

# Not as transient: patients with transient ischaemic attack or minor stroke experience cognitive and communication problems; an exploratory study

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## Original Article

# Not as transient: patients with transient ischaemic attack or minor stroke experience cognitive and communication problems; an exploratory study

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### KEY MESSAGE:

- A considerable proportion of patients with a transient ischaemic attack or minor stroke experience cognitive and communication problems
- Primary care health care professionals should be aware of these possible consequences and should monitor patients systematically and regularly after discharge from the hospital

### ABSTRACT

**Background:** Patients with transient ischaemic attack (TIA) or minor stroke generally receive, besides secondary prevention, no regular follow up care after discharge directly home from the Emergency Room or TIA outpatient clinic; because it is believed that they will experience no consequences.

**Objectives:** To explore whether the TIA and minor stroke patients have persistent problems due to the event.

**Methods:** This study has a cross-sectional, comparative non-randomized, exploratory design. Patients with TIA or minor stroke, not requiring hospital admission, and a control group of stroke patients, recently discharged home, were selected and interviewed with a questionnaire by telephone or home visit, between one and eight months after the event. Patients with angina pectoris (AP) were recruited as a second control group.

**Results:** Data showed that 51% of the TIA and minor stroke patients and 71% of the stroke patients experienced five or more problems, as opposed to 32% of patients with AP. Between 39 and 49% of the TIA, minor stroke and the stroke patients reported cognitive and communicative difficulties. Moreover, the TIA and minor stroke patients had more cognitive deficits ( $n = 27$ , 49%) and communicative limitations ( $n = 23$ , 42%) than the AP group ( $n = 7$ , 10% and  $n = 4$ , 6%, respectively).

**Conclusion:** About half of the TIA and minor stroke patients experienced problems regarding cognition and communication, which were specific to the event. General practitioners should be aware of these potential problems and monitor patients regularly. Future research should focus on prognostic indicators to identify patients at risk.

**Keywords:** General practice, transient ischaemic attack, minor stroke, cognitive function, communication, rehabilitation

### INTRODUCTION

Patients who survived a stroke often experience problems in the long term because of their stroke, which can be related to physical deficits (1,2) and also to psycho-emotional and cognitive limitations (3,4).

Patients diagnosed with a transient ischaemic attack (TIA) or minor stroke only receive follow-up care focused on secondary prevention, after discharge from the emergency room (ER) or TIA outpatient clinic (5). General practitioners usually manage this

follow-up care, because they are the primary health care professionals for non-hospitalized patients. National (such as Dutch and British guidelines for General Practitioners and Physicians) (6,7) and international guidelines (such as Helsingborg declaration) for the management of stroke care also primarily focus on the management of secondary prevention of TIA and minor stroke patients to prevent a subsequent stroke. There is, however, no attention for other problems after the event, because it is believed that TIA and minor stroke patients experience no further consequences. Follow-up care for other consequences is, therefore, not structurally organized. There are indications that these patients experience problems because of the incident and that this initial belief should be revised. Previous research has indicated that TIA and minor stroke patients experience high levels of fatigue (8), have subtle problems in activities of daily life (9), have an increased risk of depression (10), and are affected in emotional, social and physical functioning (11). However, these studies have not evaluated whether patients experienced problems with cognition and communication, which are often impaired after a stroke. This raises the possibility that TIA and minor stroke patients could also experience other stroke-related problems shortly after the event and that care should be provided at an earlier stage.

As far as we know, there is no study investigating a complete spectrum of stroke-related problems in outpatients with a TIA or minor stroke within six months after the event. The aim of this study, therefore, was to explore whether this group of patients experienced problems after discharge home directly from the ER or TIA outpatient clinic. We used a questionnaire that was developed to measure a wide range of stroke-related problems. In addition, two other groups were selected to verify whether these problems are indeed related to TIA or minor stroke (not requiring hospital admission). We included a group of stroke patients recently being discharged home after hospitalization or inpatient rehabilitation and a group of patients with angina pectoris (AP), also visiting the ER or outpatient clinic without subsequent hospital admission. These groups were studied to answer the question whether patients with TIA and minor stroke experience similar problems as the stroke patients and whether they report different problems than the patients with AP.

## METHODS

### *Study design*

This study was a cross-sectional, comparative non-randomized, exploratory study. The medical ethics committee of the Maastricht University Medical Centre + approved this study (METC 07-4-051).

