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Estimates of the Prevalence of Acute Stroke Impairments and Disability in a Multiethnic Population

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Background and Purpose—The goals of the present study were to estimate the prevalence of acute impairments and disability in a multiethnic population of first-ever stroke and to identify differences in impairment and early disability between pathological and Bamford subtypes. Associations between impairments and death and disability at 3 months were identifed.

Methods—Impairments that occur at the time of maximum neurological deficit were recorded, and disability according to the Barthel Index (BI) was assessed 1 week and 3 months after stroke in patients in the South London Stroke Register.

Results—Of 1259 registered patients, 6% had 1 or 2, 31.1% had 3 to 5, 50.6% had 6 to 10, and 10.6% had >10 impairments. Common impairments were weakness (upper limb, 77.4%), urinary incontinence (48.2%), impaired consciousness (44.7%), dysphagia (44.7%), and impaired cognition (43.9%). Patients with total anterior circulation infarcts had the highest age-adjusted prevalence of weakness, dysphagia, urinary incontinence, cognitive impairment, and disability. Patients with subarachnoid hemorrhage had the highest rates of coma. Patients with lacunar stroke had the high prevalence of weakness but were least affected by disability, incontinence, and cognitive dysfunction. Blacks had higher age- and sex-adjusted rates of disability in ischemic stroke (BI <20, odds ratio 2.76, 95% CI 1.47 to 5.21, $P=0.002$; BI <15, odds ratio 1.8, 95% CI 1.45 to 2.81, $P=0.01$) but impairment rates similar to those of whites. On multivariable analysis, incontinence, coma, dysphagia, cognitive impairment, and gaze paresis were independently associated with severe disability (BI <10) and death at 3 months.

Conclusions—The extent of these findings indicates that an acute assessment of impairments and disability is necessary to determine the appropriate nursing and rehabilitation needs of patients with stroke. (*Stroke*. 2001;32:1279-1284.)

The impact of stroke on an individual or a population is best examined with the World Health Organization scheme of classification of impairment, activities (disability), and participation (handicap).[1,2] Selected impairments caused by stroke, such as limb weakness, cognitive dysfunction, and impairment of language and spatial perception, have been studied extensively, and there are data on incidence, recovery, and associated demographic factors and outcome. However, in most studies, hospital cohorts were used,[3,4] and a single impairment was examined in isolation.[5–7]

Community-based studies[5,8–10] that determine all cases of stroke in a defined population have the advantage over hospital studies of including mild strokes and of recording all available clinical information on early deaths, providing better estimates of the prevalence of impairments. However, previous community studies have included recurrent strokes,[5,9,10] and the relationship between the impairment and first-in-a-lifetime stroke is not clear.

Few studies of impairments have distinguished between pathological stroke subtypes,[5,7,11] or only 1 subtype has been examined.[12–14] There are no published data on the prevalence of acute impairments for the Bamford classification of ischemic stroke,[15] which is commonly used in clinical practice.

Data on the impact of stroke on black and white ethnic groups in terms of impairments and disability are limited to hospital series in the United States[14,16–21]; to date, there is no conclusive view on whether significant ethnic differences exist.

This lack of consensus could be due to methodological problems with previous studies. Some studies had highly selected cohorts[14,17] or retrospective series.[16] Patients with previous stroke have been included in all previous studies, thereby assuming that recurrence rates are equal between ethnic groups. A further assumption has been that access to health care was equal among ethnic groups.[21]

The objectives of this community-based prospective study were to estimate the overall prevalence of acute impairments and disability in a multiethnic population of first-ever stroke and to determine differences in the prevalence of impairments

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and early disability for pathological and Bamford stroke subtypes. In addition, we determined which acute impairments were associated with severe disability and death at 3 months after stroke.

Subjects and Methods

In the present study, we used data collected by the South London Stroke Register (SLSR) of strokes that occurred between January 1, 1995, and December 31, 1998. The SLSR is an ongoing population-based study of first-ever stroke in persons of all ages. The annual incidence of stroke in this population is 1.3 per 1000.[22] A recent study of variations in stroke incidence found this rate to be comparable to that of other European populations.[23]

The methodology of the register has been described in detail elsewhere[22]; briefly, all first-in-a-lifetime strokes, for persons of all ages, in an area of South London that corresponds to the area of the Lambeth, Southwark and Lewisham Health Authority were registered. To ensure complete case ascertainment, 12 sources of notifications of stroke were identified. Hospital surveillance of admitted stroke cases included 2 hospitals inside and 3 outside the study area. Community surveillance of stroke included all patients under the care of all general practitioners within and on the borders of the study area (n=147).

