TITLE: Balance and Gait After First Minor Ischemic Stroke in People 70 Years of Age or Younger: A Prospective Observational Cohort Study

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Background. Two-thirds of patients with stroke experience only mild impairments in the acute phase, and the proportion of patients < 70 years is increasing. Knowledge about balance and gait and predictive factors are scarce for this group.

Objective. The objective of this study was to explore balance and gait in the acute phase and after 3 and 12 months in patients ≤70 years with minor ischemic stroke (National Institute of Health Stroke Scale (NIHSS) score ≤3). This study also explored factors predicting impaired balance after 12 months.

Design. This study was designed as an explorative longitudinal cohort study.

Methods. Patients were recruited consecutively from two stroke units. Balance and gait were assessed with the Mini-BESTest, Timed Up and Go (TUG), and preferred gait speed. Predictors for impaired balance were explored using logistic regression.

Results. This study included 101 patients. Mean (SD) age was 55.5 (11.4) years, 20% were female and mean (SD) NIHSS score was 0.6 (0.9) points. The Mini-BESTest, gait speed, and TUG improved significantly from the acute phase to 3 months, gait speed also improved from 3 to 12 months. At 12 months, 26% had balance impairments and 33% walked slower than 1.0 m/s. Poor balance in the acute phase (odds ratio =0.92, 95% CI = 0.85 – 0.95) was the only predictor of balance impairments (Mini-BESTest score ≤ 22) at 12 months post-stroke.

Limitations. Limitations include lack of information about pre-stroke balance and gait impairment, and post-stroke exercise. Few women limits the generalizability.

Conclusion. This study observed improvements in both balance and gait during the follow-up, still about one third had balance or gait impairments at 12 months post-stroke. Balance in the acute phase predicted impaired balance at 12 months.

Stroke is a major health challenge. It is the second most common cause of death and the third most common cause of disability worldwide.[1] Traditionally, stroke has been a disease of old age; however, in the last two decades, the proportion of affected younger people has increased.[1-3] Because of the positive effect of new treatments (e.g., prophylactic interventions, stroke units, reperfusion therapy), outcomes after stroke have improved in recent years.[4,5] Today, approximately two-thirds of patients admitted to a stroke unit experience only mild deficits.[6,7] Despite better outcomes, many patients still report reduced function in different areas, such as physical, cognitive and emotional limitations, which can affect everyday function.[8-11] For persons of working age (i.e. 18 - 70 years old), such mild impairments after stroke can reduce the ability to return to work[12,13] and hinder participation in family and societal life.[14-16]

There is no uniform definition of a mild stroke.[17] A commonly assessment tool is the National Institute of Health Stroke Scale (NIHSS),[18] and a NIHSS score from 0 up to 3 to 5 points (max 42) has been described as indicative of a mild stroke.[17] However, not every stroke sign is captured using the NIHSS, and balance and gait are among these signs.[19] In addition, after initial screening, current guidelines for stroke rehabilitation and recovery recommend that patients should have a comprehensive assessment of functioning by a multidisciplinary team early after admittance to the stroke unit.[20] One of the physical therapist's tasks in this acute phase is to evaluate the patient's motor impairments, which is of importance for diagnostic as well as prognostic purposes and for planning and tailoring individual rehabilitation.[21] Balance and gait evaluations are considered as key features in this assessment.[22]

In patients with mild stroke, the deficits are in general subtle and may go undetected due to the lack of clear or obvious impairment.[23] This poses a challenge for the physical therapist, as outcome measures included in the current core set of balance tests,[22] such as the Berg Balance Scale, have a ceiling effect in patients with mild impairments after stroke.[24] The authors of the clinical practice guideline for rehabilitation of adults with neurological conditions have acknowledged this ceiling effect and recommended future studies to include the Mini-BESTest and Timed Up and Go.[22]

Previous studies have failed to recruit patients with very mild strokes,[25] and we have found only a few studies related to balance and gait in patients with mild stroke, and none of them focused on patients of working age. One study found balance and gait impairments in patients with mild stroke (n = 12) compared to a healthy control group.[26] Another study of high-functioning patients with stroke (n = 21) reported lower gait speed and deficits in motor control compared to a healthy control group.[27] However, both these studies were cross-sectional and did not provide any information about the trajectory of recovery in the first year after stroke.