### *Selection of study participants*

The patient registration database of the department of Neurology of the Maastricht University Medical Centre + was used to select patients of the experimental group (i.e. TIA or minor stroke patients). Patients were selected if they had a TIA or minor stroke not requiring hospital admission; if they had visited the ER or TIA outpatient clinic between 1 January and 30 June 2008; and were aged 50 years or older. TIA was defined as a sudden onset of cerebrovascular neurological deficits, the clinical symptoms of which disappear within 24 h after onset. The diagnosis was based on clinical symptoms, MRI-imaging and judgement of an experienced neurologist. Patients were considered to have a minor stroke, when they had a Rankin Score of 1 (12).

The control group of stroke patients participated in a longitudinal study on the effectiveness of long-term care. Between April 2008 and December 2009, patients were selected from the registration of home care services based on diagnosis of stroke (based on clinical symptoms, MRI-imaging and judgement of an experienced neurologist), age of 50 years and older and recently discharged home from hospital or inpatient rehabilitation.

For the second control group, we selected patients with another vascular condition and common risk factors. The patients of the control group were selected from the patient registration database of the department of cardiology of the Maastricht University Medical Centre +. These patients were selected based on diagnosis of angina pectoris (AP) not requiring hospital admission, a visit to the ER or outpatient clinic of cardiology between 1 November 2010 and the 30 May 2011, and the age of 50 years or older. AP was defined as having a history of chest pain or discomfort, elicited by physical activity, psychological stress or occurring at rest, lasting for a maximum of 15 min. The diagnosis of AP was based on clinical symptoms, ECG-images and judgement of an experienced cardiologist.

### *Measurements*

All patients in the three groups received the patient information by a letter explaining the purpose of the study. To acquire informed consent, patients were contacted by telephone after one week. The interview was subsequently held by telephone or home visit depending on the patients' preference and the questionnaire was administered. All stroke patients were interviewed at home by a stroke care coordinator. The questionnaire used for the interviews is part of a larger assessment tool, developed to assess stroke-related problems in stroke patients, who may need follow-up care after being discharged home from hospital, nursing home or rehabilitation clinic. It consists of 15 questions each related

to a specific health care domain, that can be answered by yes (e.g. patient experiences problems) or no (e.g. patient experiences no problems) and the respondent can add comments. Patients were asked whether they experienced new problems after the event or whether pre-event existing problems had changed after the event. The assessment tool was validated (regarding content and criterion) with stroke patients in a pilot study and patients, caregivers and health care professionals rated it as feasible in health care. The assessment tool, including the questionnaire, is now being used in regular health care.

### Outcome

The outcome of the study was the percentage of reported problems of the participants based on the questionnaire.

### Statistical analysis

Data was analysed using descriptive statistics. Differences in patients' characteristics were analysed by an independent sample *t*-test and chi-square tests where appropriate. Differences in the responses to the questionnaire between the TIA and minor stroke group on the one hand, and the other two groups on the other hand were analysed using the chi-square test. In case expected cell assumption was violated, the Fisher's exact test was used. The results of the TIA and minor stroke group were compared with the results of the stroke group, to explore whether the results of the TIA and minor stroke group were comparable to stroke patients. Furthermore, the results of the TIA and minor stroke group were compared with the results of the AP group, to investigate whether the results were stroke-related. *Post-hoc* exploratory analysis was conducted to investigate subgroup differences. The analyses were conducted with the Statistical Package for Social Sciences (SPSS, version 18). Alpha was set at 0.05.

## RESULTS

### Study population

For the TIA and minor stroke group, 67 patients were selected, and 55 patients were successfully interviewed by telephone. 12 patients did not participate for several reasons; 6 patients could not be contacted, 3 patients refused to participate and 3 patients were unable to participate due to hearing or speech problems. For the stroke group, 77 out of 171 patients gave informed consent, of which 62 participated in the longitudinal study. For the control group of AP patients, 99 patients were contacted and 72 patients were successfully interviewed. 27 patients of the AP group were not interviewed for several reasons: 16 patients could not be contacted, 7 patients refused participation, 3 patients were unable to participate due to hearing problems, severe mental health problems or hospital admission, and one patient was recently deceased.

The characteristics of the participating patients are shown in Table 1. TIA and minor stroke patients and AP group were interviewed between two and eight months after being discharged from the ER, TIA outpatient clinic or the cardiology outpatient clinic. There was only a significant difference in the mean age between the TIA and minor stroke group and the two other groups; the stroke patients ( $t(115) = -2.550, P = 0.012$ ) and the AP patients ( $t(125) = -2.600, P = 0.011$ ) were older.