Stroke was defined clinically according to the World Health Organization criteria,[24] and pathological subtype classification was confirmed by CT or MRI or at post mortem. Subtypes that were included are ischemic, primary intracerebral hemorrhage (PICH), and subarachnoid hemorrhage (SAH). Ischemic strokes were classified according to the Bamford classification, which classifies cerebral infarcts according to vascular territory using clinical features to determine the size and site of infarct. These subtypes are total anterior circulation infarcts (TACIs), partial anterior circulation infarcts (PACIs), posterior circulation infarcts (POCIs), and lacunar infarcts (LACIs).[15]

All patients alive at the time of notification to the register, except for 6 patients who could not be traced (1021 of 1259, or 81%), were examined by an SLSR physician (E.L., J.S., A.R.). Eight hundred six (80%) patients were seen within 3 weeks of stroke. No patient refused assessment. Impairments found at the time of maximum neurological deficit were recorded. Supplementary data from medical notes were used for patients whose deficits had improved or resolved by the time of interview with the register physician. All details regarding impairment were taken from medical notes for patients who had died before notification to the register. Disability was assessed with the Barthel Index (BI)[25] at 1 week and 3 months after stroke. The register was informed of all patient deaths by the Office for National Statistics. Stroke survivors were followed up at 3 months after the stroke and then annually.

Conscious level was assessed using the Glasgow Coma Scale (GCS).[26] Impaired consciousness was defined as a GCS score of <15, and coma was defined as a score of ≤8. Those who died immediately after the stroke were given a GCS score of 3.

Cognitive impairment was measured with the Mini-Mental State Examination (MMSE),[27] and cognitive impairment was defined as a score of ≤23.[28] Gaze paresis was identified when there was a failure of conjugate gaze toward the side of limb weakness. Visual field defect and visual neglect were identified through patient confrontation. Water swallowing test[29] was undertaken by alert patients, and drowsy patients were classified as having failed the swallow test. Dysarthria was identified by any disturbance in the motor control of speech. Sensory inattention was tested through the simultaneous stimulation of both limbs. Aphasia was identified if there was a deficit of comprehension, ability to name objects, ability to repeat, spontaneous writing, and reading of a command out loud. Ataxia was assessed by examining the limbs and the patient's gait. Urinary incontinence was defined as any episode of urinary incontinence up to the time of assessment.

Ethical approval for this study was given by St Thomas' Hospital Research Ethics Committee at Guy's and St Thomas' Hospital Trust.

Statistical Analysis

Demographic and clinical characteristics of the population were analyzed by ethnic group using the χ^2 test.

Percent prevalence rates of impairment and disability for pathological and Bamford subtypes were adjusted for age. Unclassified strokes were excluded from this analysis.

The association between ethnicity and acute impairment was analyzed separately for cerebral infarcts, PICH, and SAH using logistic regression to adjust for age and sex. Analysis of ethnic differences in impairment by Bamford subtype was not possible because of the small number of black subjects. Subjects who could not be classified as white or black (58 Indian, Pakistani, Bangladeshi, and Chinese subjects) were excluded from this analysis.

The relationship between acute impairments and poor outcome at 3 months after the stroke was examined with multivariable logistic modeling. The dependent variable was a combination of death or severe disability (BI <10) by 3 months, and acute impairments, age, sex, and ethnic group were independent variables.

Results

Patient Characteristics

Table 1 describes the sociodemographic, risk factor, and stroke subtype characteristics of the patients by ethnic group and for all patients. Of the1259 patients in the study, 864 (69.01%) had cerebral infarcts, 170 (13.58%) had PICH, 77 (6.15%) had SAH, and 148 (11.76%) had unclassified strokes. The mean age was 71.7 years (range 12 to 106 years), and 569 (51.4%) were women. One thousand twenty-seven (81.6%) patients were alive at the time of notification to the register, and 202 (16%) patients were not admitted to the hospital.

Black subjects were younger and had significantly better prestroke function, with 19.1% of patients having a BI of <20 compared with 28.2% of whites (P=0.024).