Furthermore, patients with mild stroke are often discharged from the stroke unit with very limited follow-up.[28] There is thus a lack of information regarding their long-term prognosis for balance and gait and regarding which factors predict balance impairments after 12 months. Given the reported impairments in balance and gait after mild stroke, these patients may need a more comprehensive assessment in the acute phase, as well as a closer follow-up after discharge.

The primary aim of this study is to describe balance and gait performances in the acute phase and after 3 and 12 months in patients 70 years or younger with first-ever mild ischemic stroke defined by a NIHSS[18] score of ≤ 3.[17] The secondary aim is to explore which patient characteristics in the acute phase can predict impaired balance 12 months post-stroke in the same patients.

[H1] Methods

[H2] Participants and procedure

This observational longitudinal cohort study is part of the study entitled, “Hidden impairments after cerebral stroke” at Oslo University Hospital (OUS). The main study consecutively included 123 patients hospitalized in the acute stroke units of OUS, Ullevål Clinic and Vestre Viken Hospital Trust, Bærum Hospital, from November 2014 to December 2016. Inclusion criteria were age 18 to 70 years (i.e. "working age") and a first-ever mild ischemic stroke (supra- and infratentorial). A mild stroke was defined by a score from 0 to 3 on the NIHSS.[18] To verify an acute stroke with no evidence of prior ischemic infarction or hemorrhage, all patients underwent magnetic resonance imaging (MRI).[29] In addition, the patients had to be able to complete the cognitive tests in Norwegian. Exclusion criteria were cognitive decline prior to the stroke, defined as a score on the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) ≤ 3.2 [30] and history of a new stroke during the first year after being discharged from the stroke unit. A medical doctor was responsible for the inclusion.

Physical therapists working in the two stroke units conducted the assessments at enrollment. Prior to the study, the physical therapists had participated in training sessions where the different scoring possibilities for and the Mini-BESTest were discussed. In addition, they also had access to the Mini-BESTest training video on the bestest.us web site.[31] The balance and gait assessments were conducted as part of the clinical routine in the acute phase and at 3 months (subacute phase), while the assessment at the 12-month follow-up was added for study purposes. All patients gave their written, informed consent before inclusion. The Regional Ethical Committee and the Data Protection Authorities approved the study (reference 2014/1268).

[H2] Outcome measures

[H3] *Sociodemographic characteristics*

Information regarding sex, age, years of education, vascular risk factors, and body mass index (BMI) were collected in the acute ward by interviews, patient records, and physical examinations of the patients. Length of stay was also recorded.

[H3] *Stroke-related instruments*

We used the NIHSS to evaluate severity of stroke impairments and to evaluate whether or not the patient met the inclusion criteria.[18] The NIHSS rates impairments in 11 different functional domains commonly affected in patients with stroke, such as level of consciousness and orientation, facial palsy, motor function in arm and leg, language, and inattention. The NIHSS ranges from 0 to 42 points, where a higher score indicates more severe impairment. To assess cognitive status prior to stroke, the IQCODE was used.[30] The IQCODE is a 16-item questionnaire scored on a 1- to 5-point ordinal scale by a relative or next of kin. The average item score was then calculated, with a score of 3 indicating no change in cognitive function and a higher score indicating a decline in cognitive functioning. We included patients with a score ≤ 3.2 points, which indicates a stable cognitive functioning prior to the stroke.[32] The Mini-Mental State Examination (MMSE) was used to assess cognitive status at the three assessment time points post stroke.[32,33] MMSE is scored from 0 to 30 points based on tasks targeting orientation, attention, calculation, recall, and complex commands. A higher score indicates better cognitive functioning. In addition, the Trail Making Test parts A and B (TMT-A and TMT-B) were applied. TMT-A measures focused attention, visual search, and motor function, and TMT-B measures executive functioning, split attention, visual search, and motor function.[34] The strokes were classified according to the Oxfordshire Community Stroke Project (OCSP) classification scheme, which classified each stroke as a total or a partial anterior circulation infarction (TACI or PACI), a lacunar (LACI), or a posterior infarction (POCI).[35] The OCSP was dichotomized into POCI versus the other areas to highlight any impact from the cerebellar region.

[H3] *Balance and gait assessments*

To measure balance, we used the Mini-Balance Evaluation Systems Test (Mini-BESTest), which focuses on dynamic balance.[36] The Mini-BESTest consists of 14 items divided into four sections: anticipatory postural adjustments, postural responses, sensory orientation, and stability in gait. The items are scored on a 3-point ordinal scale from 0 (severe difficulties) to 2 (normal function), giving a maximum score of 28.

