive Performance Scale; ADL, activity of daily living.

ADLs without extensive assistance. Although these are not definitive diagnosis, our results suggest that there may be a high degree of undetected dementia. It is worthwhile to point out that our cut-points for case selection were relatively high (CPS score ≥ 4 and ADL score ≥ 3). As a result, it is likely that we captured only the genuine cases and that our result represents an underestimation of the true severity of the problem.

Our multivariable analysis showed that there were many contributing factors to no diagnosis. The most striking finding was that of marital status. In particular, a resident who was never married was twice as likely to have no diagnosis, as compared with those who were ever married. This finding concurs with our current diagnostic practice, which largely relies on clinical suspicions provided by the caregiver (Bradford *et al.*, 2009). The finding is concerning as it suggests that older individuals who lack immediate family, such as spouse and adult children, face a significantly higher risk of being overlooked. Furthermore, admission to hospital-based

facilities, as opposed to residential continuing care facilities, also increases the odds of no diagnosis by 34%. By all accounts, hospital-based residents are the most vulnerable individuals as they likely suffer from other physical ailments in addition to cognitive decline. Taken together, these findings suggest that an individual's social network may play an important role in dementia diagnosis, as residential continuing care facilities generally provide more opportunities for socialization among staff, residents, and their families.

Our study also examined the role of comorbidity in dementia diagnosis. Major psychiatric conditions appeared to hinder the diagnosis of dementia. In particular, residents with depression and schizophrenia were less likely to have a diagnosis. This observation may be the result of the resident's decline in cognitive function being dismissed as their psychiatric problems. Schizophrenia and frontotemporal dementia are easily confused as both conditions lead to cognitive disorders, executive impairments, and global functional

Table 3 Descriptive statistics by dementia diagnosis

	No diagnosis group $n = 28,078$ (95% CI)	Diagnosed group $n = 11,614$, (95% CI)	p-value
Age in years, mean (SD)	77.0 (15.5)	83.8 (8.8)	0.0001
Sex, %male	36.4% (35.8%, 37.0%)	31.8% (31.0%, 32.6%)	0.0001
Marital status			
Never married	20.1% (19.6%, 20.6%)	5.8% (5.4%, 6.2%)	0.0001
Married	30.0% (29.5%, 30.5%)	34.3% (33.4%, 35.2%)	
Widowed	42.4% (41.8%, 43.0%)	54.1% (53.2%, 55.0%)	
Others	7.5% (7.2%, 7.8%)	5.8% (5.4%, 6.2%)	
Family income (quintile)			
I	26.0% (25.5%, 26.5%)	23.9% (23.1%, 24.7%)	0.0001
II	21.6% (21.1%, 22.1%)	20.6% (19.9%, 21.3%)	
III	19.9% (19.4%20.4%)	20.6% (19.9%, 21.3%)	
IV	17.6% (17.2%, 18.0%)	17.7% (17.0%, 18.4%)	
V	14.9% (14.55, 15.3%)	17.2% (16.5%, 17.9%)	
Facilities			
Hospital-based	21.0% (20.5%, 21.5%)	14.9% (14.3%, 15.5%)	0.0001
Residential-based	79.0% (78.5%, 79.5%)	85.1% (84.5%, 85.7%)	
Parkinson's disease, %yes	7.9% (7.6%, 8.2%)	8.3% (7.8%, 8.8%)	0.17
Anxiety disorder, %yes	6.1% (5.8%, 6.4%)	6.3% (5.9%, 6.7%)	0.31
Depression, %yes	27.2% (26.7%, 27.7%)	23.7% (22.9%, 24.5%)	0.0001
Schizophrenia, %yes	3.7% (3.55, 3.9%)	1.6% (1.4%, 1.8%)	0.0001
Diabetes mellitus, %yes	26.4% (25.9%, 26.9%)	22.1% (21.3%, 22.9%)	0.0001
Arthritis, %yes	24.3% (23.8%, 24.8%)	31.2% (30.4%, 32.0%)	0.0001
Adequate vision, %yes	43.8% (43.2%, 44.4%)	41.2% (40.3%, 42.1%)	0.0001
Adequate hearing, %yes	62.5% (61.9%, 63.1%)	57.2% (56.3%, 58.1%)	0.0001
Index of social engagement			
0	34.0% (33.4%, 34.6%)	35.5% (34.6%, 36.4%)	0.0001
1	21.7% (21.2%, 22.2%)	22.1% (21.3%, 22.9%)	
2	16.7% (16.3%, 17.1%)	16.5% (15.8%, 17.2%)	
3	12.6% (12.2%, 13.0%)	12.9% (12.3%, 13.5%)	
4	7.9% (7.6%, 8.2%)	6.6% (613%, 7.1%)	
5	3.8% (3.6%, 4.0%)	3.0% (2.7%, 3.3%)	
6	3.3% (3.1%, 3.5%)	3.4% (3.1, 3.7%)	

