

CHAPTER 5

A motivational interviewing-based
secondary prevention program to
improve risk factor management in
ischemic stroke and TIA patients

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A B S T R A C T

Background

The quality of secondary prevention for ischemic stroke and TIA patients is suboptimal in clinical practice. The aim of this study was to evaluate the effect of a motivational interviewing-based risk factor management program on risk factor modification in individuals with ischemic stroke or TIA.

Methods

In this prospective cohort study, 71 patients with a recent ischemic stroke or TIA participated in a motivational interviewing-based risk factor management program. The primary endpoint of optimal medical therapy was defined as the percentage of patients whom achieved the combined target for the use of antithrombotics, blood pressure <140/90 mm Hg, and a LDL-cholesterol level <2.5 mmol/l (<100 mg/dl) one and two years after the initial event.

Results

89% attended the one-year follow-up visit and 76% attended the two-year follow-up visit. We found a significant increase in the number of patients who achieved the primary endpoint and both blood pressure and LDL-cholesterol level targets after one year. We found a significant reduction in the absolute values of both systolic and diastolic blood pressure, LDL-cholesterol levels and a significant increase in the attainment of the lifestyle targets smoking and waist circumference. At the two-year follow-up visit the proportion of patients who reached the primary endpoint fell by 18%.

Conclusions

In this study a motivational interviewing-based risk factor management program resulted in a substantial increase in the attainment of secondary prevention targets after one year. After two years we found a significant decrease in the number of patients who achieved these targets.

Introduction

Stroke is a common and serious global health-care problem.^{1,2} Patients after ischemic stroke and transient ischemic attack (TIA) have an increased risk of recurrent stroke, other vascular events and dementia.³⁻⁵ Secondary prevention is a proven and effective way to reduce the risk of recurrent stroke and cardiovascular disease in these patients.^{6,7} Despite the benefits of secondary prevention in individuals with ischemic stroke and TIA, an amount of evidence indicates that these patients often do not receive the recommended interventions.⁸⁻¹³

Secondary prevention strategies for ischemic stroke and TIA patients can be classified into two major groups: **1)** medically modifiable risk factors (ie antithrombotic therapy or oral anti-coagulants, antihypertensive agents and statins) and **2)** behaviourally modifiable risk factors (ie medication non-adherence, smoking and alcohol abuse, physical inactivity and unhealthy diet)^{14,15} that may be modulated by changes in lifestyle. In this study, we studied the effect of a motivational interviewing-based risk factor management program on risk factor modification in ischemic stroke and TIA patients. Motivational interviewing is a patient centered counselling technique designed to engage ambivalence or resistance in the process of behaviour change.^{16,17} Originally designed to help people to change addictive behaviour, this technique is now widely used in the management of various long-term conditions and has been found useful in helping patients to exercise more, lose weight and lower blood pressure and cholesterol levels.¹⁸

Aims

The aim of this study was to evaluate the effect of a motivational interviewing-based risk factor management program on risk factor modification in individuals with ischemic stroke or TIA.

Methods

Study design and setting

Patients were recruited at two hospitals in the Netherlands, the Sint Lucas Andreas Hospital in Amsterdam, and the Zaan Medical Centre in Zaandam. The ethics committee approved the study.

Patients

All ischemic stroke and TIA patients who visited or were admitted to the neurology department at one of the participating hospitals in 2010 were invited to participate. There was one inclusion criterion (age of more than 18 years) and one exclusion criterion (communication problems preventing participation in the intervention). All patients who agreed to participate provided written informed consent.

Intervention

During this one-year program, patients participated in a motivational interviewing based secondary prevention program. Visits took place at 4 weeks, 3 months, 6 months, 9 months, and one year after the index event. The program consisted of brief (15-30 minutes) sessions of a motivational interviewing based counselling strategy. All sessions were conducted in a face-to-face manner in hospital. The aim of the program was to lower blood pressure and lower level of LDL-cholesterol (LDL-C) with medical treatment, to attain a healthier and more active lifestyle, and to optimize medication adherence. To achieve this aim, a stepwise approach was documented in a protocol and distributed to

all participating physicians, nurses and physiotherapists, who were all trained in and qualified for motivational interviewing. After the one-year motivational interviewing-based secondary prevention program, patients were referred to their primary care physician for ongoing management of secondary prevention and lifestyle targets.

Outcome assessment

The primary endpoint of optimal care was defined as the percentage of patients whom achieved the combined target for the use of antithrombotics, blood pressure <140/90 mm Hg, and LDL-C <2.5 mmol/l (<100 mg/dl). Secondary endpoints were the individual components of the primary endpoint and lifestyle targets.