The Mini-BESTest has shown high interrater and test-retest reliability when used in subjects with neurological disease in general[36] as well as in persons with acute or chronic stroke,[37,38] and has shown less ceiling effect when used in samples of patients with subacute stroke than other commonly used balance tests.[39] The test has been translated into a Norwegian version, which also has shown good interrater and test-retest reliability.[40] To describe impaired balance, a score of Mini-BESTest ≤ 22 was used, as this cut off corresponds with self-perceived balance problems.[41] To measure gait speed, patients were instructed to walk at their normal speed from a standing-still position till passing a mark on the floor 6 m away. Time in seconds with one decimal was measured by a hand-held stopwatch, and then the speed in meters per second (m/s) was calculated. The Timed Up and Go (TUG) and the Timed Up and Go-Dual Task (TUG-DT) were conducted as part of the Mini-BESTest.[36] For the TUG, the patients started by sitting in a chair, they were timed to rise from the chair, walk 3 meters at their preferred speed, turn and walk back, and sit down again. TUG-DT was performed the same way as TUG, but with a secondary cognitive task (counting backwards by three) to challenge the patient's attention. Time and accuracy of counting were measured. There were no instructions of which task to prioritize.

[H2] Data analysis

Data are presented as means and standard deviations (SD) for normally distributed variables, as median and interquartile range and/or total range for variables with skewed distribution, and as proportions and percentages for categorical variables. Change over the three test times (i.e., acute phase and 3 and 12 months) for normally distributed variables were explored by using one-way repeated measure ANOVA and for skewed distributed data using the Friedman's test. If the change was statistically significant, we proceeded with pairwise comparisons between each of the test points (i.e., acute phase to 3 months, 3 to 12 months, and acute phase to 12 months) using the Wilcoxon signed-rank test. To allow for multiple comparisons, we applied the Bonferroni correction to these analyses using a significance level at p=.017. To examine which variables in the acute phase were predictors of impaired balance (a dichotomized score of ≤ 22 points on the Mini-BESTest) at the 12-month follow-up, we performed a multiple logistic regression analysis. Independent variables in the model were chosen based on clinical reasoning and included sociodemographic data (sex, age, education), stroke characteristics, including NIHSS, OCSP (dichotomized into POCI vs. others), co-morbidity (BMI, atrial fibrillation, diabetes), cognition (MMSE, TMT-B)) and balance and gait (Mini-BESTest, gait speed). We examined the correlations between these independent variables to determine if there were issues with collinearity (rs ≥0.7), in which case they were excluded. We used univariate binary logistic regression analyses to determine which of the independent variables had predictor ability of impaired balance at the 12-month follow-up. Next, we included only the significant variables from the univariate analyses into the multivariate logistic regression models. The Hosmer-Lemeshow Goodness-of-Fit Test for logistic data was used to verify that the models supported the data.

Statistical analyses were performed using the Statistical Package for Social Science (SPSS) version 25 (IBM Corporation, Armonk, NY, USA) program. P-values <.05 were considered as indicators of statistical significance, and all tests were two-sided.

[H2] ROLE OF THE FUNDING SOURCE: This study was funded by the Norwegian Fund for Postgraduate Training in Physiotherapy, which played no role in the design, conduct, or reporting of the research.

[H1] Results

The inclusion process and study flow are shown in the Figure. We had 101 patients attend the 12-month follow-up. Table 1 shows demographic and clinical characteristics of the patients. The mean age was 55.5 years, and about one in five were female. The median ($Q_{1,}$ Q_3) length of stay at the stroke unit was 6.0 (5.0, 8.0) days. We included and tested the patients for balance and gait at median ($Q_{1,}$ Q_3) day 4.0 (2.0, 5.0) after arrival to the hospital. At inclusion, most of the participants (67.3%) had a NIHSS score of 0, which indicates no visible impairments detected using the NIHSS. None of the patients used a walking device pre-stroke.

There was a statistically significant improvement in the Mini-BESTest score from the acute phase to 12 months [x^2 (2, n= 101) = 19.2, $p < .001$]. When looking for differences between each time point, the Mini-BESTest improved significantly between the acute phase and 3 months and between the acute phase and 12 months but not between 3 and 12 months (Tab. 3). The items with the lowest scores were TUG-DT, where 50% were unable to perform the task (0 points) (37% at 12 months), “Horizontal head turns” 30% (25% at 12 months), and “Compensatory side steps - lateral” 25% (12% at 12 months).