Table 4 Adjusted odds ratios (95% confidence interval) for potentially undetected diagnosis

	Adjusted odds ratio[1] (95% CI)	p-value
Age (years)	0.97 (0.96, 0.97)	0.001
Sex	0.98 (0.97, 1.08)	0.391
Marital status		0.001
Never married versus ever married	2.10 (1.91, 2.29)	
Family income	0.97 (0.96, 0.99)	0.001
Types of facilities		
Hospital-based versus residential-based	1.58 (1.48, 1.69)	0.001
Schizophrenia	1.43 (1.22, 1.69)	0.001
Depression	1.23 (1.16, 1.29)	0.001
Diabetes mellitus	1.32 (1.26, 1.40)	0.001
Arthritis	0.92 (0.88, 0.97)	0.002
Index of social engagement	1.05 (1.04, 1.07)	0.001
Vision problems	1.02 (0.97, 1.07)	0.562
Hearing problems	1.06 (1.01, 1.10)	0.016
Length of time since admission	1.09 (1.08, 1.10)	0.001

CI, confidence interval.
[1]Odds ratios adjusted for all other variables included in the table.

impairment (Sanders et al., 2012; Wadsworth et al, 2012). Indeed, there have been documented cases where individuals who are later diagnosed with frontotemporal dementia were initially misdiagnosed as being schizophrenic (Gourzis et al., 2012).

Our study also revealed a rather novel finding where residents with diabetes mellitus were less likely to have a dementia diagnosis. This finding is in agreement with Chodosh et al. (2004), where the authors found that physicians were less likely

to identify dementia in patients with a prior hospitalization for major chronic conditions such as myocardial infarction and cancer. Vision and hearing problems also appeared to have an effect on diagnoses, although the associations were quite small and nonsignificant for vision problems. One explanation may lie in the issues of communication between the affected individual and their physician. There is evidence to suggest that physicians are less inclined to disclose a dementia diagnosis if they perceive the patient as having a low level of comprehension (Cahill *et al*., 2006).

Conclusions

Given that age is one of the most significant risk factors for developing dementia (Brookmeyer *et al*., 2007), it is not unreasonable to assume that a number of residents will develop the condition during their stay at an institutional care facility. When the condition develops after they become residents, our findings suggest that a significant decline in cognitive function is often overlooked. Our results demonstrate that a large number of institutional care facility residents who had poor cognitive function and inadequate ADL ability did not have dementia diagnoses. Failure to diagnose is likely the result of a complex web of contributing factors. Although neglect and lack of expertise among institution staff conceivably play a part, an individual's reluctance to get screened also contributes to the problem. The latter may stem from the stigmatization of a dementia label and the social changes that such a diagnosis can bring (Boustani *et al*., 2008; Garand *et al*., 2009). Our study identifies several factors that appear to be correlated with potentially undetected dementia. Together, these concerns must be addressed collectively through better training and education, elimination of stigma, and a better coordinated network of support systems. As diagnosis is a gateway for care and treatment, it is vital to increase the recognition of CI and dementia so as to ensure optimal care for these vulnerable individuals.

Key points

- A large number of institutional care facility residents who had poor cognitive function and inadequate ADL ability did not have dementia diagnoses on record.

- Contribution to undetection appeared to be multifactorial, involving both social and comorbid conditions.

Conflict of interest

None declared.

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