### Outcome

28 patients of the TIA and minor stroke group (51%), 44 stroke patients (71%) and 25 patients of the AP group (35%) experienced five or more problems. As Table 2 shows, a high proportion of each group reported fatigue problems. When comparing the TIA and minor stroke patients and the stroke patients, the results show that both group were comparable, for instance in medical condition, cognition, communication and daily schedule. The percentages of problems about the activities of daily

Table 1. Patient characteristics of the three patient groups: transient ischaemic attack/minor stroke, stroke and angina pectoris.

	TIA <sup>a</sup> /minor stroke	Stroke	Angina pectoris
Number of patients	55 <sup>b</sup>	62	72
Mean age, years (SD)	68 (9.8)	73 (10.0)	73 (9.9)
Male gender ( <i>n</i> /%)	35/64%	32/52%	36/50%
Health care service ( <i>n</i> )			
Outpatient clinic	49	—	70
Emergency room	6	—	2
Hospitalization/inpatient rehabilitation	—	62	—
Mean time since the event (months)	4.2	2.1	4.9

<sup>a</sup>TIA: transient ischaemic attack.

<sup>b</sup>TIA: 35 (64%), minor stroke: 20 (36%).

Table 2. Questionnaire results: 'Yes' responses related to transient ischaemic attack/minor stroke, stroke, or angina pectoris.

Domain	TIA <sup>a</sup> /minor stroke (1) <i>n</i> = 55 <i>n</i> (%)	Stroke (2) <i>n</i> = 62 <i>n</i> (%)	Angina pectoris (3) <i>n</i> = 72 <i>n</i> (%)	Significance test	
				1 vs 2 <i>P</i> -value	1 vs 3 <i>P</i> -value
Activities of daily life (ADL)					
<i>Do you need help with washing, getting dresses or walking staircases?</i>	4 (7%)	16 (26%)	7 (10%)	0.008	0.627
Instrumental ADL					
<i>Do you need help with house keeping activities (such as cleaning, cooking or groceries)?</i>	9 (16%)	39 (63%)	20 (28%)	<0.001	0.129
Hobbies/social activities					
<i>Do you have problems relating to hobbies, going out or visiting people?</i>	19 (35%)	29 (47%)	19 (26%)	0.156	0.320
Daily schedule					
<i>Do you have difficulties to find daily activities to do?</i>	12 (22%)	11 (18%)	22 (31%)	0.641	0.270
Cognition					
<i>Do you have daily problems with memory, concentration or performing multiple activities simultaneously?</i>	27 (49%)	30 (48%)	7 (10%)	0.713	<0.001
Communication					
<i>Do you have problems with reading, writing, speech or speech comprehension?</i>	23 (42%)	24 (39%)	4 (6%)	0.987	<0.001
Psycho-emotional					
<i>Do you feel down, anxious, useless or depressed?</i>	20 (36%)	19 (31%)	17 (24%)	0.687	0.117
Fatigue					
<i>Do you often experience severe fatigue?</i>	33 (60%)	49 (79%)	36 (50%)	0.004	0.262
Risk management: smoking/drinking					
<i>Do you smoke, drink alcohol, exercise or have overweight?</i>	17 (31%)	12 (19%)	25 (35%)	0.163	0.651
Risk management: check blood pressure/cholesterol					
<i>Have your blood pressure and cholesterol levels not been checked regularly?</i>	1 (2%)	24 (39%)	3 (4%)	<0.001	0.633
Medical condition: sleep/swallow/pain/dizziness					
<i>Do you have problems relating to sleeping, swallowing, pain or dizziness?</i>	28 (51%)	31 (50%)	25 (35%)	0.862	0.067
Medical condition: others					
<i>Do you have other medical complaints?</i>	13 (24%)	14 (23%)	8 (11%)	0.909	0.060
Relationship relatives					
<i>Are there problems in the relationship with close relatives?</i>	3 (5%)	7 (11%)	4 (6%)	0.034	0.980
Intimacy partner					
<i>Do you experience intimacy or sexual problems between you and your partner?</i>	7 (13%)	3 (5%)	7 (10%)	0.412	0.592
Information provision					
<i>Did you receive insufficient information about consequences of or about services available after the event?</i>	10 (18%)	25 (40%)	12 (17%)	0.003	0.823

<sup>a</sup>TIA: transient ischaemic attack

life (ADL) and the instrumental ADL (IADL) were significantly higher in the stroke patient group.