There was a significant increase in gait speed from the acute phase to 12 months (p= .001) (Tab. 2 and 3). The gait speed ranged between 0.4 and 1.5 m/s in the acute phase and 0.5 and 1.5 m/s at 12 months. In the acute phase, 50% of the participants had a gait speed > 1.0 m/s. At 12 months, the number of participants walking > 1.0 m/s increased to 66%.

At 12 months, 26 (25.7%) participants had a Mini-BESTest score ≤ 22, indicating impaired balance compared to 39 (38.6%) in the acute phase. The correlation between the risk factors ranged from -.39 to .38 and did not suggest collinearity. The correlation between the balance score (Mini-BESTest) in the acute phase and after 12 months was .44.

In the univariate analyses**,** three of the independent variables were associated with the dependent variable (age, TMT-B, and balance assessed by the Mini-BESTest in the acute phase) (Tab. 4). In the final model only balance in the acute phase was significantly associated with impaired balance at follow-up. The model as a whole explained 25% (Nagelkerke R^2) of the variance in impaired balance after 12 months and correctly classified 73% of cases. The strongest predictor for having impaired balance at 12 months was low balance score in the acute phase, with an odds ratio (95% CI) of .92 (.85-.95).

[H1] Discussion

The main finding in this study is that although many patients performed well on balance and gait, one in four had balance impairments at 12 months and one in three walked with a gait speed below 1.0 m/s. We observed a statistically significant improvement on these outcomes from the acute phase to 12 months. Most improvements took place between the acute phase and 3 months post-stroke. Poorer balance performance in the acute phase was the only significant predictor for having impaired balance at 12 months post-stroke. To our knowledge, this is the first study exploring balance and gait with this large number of participants with first-ever mild stroke.

Balance and gait have previously been described for the stroke population in general but for younger patients with only mild symptoms the knowledge is sparse. In younger patients with lower scores on the NIHSS, we expected that a large proportion of the participants would perform well on the balance and gait assessments. The median total scores on the Mini-

BESTest was towards the upper end of the scale at each test point, indicating good performance. Furthermore, there was a significant improvement from the acute phase to the follow-up assessments for the Mini-BESTest, TUG and gait speed. The main improvements did occur between the acute phase and the 3-month follow-up. This can be due to the reported spontaneous recovery of body functions in the first weeks after stroke.[42] Some patients might also have engaged in balance training after the stroke; however, we do not have information about this. Since we do not have information about pre-stroke balance and gait performance besides that none were in need of walking device, we cannot be certain that the balance impairments were caused by the stroke. However, a substantial proportion of our sample (25%) had balance impairments at the 12 months follow-up, which is in line with the study of Batchelor et al. who showed a dysfunction in dynamic balance and gait tasks in 12 patients with TIA or mild stroke in the sub-acute phase compared with 12 healthy controls.[26] Lodha et al studied high functioning patients with stroke, and found deficits in gait speed and motor control.[27] This sample was in a chronic phase after stroke, as the mean time since the stroke was close to 5 years. We will therefore underline that although the balance and gait performance in our patients were overall good, it is important to identify and follow-up the patients who have the lowest balance score.

The item where most patients had difficulties with in the acute phase was TUG-DT, which simultaneously challenges attention to both a mobility and a cognitive task. Almost 50% of the patients stopped walking while counting, or stopped counting while walking. The second most difficult item was "Walk with horizontal head turns", where about 30% of the participants experienced reduced balance that forced them to have a broader base of support or to take sidesteps to maintain their balance. Also, close to 25% of patients were not able to perform the item "Compensatory stepping correction – lateral", indicating deficits in reactive balance control.[43] In real-life situations, these kind of balance impairments could lead to difficulties in situations such as walking safely in traffic and busy surroundings.[44-46] Moreover, 26 participants had a Mini-BESTest score ≤ 22 points, which indicates self-perceived balance impairments.[41] These disturbances may have an impact on long-term prognosis.