Prevalence of Acute Impairments

Table 2 refers to the prevalence of acute impairments in this first-ever stroke population and the proportion of patients who could not be assessed for impairment. The most common impairments in the population were limb weakness, urinary incontinence, dysphagia, impaired consciousness, and cognitive impairment. The impairment with the highest rate of nonassessment was cognitive dysfunction (33.6%). One hundred twenty (30%) of nonresponders had a GCS of ≤8, 122 (30.5%) were registered 3 months after the stroke, and 132 (33%) were dysphasic; for 26 (6.5%), there were other reasons.

The mean number of impairments per patient was 6.5 (SD 2.95). There was no information on impairments for 21 (1.7%) patients; 15 of these subjects had died early after the stroke and clinical notes were unobtainable, and the other 6 could not be traced and had not registered with a general practitioner. All other register patients had ≥1 impairment. Seventy-five (6.0%) had 1 or 2, 393 (31.1%) had 3 to 5, 637 (50.6%) had 6 to 10, and 133 (10.6%) had >10 impairments. The highest number of impairments was 14, and that occurred in 6 patients.

Acute Impairments and Bamford Stroke Subtypes

Table 3 reports the age-adjusted prevalence rates of impairment for each pathological and Bamford subtype. Patients with TACIs showed the worst acute impairment

TABLE 1.   Demographic and Clinical Characteristics by Ethnic Group and for All Patients

Characteristic	White (n=997)	Black (n=204)	Other (n=58)	Total (n=1259)	P
Mean age (SD)	73.9 (13.2)	62.7 (15.4)	66.7 (13.1)	71.7 (14.2)	<0.0001
Female	530 (53.2)	93 (45.6)	25 (43.1)	648 (51.4)	0.061
Not hospitalized	168 (16.9)	23 (11.3)	11 (19.0)	202 (16.0)	0.117
Dead on notification to register	189 (18.9)	32 (15.7)	11 (18.9)	232 (18.4)	0.544
Employment: manual work	535 (53.7)	146 (71.6)	24 (41.4)	705 (56.0)	<0.0001
Prestroke BI <20	281 (28.2)	39 (19.1)	9 (15.5)	329 (26.0)	0.024
Hypertension	513 (51)	134 (65.7)	24 (46.2)	671 (53.3)	<0.0001
Ischemic heart disease	248 (24.9)	29 (14.2)	11 (21.2)	288 (22.9)	0.004
Diabetes	110 (11.0)	60 (29.4)	21 (36.2)	191 (15.2)	<0.0001
Smoke	308 (30.9)	47 (23.0)	13 (22.4)	368 (29.2)	<0.0001
Pathological subtype					<0.0001
All infarcts	697 (69.9)	133 (65.2)	34 (58.6)	864 (69.0)	
Lacunar	225 (22.6)	48 (23.5)	10 (17.2)	283 (22.4)	
PICH	115 (11.5)	38 (18.6)	17 (29.3)	170 (13.6)	
SAH	52 (5.3)	22 (10.8)	3 (5.2)	77 (6.15)	
Unclassified	133 (13.3)	11 (5.4)	4 (6.9)	148 (11.8)	

Values are n (%) unless otherwise specified.

and disability profile. However, patients with SAH and intracerebral hemorrhage had more impaired consciousness and coma, and SAH was associated with the highest age-adjusted prevalence of gaze paresis. Patients with lacunar strokes had a high prevalence of limb weakness but were least affected by disability, incontinence, and cognitive dysfunction.

Ethic Differences in Impairment and Disability in Pathological Subtypes

There was no difference in the mean number of impairments in black (6.49, SD 2.87) and white (6.52, SD 2.96) patients (age- and sex-adjusted P value=0.700). Logistic regression analysis of acute impairments in black and white ethnic groups with ischemic stroke adjusted for age and sex showed that blacks had significantly more mild to moderate disability than did whites (BI <20, OR 2.76, 95% CI 1.47 to 5.21, P=0.002; BI <15, OR 1.8, 95% CI 1.45 to 2.81, P=0.01), but there was no ethnic difference in severe disability (BI <10, OR 1.09, 95% CI 0.72 to 1.62, P=0.684). Blacks had an excess of leg weakness, but this was a weak association (OR 1.56, 95% CI 0.96 to 2.52, P=0.072).

There was significantly less urinary catheterization in blacks than in whites (OR 0.53, 95% CI 0.33 to 0.86, P=0.011). Analysis for associations between acute impairments and ethnic groups in intracerebral hemorrhage showed that blacks had significantly more dysarthria (OR 3.4, 95% CI 1.4 to 10.1, P=0.027). There was less urinary incontinence (OR 0.69, 95% CI 0.28 to 1.7, P=0.44) and impaired consciousness (OR 0.56, 95% CI 0.22 to 1.43, P=0.8) in blacks than in whites, but these differences were not significant. There were no significant ethnic differences in acute impairments for SAH, but this may be related to the small number of patients who were studied.