When comparing the TIA and minor stroke group with the AP group, the TIA and minor stroke group reported significantly more problems in the domains of cognition and communication (Table 2). For cognition, the TIA and minor stroke group responded deficits mostly with memory ( $n = 24$ , 44%) and/or concentration ( $n = 14$ , 26%). The communication problems of the TIA and minor stroke group were mainly related to difficulties with speech and language comprehension ( $n = 17$ , 31%) and in writing ( $n = 13$ , 24%). Although the differences were non-significant, patients with a TIA or minor stroke reported different somatic complaints; 7 patients had difficulties with swallowing (13%) versus

3 patients of the AP group (4%); 17 patients had pain (31%) versus 4 patients of the AP group (6%) and 16 patients complained of dizziness (29%) versus 14 patients of the AP group (19%). The TIA and minor stroke group also reported other somatic problems, such as problems with vision, hemiparesis or headaches. 4 out of 8 patients of the AP group mentioned respiratory problems.

Next, a *post-hoc* exploratory analysis of subgroups was performed. There were differences between TIA patients and minor stroke patients: patients with a minor stroke generally reported more problems compared to TIA patients. Approximately 70% of the minor stroke patients experience difficulties with communication, whereas 26% of the TIA patients have

communication problems. There were no other differences found between the minor stroke and the TIA patients.

## DISCUSSION

Results in this study show that approximately half of patients with a TIA or minor stroke experience five or more problems, compared to one third of AP patients. Most problems of patients with a TIA or minor stroke are related to cognition and communication. A similar proportion of the stroke patient group experienced problems regarding these two domains, but only a small proportion of the AP group reported these complaints. In addition, the AP patients were older than the TIA and minor stroke patients that seem to be in contrast with findings showing that elderly experience more problems. The results, therefore, suggest that the reported problems of cognition and communication were related to cerebrovascular events and were specific to the TIA and minor stroke and not attributable to age differences.

### *Strengths and limitations of the study*

This is the first study exploring a broad spectrum of stroke-related consequences in patients with a TIA or minor stroke. The value of the results of the TIA and minor stroke patients are strengthened by comparing their results with patients who have the same vascular condition and common risk factors. In addition, the problems of the group of stroke patients also showed that the problems of the TIA and minor stroke patients were related to a cerebrovascular event.

Alternatively, we are aware that the results in this study are based on self report, which means that the reported problems could be an overestimate or underestimate of the actual problems. We are also aware that we analysed the TIA and minor stroke patients together. TIA and minor stroke are different cerebrovascular events from a neurological perspective, but TIA and minor stroke are treated as a similar cerebrovascular event from the viewpoint of general practitioners. In addition, separate analyses of the TIA and minor stroke patients also revealed no large differences. Another limitation is that we have no concurrent control group. Finally, no previous assessment of problems was performed, but we discriminated between TIA, minor stroke, stroke, angina pectoris and other possible causes by asking the patients to indicate whether they experienced new problems after the event or whether already existing problems have changed after the event.

### *Comparison with existing literature*

A high level of fatigue was found in 63% of patients with a TIA or minor stroke, which is in line with the results of

Winward and colleagues, who found a percentage of 56% in minor stroke patients and 29% in TIA patients (8). In addition, previous studies did not assess problems with cognition and communication, which appeared to be a major problem in the population studied. A recent study showed that cognitive decline is an independent predictor of stroke, which could possibly also explain the high incidence of reported cognitive problems (13). Incidence of depression in TIA and minor stroke patients was also found by Luijendijk and colleagues, who highlight that more attention is needed to the potential problems after TIA and minor stroke (10).

### *Implications for future research or clinical practice*

We want to increase awareness of the potential problems that patients with a TIA or minor stroke can experience. TIA and minor stroke quickly seem to recover fully from a neurological point of view and consequently do not get a specific follow-up. Now we can conclude that quite some problems can be detected after several months, indicating that TIA and minor stroke are not as transient or lead to full recovery as we believed. There are indications that TIA and minor stroke patients experience benefit from therapy after hospitalization (14). Although it is unclear whether this therapy is also effective for non-hospitalized patients, it does show that rehabilitation options are available. An early detection of stroke-related problems in this group of patients is therefore important. Since TIA and minor stroke patients are non-hospitalized, general practitioners or practice nurse could play a major role in this early detection during their regular check-up for secondary prevention. Findings are based on an exploratory study and further controlled research is required. Future research should examine prognostic indicators to identify patient with TIA or minor stroke who are at risk of experiencing these problems.

### *Conclusion*

Most of the TIA and minor stroke patients reported problems of cognition and communication. Stroke patients also experience these problems, but patients with AP did not, indicating that these problems are specific to the cerebrovascular event. Care professionals should be aware of potential cognitive and communicative difficulties and identify patients at risk by monitoring them systematically and regularly.

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