Gait speed has been shown to be a useful measurement for determining mobility function after stroke.[47] A commonly used cut-off value for gait speed to characterize independence in mobility and daily living in older adults is 1.0 m/s.[48] Even though the proportion of our participants who walked faster than 1.0 m/s increased from 50% in the acute phase to 66% after 12 months, our participants showed a rather slow gait speed for their age with a mean gait speed as low as 1.1 m/s at 12 months. Normative reference values for preferred gait speed for persons 60 to 69 years are 1.34 m/s for men and 1.24 m/s for women.[49] Our choice of a static start can partly explain the relatively slow preferred gait speed.[50] However, in a recent population-based study presenting reference values for gait speed (4 meters with a static start), persons aged 70 to 74 years walked faster than our patients with a mean age of 55 years.[51] Our patients improved their gait speed from the acute phase to 12 months equal to a clinical meaningful difference.[48] However, they still walk slowly and a third walks slower than 1.0 m/s, which indicates that they are at risk for future functional decline.[52]

In logistic regression analyses, only three variables, age, TMT-B and balance score in the acute phase, were significantly associated with impaired balance at 12 months in the unadjusted analyses. However, in the adjusted model, low balance score in the acute phase was the only significant predictor of having impaired balance after 12 months. Previous studies indicate that younger persons have better balance than older persons.[53] TMT-B has been associated with impaired balance in general stroke populations[54] as well as other patient populations[55,56] The relative young age of our participants and in general well-preserved performance on the TMT-B can explain why these variables were no longer significant in the final analyses. Poor balance performance in the acute phase was the only predictor of impaired balance after 12 months. This underlines the need for a thorough balance assessment in the acute phase. We cannot be certain whether these balance deficits are a results from the stroke or if they were present pre-stroke. Nevertheless, in this young population, such balance impairments should be adressed regardless of underlying cause.

The major limitations of this study are the lack of details about pre-stroke balance and gait impairments, as well as information about comorbidities affecting mobility such as knee or hip arthritis. Further, we also lack data on pre-stroke physical activity and post-stroke exercise interventions. These matters affect balance and gait performance in the acute phase as well as the trajectory of recovery, and future studies should seek to include this information. Another limitation is the larger proportion of included men. In younger stroke age groups, men are overrepresented.[57] Still, the 20% of women included in the study is smaller than what would be expected and may limit the generalizability of our findings for female stroke patients. Our results are also only generalizable to patients with ischemic stroke. Further, there are limited normative data for the Mini-BEST, although beyond the aim of this study, this limits our opportunity to compare our participants' results to the general population. Finally, several physical therapists were involved in the assessments, which may affect inter- and test-retest reliability; however, we believe that the bias that might have been introduced by this was relatively limited given the training and discussion of the test procedures prior to and during the study.

The major strengths of the study are the large sample size of a previously scarcely described group of patients, consecutive inclusion, the longitudinal follow-up, and that the study has an almost complete dataset with very few drop-outs. In addition, all patients had a thorough diagnostic evaluation, including an MRI following the clinical diagnosis, which confirmed the acute stroke lesion.

When using NIHSS to evaluate the degree or severity of stroke impairments, it is important to remember that balance and gait are not among the domains that are being evaluated, and the correlation between NIHSS score and balance and gait measurements is reported to be weak.[19] Our results suggest that even patients with an NIHSS score ≤ 3 can have impaired balance. With the large proportion of patients with mild stroke presenting to the stroke unit, we see a need to refine the assessment protocols in the acute phase in order to identify persons in need of information, training advice, and individualized rehabilitation, in addition to secondary prevention of new cerebrovascular events.[58,59]

In conclusion, we observed that despite of improvements in both balance and gait during the follow-up, approximately 25% had balance impairments and 33% walked slower than 1.0 m/s 12 months after the stroke. There is a need to reproduce and verify the clinical relevance of the present results and to investigate if there are other variables that predict impaired balance after 12 months. Future studies should focus on whether changes in mobility can predict other symptoms like cognitive or emotional impairments in patients with mild ischemic stroke.

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Ethics Approval

This study was approved by the Regional Committee of Medical and Health Research Ethics (REC no. 2014/1268). All patients gave their written, informed consent before inclusion.