TABLE 2.   Prevalence of Acute Impairments and Disability in First-in-a-Lifetime Stroke for 1259 Patients

Impairment	n	%	Unable to Assess, n (%)
Gaze paresis*	219	18.4	142 (11.9)
Visual field defect	328	26.1	271 (21.5)
Visual neglect	249	19.8	298 (23.7)
Sensory inattention*	231	19.4	393 (33.1)
Upper limb motor deficit	975	77.4	39 (3.1)
Lower limb motor deficit	911	72.4	39 (3.1)
Ataxia	91	7.23	316 (25.1)
Upper limb sensory deficit	381	30.3	255 (20.3)
Lower limb sensory deficit	342	27.2	254 (20.2)
Dysphagia	563	44.7	91 (7.2)
Dysarthria*	494	41.5	280 (23.5)
Dysphasia	290	23.0	206 (16.4)
Urinary incontinence	607	48.2	80 (6.4)
Urinary catheterisation*	427	35.9	62 (5.2)
MMSE <24*	522	43.9	400 (33.6)
GCS <15	563	44.7	34 (2.7)
GCS <9	235	18.7	34 (2.7)
BI <20†	835	79.4	48 (4.6)
BI <15†	680	64.7	48 (4.6)
BI <10†	512	51.1	48 (4.6)

*For gaze paresis, sensory inattention, dysarthria, urinary catheterisation, and MMSE were not assessed for 70 patients.

†For BI, 208 died by day 7.

Acute Impairments and Severe Disability or Death at 3 Months After Stroke

Table 4 reports the logistic regression analysis of impairments that are associated with severe disability (BI <10) and

TABLE 3. Age-Adjusted Prevalence Rates of Impairment and Disability by Pathological and Bamford Subtype of Stroke

Impairment	TACI n=189	PACI n=250	POCI n=142	LACI n=283	PICH n=170	SAH n=77
Gaze paresis	42 (35–50)	7 (4–11)	25 (17–32)	4 (1–7)	29 (21–37)	46 (37–65)
Visual field defect	94 (90–98)	21 (16–26)	32 (24–39)	...	35 (26–44)	25 (0–54)
Visual neglect	67 (59–74)	25 (19–31)	17 (11–24)	...	31 (22–39)	48 (40–56)
Sensory inattention*	91 (86–97)	35 (29–42)	18 (11–25)	...	33 (23–42)	38 (38–38)
Upper limb motor deficit	100	78 (73–83)	54 (46–62)	88 (85–92)	79 (73–86)	66 (53–79)
Lower limb motor deficit	99 (98–100)	63 (57–69)	50 (42–58)	84 (80–89)	76 (69–82)	66 (53–79)
Upper limb sensory deficit	72 (65–79)	38 (31–44)	22 (15–29)	33 (28–38)	39 (31–48)	32 (9–55)
Lower limb sensory deficit	68 (60–75)	34 (28–41)	21 (14–28)	27 (21–32)	36 (28–44)	32 (9–55)
Dysphagia	81 (75–86)	33 (28–39)	34 (26–41)	26 (20–31)	62 (54–70)	68 (56–81)
Dysarthria*	85 (78–91)	49 (42–55)	44 (35–53)	54 (48–60)	54 (45–64)	5 (0–12)
Dysphasia	51 (43–58)	45 (38–51)	10 (5–15)	...	29 (21–37)	25 (0–53)
Urinary incontinence	87 (82–92)	37 (31–43)	38 (30–45)	25 (20–30)	70 (63–78)	71 (57–85)
Urinary catheterisation*	66 (60–73)	22 (16–27)	25 (18–33)	12 (8–15)	52 (44–60)	61 (46–77)
MMSE <24*	89 (84–95)	64 (58–71)	51 (41–60)	50 (44–56)	78 (70–86)	85 (72–99)
GCS <15	69 (63–75)	37 (31–43)	35 (27–42)	15 (11–19)	63 (55–70)	82 (70–93)
GCS <9	23 (17–28)	3 (1–5)	12 (7–18)	3 (1–6)	36 (29–43)	67 (55–80)
7-d BI <20†	100	80 (74–85)	77 (70–84)	73 (68–78)	96 (93–99)	94 (92–97)
7-d BI <15†	95 (93–98)	59 (53–66)	54 (46–62)	50 (44–56)	87 (81–92)	90 (83–97)
7-d BI <10†	90 (85–94)	35 (29–41)	36 (27–44)	32 (27–38)	70 (62–78)	76 (59–95)