Data on neurological, laboratory and treatment information for all subjects were prospectively collected at baseline, one year and two years after the index event. Collected data included age, sex, stroke subtype classification, National Institute of Health Stroke Scale (NIHSS) score, medical history, vascular risk factors, blood pressure, LDL-C level, medication use (4-item Morisky medication adherence scale; a high medication adherence was defined as a score of 0)¹⁹, smoking status (self-reported), alcohol consumption (self-reported), physical activity level (self-reported), height, weight, Body Mass Index (BMI), and waist circumference. Blood pressure was measured in all participating patients with an EDAN M3 Vital Signs Monitor (Edan Instruments, Inc). After a 5-minute rest with the patient in a sitting position, three measurements were made at a 10-minute interval; the mean of the two last measurements was calculated. Based on guidelines alcohol overuse was defined as >1 drink per day for women, and >2 drinks per day for men.⁷ Physical activity level was measured according to the Dutch Norm for Healthy Exercise (Nederlandse Norm Gezond Bewegen).²⁰ For people over the age of 55, the standard is moderately intense physical activity for a total of 30 minutes or longer at least 5 days a week.

Statistical analysis

All statistical analyses were carried out using IBM SPSS statistics version 20. To evaluate a difference in baseline characteristics between patients with and without follow-up at one year, we used the independent sample t-test for continuous data, the Mann-Whitney U test for data with a non-parametric distribution, and the chi-squared test for test for categorical data. To evaluate the difference between baseline data and data from the one and two-year follow-up visit, the paired sample t-test was used for continuous data and the Wilcoxon signed rank test for data with a non-parametric distribution. The McNemar test was used for the outcome measures with a dichotomous outcome. A p-value of less than 0.05 was considered significant.

Results

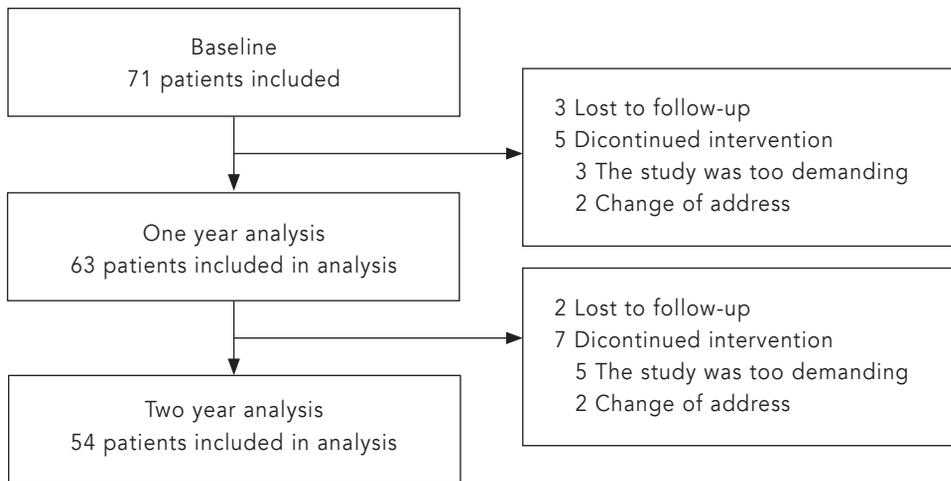
Seventy-one patients agreed to participate in the study. Baseline characteristics of all patients are shown in Table 1. Mean age was 67 years (SD 11 years) and 40 (56%) were men. The most prevalent comorbidities and vascular risk factors were hypertension and dyslipidaemia. Sixty-three patients (89%) attended the one-year follow-up visit and 54 (76%) patients attended the two-year follow-up visit. Reasons for lost to follow-up and discontinuation of the intervention are shown in Figure 1. Except for a significant difference in MMSE score, which was lower in patients who discontinued the intervention, baseline characteristics were similar between both groups (Table 1). Follow-up results are shown in Table 2 for patients who attended the one-year and two-year follow-up visits. At the first year follow-up visit 43 (68%) patients reached the primary endpoint for optimal medical care. Sixty-two (98%) patients used antithrombotic, 52 (83%) patients reached the target of a blood pressure $\leq 140/90$ mm Hg, and 53 (84%) patients reached the LDL-C target of ≤ 2.5 mmol/l. Compared to baseline results, we found a significant increase in the number of