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Disclosures

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

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Tables:

Table 1. Baseline Characteristics of the Participants [a]

Variable	Total (n = 101)
Sex (female)	21 (20.8)
Age (y), mean (SD)	55.5 (11.4)
Years of education, mean (SD)	15.3 (3.5)
BMI (kg/m^2), median (min-max)	26.8 (18.0-45.6)
Stroke characteristics	
NIHSS at arrival stroke unit, median (min-max)	1.0 (0-22)
NIHSS at inclusion, median (min-max)	0 (0-3)
OCSP	
Total/ Partial Anterior Circulation Infarction	44 (43.6)
Lacunar Infarction	25 (24.8)
Posterior Circulation Infarction	32 (31.7)
Cognition	
Mini-Mental Status Examination, median (min-max)	29.0 (20-30)
TMT-A, s., median (min-max)	36.0 (35-196)
TMT-B, s., median (min-max)	84.5 (35-310)
Comorbidity	
Hypertension	45 (44.6)
Hyperlipidemia	74 (73.3)
Prior myocardial infarction or angina pectoris	8 (7.9)
Atrial fibrillation	13 (12.9)
Diabetes	13 (12.9)

[a] Only patients who participated throughout the 12 months study period are displayed. Data are reported as numbers (percentages) of participants unless otherwise indicated. BMI = body mass index, MMSE = mini mental state examination; NIHSS = National Institute of Health Stroke Scale; OCSP = The Oxfordshire Community Stroke Scale; SD = standard deviation; TMT-A = Trail Making Test-A; TMT-B = Trail Making Test-B.

Table 2. Balance and Gait Performance Across the Assessment Points[a]

Variable (n = 101)	Acute phase	3 months	12 months	*Friedman Test* x^2	*df*	*P*
Mini-BESTest (max=28), median (Q_1, Q_2) (min-max)	24.0 (19.0, 26.0) (0-28)	24.0 (23.0, 26.0) (7-28)	25.0 (22.0, 27.0) (3-28)	19.2	2	<.001
Gait speed m/s, mean (SD) (min-max)	1.0 (.2)(.4-1.5)	1.1 (.2)(.6-1.5)	1.1 (.2)(.5-1.5)	8.9	2	.012
TUG time (s), median (Q_1, Q_2) (min-max)	8.9 (7.6, 10.4) (5.3-26.6)	8.4 (7.5, 9.4) (5.1-18.5)	8.6 (7.4, 9.2) (5.4-16.1)	8.4	2	.015
TUG-DT time (s), median (Q_1, Q_2) (min-max)	13.5 (11.0, 18.6) (4.6-107.8)	11.8 (10.0,16.8) (7.4-61.2)	12.0 (10.1, 17.1) (6.5-109.4)	7.8	2	.02

[a]Mini-BESTest = Mini-Balance Evaluation Systems Test; TUG = Timed Up and Go; TUG-DT = TUG-Dual Task.

Table 3. Pairwise Comparisons of Balance and Gait Performances Between Assessment Points[a]

Pairwise comparisons	0-3 months		3-12 months		0-12 months	
	z	*p*	*z*	*P*	*Z*	*p*
Mini-BESTest	-3.99	<.001	-1.32	.19	-3.56	<.001
Gait speed	-2.80	.005	-2.15	.03	-3.54	<.001
TUG	-2.85	.004	-.27	.79	-3.22	.001

[a]Mini-BESTest = Mini-Balance Evaluation Systems Test; TUG = Timed Up and Go.

Bonferroni post hoc comparisons $p = .017$

Table 4. Logistic Regression Models of Factors Associated With Having Impaired Balance[a] at 12 months Follow-up[b]

Variable, acute phase	Unadjusted Model			Adjusted Model		
	OR (95% CI)		*p*	OR (95% CI)		*p*
Sex (reference category: male)	1.2	.41-3.51	.74			
Age (years)	1.06	1.01-1.12	.013	1.049	.997-1.105	.067
Education (years)	.885	.077-1.02	.084			
OCSP (reference category: POCI)	1.01	.6-1.69	.98			
NIHSS at arrival (points)	1.01	.9-1.14	.85			
BMI (kg/m^2)	1.08	.98-1.19	.129			
Diabetes (reference category: no)	.41	.16-1.04	.059			
Atrial Fibrillation (reference category: no)	2.91	.88-9.67	.08			
MMSE (points)	.87	.7-1.07	.174			
TMT-B (s)	1.01	1.00-1.02	.009	1.008	.999-1.017	.082
Mini-BESTest (points)	.9	.84-.96	.002	.915	.853-.952	.014

[a](Mini-BESTest Score ≤ 22)

[b]BMI = body mass index; CI = confidence interval; Mini-BESTest= Mini-Balance Evaluation Systems Test; MMSE= Mini Mental State Examination; NIHSS = National Institute of Health Stroke Scale; OCSP = The Oxfordshire Community Stroke Scale; OR = odds ratio; POCI=Posterior cerebral infarction; TMT-B = Trial Making Test- B.

Figure. Flowchart for inclusion for the study participants.