Values are % (95% CI).
*For gaze paresis, sensory inattention, dysarthria, urinary catheterisation and MMSE were not assessed for 70 patients.
†For BI, 208 died by day 7.

death by 3 months with controlling for age, sex, and ethnic group. Gaze paresis, dysphagia, cognitive impairment (MMSE <24), urinary incontinence, and coma were independently associated with death and severe disability at 3 months.

TABLE 4. Logistic Regression to Determine the Acute Impairments Associated With Severe Disability or Death at 3 Months, Adjusted for Age, Sex, and Ethnic Group

Impairment	Odds Ratio	95% CI	P
Gaze paresis	2.01	1.21–3.32	0.001
Visual field defect	0.97	0.58–1.64	0.923
Visual neglect	0.93	0.54–1.59	0.846
Sensory neglect	1.7	0.99–2.92	0.052
Dysphasia	0.71	0.46–1.09	0.123
Upper limb sensory deficit	0.55	0.22–1.37	0.200
Lower limb sensory deficit	1.90	0.79–4.99	0.143
Upper limb motor deficit	1.06	0.51–2.17	0.870
Lower limb motor deficit	1.62	0.81–3.25	0.173
Ataxia	0.53	0.28–1.00	0.053
Dysphagia	2.48	1.61–3.80	<0.0001
Dysarthria	1.30	0.85–1.90	0.221
GCS 15	1.0	...	<0.0001
GCS 14–9	1.72	0.96–3.07	...
GCS <9	3.45	1.67–7.1	...
MMSE <24	2.28	1.41–3.70	0.001
Urinary incontinence	2.73	1.81–4.12	<0.0001

Discussion

This is the first population-based study to estimate the prevalence of the full range of acute stroke impairments and to compare the frequency of impairments between pathological and Bamford ischemic stroke subtypes.

Common impairments that were identified were limb weakness, urinary incontinence, dysphagia, impaired consciousness, and cognitive impairment. This study found upper limb weakness in 77% of patients and lower limb weakness in 72%. Previous studies also found motor deficit to be the most common impairment in stroke patients, with more upper limb than lower limb weakness.[8,30]

Hospital-based registers reported a prevalence rate of 83% to 90%,[4,31] and community registers[8,9,30] reported rates of 50% to 83%. A comparison of motor weakness in stroke subtypes showed a significantly higher prevalence of weakness in TACIs and LACIs compared with other Bamford and pathological subtypes. LACIs, however, were associated with the lowest rates of disability and incontinence. This indicates that the role of motor impairment in disability can be overstated, and cortical deficits, consciousness, and cognitive deficits contribute significantly to the acute disability found in TACIs and hemorrhagic strokes.

The prevalence of urinary incontinence for this population was 50%. A review by Brittain et al[32] found the prevalence of urinary incontinence ranged from 32% to 79% in predominantly hospital-based studies. Studies with higher rates of incontinence (69% to 79%) excluded younger patients.

Patients with TACIs and hemorrhagic strokes had the highest age-adjusted rates of incontinence, indicating that incontinence is determined by lesion severity and size.

Dysphagia was found in 45%; prevalence rates of 28% to 51% have been reported. However, previous studies have been conducted with highly selected patients and the exclusion of all except conscious patients[30,33] and those who presented within a few hours of stroke in studies of recovery.[7,30,33]

Dysphagia was more prevalent in large lesions such as TACIs and hemorrhagic strokes than in LACIs or POCIs.

Impaired consciousness was found in 45% of patients, and prevalence rates of 16% to 41% have been quoted in previous studies.[3,4,8,9,34] This wide range reflects the use of different definitions of consciousness and the case mix of the cohorts. Coma rates were highest in patients with SAH, and this was the only impairment that was more prevalent in PICH than TACI. This agrees with the Lausanne register[4] that coma after stroke first indicates hemorrhage and then a middle cerebral artery territory infarct.

Just under half of the patients had cognitive impairment (MMSE <24). Previous studies of acute cognition assessed orientation with a prevalence range of 14% to 40.7%.[5,6,35] The present study had the highest rate of cognitive dysfunction even though one third of the patients could not be assessed because of coma, aphasia, or late registration. The high level of cognitive deficit found in this cohort could be related to the greater challenge of completing the full MMSE assessment compared with orientation subscores. The MMSE also is sensitive to level of educational attainment, which will vary between cohorts. Nevertheless, an MMSE score of <24 was independently associated with severe disability and death by 3 months. The assessment rate of cognition is favorable compared with other population-based studies, with only one third of possible subjects assessed by Wade et al[5] and 65% of subjects assessed in the Copenhagen Stroke Study.[6]

Estimation of the prevalence of acute clinical impairments depended entirely on the use of retrospective data in 18.4% of the cohort, who were dead on notification. Incomplete recording of the neurological examination was the most common problem encountered in the use of medical notes. The examination findings of the most senior or expert clinician were used to ensure reliability of data.

Patients with TACI had the highest age-adjusted rates of early disability, followed by patients with SAH, PICH, PACI, POCI, and LACI. Bamford et al[15] found that for degree of dependency at 30 days, TACI was associated with the highest rate, followed by PACI, LACI, and POCI. A study of stroke complications and dependency at discharge in Bamford subtypes observed that hemorrhagic strokes had the worst outlook and TACIs the worst outlook among infarcts.[36] In the present study, the only impairment more prevalent in patients with PICH than with TACI was coma. The increased severity of stroke in patients with TACIs compared with other subtypes relates to the size of infarct. Included in the PICH and SAH groups were patients with lobar and grade 1 and 2 Hunt Hess, respectively, which lowered the levels of impairment and disability in these groups.

Ethnic differences in impairment and disability were determined for pathological subtypes. In ischemic stroke, blacks were significantly less likely to be independent (BI <20) and were more mildly disabled (BI <15) at 7 days compared with whites, but there were no differences in severe disability (BI <10) or acute impairments. This difference in functional ability was also found by Horner et al,[14] who showed the median BI was significantly worse in blacks initially after stroke, but the difference was no longer present at 90 days. Reasons for an excess of early disability in blacks with ischemic stroke are unclear. Black subjects were younger and more independent before stroke and had stroke severity similar to that of whites. Ethnic differences in the frequency of ischemic subtypes have been suggested,[14,16,37] but this was not found in our cohort. Jones et al[17] found a small but significant ethnic difference in stroke severity in men and suggested that the major determinants of ethnic difference in stroke outcome could include poorly controlled risk factors after stroke as hyperglycemia and hypertension in blacks. Future research must establish the determinants of disability in the black stroke population.

Urinary incontinence, dysphagia, and cognitive impairment, which affected almost half of the stroke population, were independently associated with severe disability and death at 3 months. Coma and gaze paresis were also associated with poor 3-month outcome. The prognostic importance of these acute impairments in the short- and intermediate-term interval after stroke is well established.[13,32–34,38–43] However, association between acute impairments and poor outcome could reflect the association between impairment and large lesion size or overall stroke severity rather than a detrimental effect of the impairment itself. This study did not look at lesion size on CT or MRI, which could relate to prognostic impairments and outcome.

Neither motor impairment nor cortical deficits were independently associated with severe disability and death at 3 months in this analysis. Severe paralysis is known to be associated with poor outcome,[39] and our model included any limb weakness. However, Allen[43] found that hemiplegia on its own was associated with return to functional independence, whereas hemiplegia with cortical deficits was associated with disability and death at 2 months. Good functional outcome and low mortality rates reported in partial anterior circulation, posterior circulation, and lacunar syndromes[15] are evidence that motor deficit, ataxia, and individual cortical impairments are unlikely to have independent adverse effects on outcome.

The present study determined that acute impairments of motor deficit, urinary incontinence, dysphagia, impaired consciousness, cognitive dysfunction, and cortical deficits were highly prevalent in a complete stroke population. Of the most common impairments, incontinence, dysphagia, and cognitive dysfunction independently predicted poor outcome at 3 months.

Differences were found in the acute impairment and disability profiles of pathological and Bamford subtypes and ethnic groups. The extent of these findings indicates that acute assessment of impairments and disability is necessary to determine the appropriate nursing and rehabilitation needs

of stroke patients. A recent retrospective audit of case notes of stroke patients in hospitals in the United Kingdom found assessment of acute impairments completely inadequate, with screening for swallowing disorders in only 55% of patients and cognitive dysfunction in 23%.[44]

Comprehensive assessment of acute impairments and disability after stroke is the starting point for providing good-quality care appropriate to a patient's requirements.

Acknowledgments

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