TABLE 1 Baseline results

Variable	All patients (n=71)	Patients who discontinued the intervention (n=8)	Patients who attended the one-year follow-up visit (n=63)
Men, n (%)	40 (56)	7 (88)	33 (52)
Age (years), mean (SD)	67 (11.3)	69 (6.7)	67 (11.8)
Ischemic stroke, n (%)	43 (61)	5 (63)	38 (60)
TIA, n (%)	28 (39)	3 (38)	25 (40)
NIHSS, median (IQR)	1 (1-3)	4 (0-10.8)	1 (0-3)
History of vascular risk factors	-		
(p)AF/ valvular disease, n (%)	8 (11.3)	2 (25)	6 (9.5)
Hypertension, n (%)	57 (80)	6 (75)	51 (81)
Dyslipidemia, n (%)	63 (89)	6 (75)	57 (91)
Diabetes Mellitus, n (%)	13 (18.3)	3 (38)	10 (15.9)
Actual smoking, n (%)	26 (37)	3 (38)	23 (37)
Alcohol overuse, n (%)	16 (23)	1 (12.5)	15 (24)
Positive family history of vascular disease, n (%)	31 (44)	3 (38)	28 (44)
Previous TIA/ischemic stroke, n (%)	19 (27)	3 (38)	16 (25)
Peripheral vascular disease, n (%)	6 (8.5)	0 (0)	6 (9.5)
Myocardial infarction/ coronary disease, n (%)	7 (9.9)	0 (0)	7 (11.1)
MMSE, median (IQR)	29 (27-29)	25 (24-29)	29 (28-30)*

TIA = transient ischaemic attack; NIHSS = national institutes of health stroke scale; BMI = body mass index; MMSE = mini mental state examination; SD = standard deviation; IQR = interquartile range.

*p-value <0.05, determined by use of the Mann-Whitney U test.

FIGURE 1 Participant flow diagram

patients who achieved the primary endpoint of optimal medical care, and both the blood pressure and LDL-C targets after one year (all p -values <0.001).

At the two-year follow-up visit, we found a significant decrease in the number of patients who achieved the primary endpoint of optimal medical care, and both the blood pressure and LDL-C targets (all p -values <0.05). In addition, absolute blood pressure values at the two-year follow-up visit were significantly higher compared to the one-year follow-up visit ($p < 0.05$). Results with regard to the behaviourally modifiable risk factors remained unchanged (Table 2).

During follow-up a total of 15 additional vascular events occurred. During the first year, eight (12.7%) patients had a recurrent TIA, three patients had a recurrent ischemic stroke (4.8%), and one patient underwent coronary artery bypass surgery because of symptomatic coronary artery disease (1.6%). During the second year one (1.9%) patient had a recurrent TIA and two (3.8%) patients had a recurrent ischemic stroke.

TABLE 2 Results on secondary prevention and cardiovascular lifestyle targets

Outcomes	Baseline	Last clinic visit	p-value
Optimal medical care, n (%)	17 (10.4)	61 (37)	<0.001#
Use of antithrombotics, n (%)	145 (88)	157 (96)	0.031#
BP <140/90 mm Hg, n (%)	50 (31)	90 (55)	<0.001#
Systolic BP, mm Hg (SD)	159 (29.1)	140 (22.9)	<0.001*
Diastolic BP, mm Hg (SD)	82 (18.2)	80 (12.6)	NS*
LDL-C <2.5 mmol/l, n (%)	52 (32)	95 (58)	<0.001#
LDL-C, mmol/l (SD)	3.22 (1.21)	2.53 (1.01)	<0.001*

BP = blood pressure; LDL-C = LDL-cholesterol; SD = standard deviation.

Determined by use of the McNemar test.

* Determined by use of the paired sample t-test.

Discussion

We performed a study which adds to the knowledge of motivational interviewing based interventions after ischemic stroke and TIA. In this study, in seventy-one patients with ischemic stroke or TIA, we found a significant increase in patients achieving the guideline recommended secondary prevention goals after a one-year motivational interviewing based risk factor management program. Although the results at the two-year follow-up visit still compare favourably with baseline results and with results reported in previous secondary prevention studies⁸⁻¹³, the proportion of patients who reached the primary endpoint fell by 18%. With regard to the behaviourally modifiable risk factors, we found a significant reduction in the number of smokers and in waist circumference after one year. These risk factors remained unchanged during the second year of follow-up.

Hitherto, there are only a few studies on the effect of motivational interviewing based interventions after ischemic stroke and TIA. A

randomized study by Watkins et al in 411 patients with acute stroke, found that motivational interviewing improved patients' mood and reduced mortality 12 months after a stroke. The patients in the intervention group received up to four 30 to 60 minute sessions of motivational interviewing.²¹ In a randomized study by Hedegaard et al in 203 patients with ischemic stroke or TIA, motivational interviewing did not improve adherence or persistence to antithrombotic therapy, oral anticoagulants and statins. Patients assigned to the intervention group received a 6-month lifestyle intervention, including motivational interviewing, to support medication adherence.²² A recent randomized controlled trial by Barker-Collo et al in 386 patients with stroke (including intracranial hemorrhage), found that motivational interviewing had no significant effect on the primary outcomes systolic blood pressure and LDL-C. Furthermore, no effect was found on the number of cardiovascular events, mood, and quality of life. The authors, however, found a significant positive effect on self-reported medication adherence nine months post stroke. In this study the patients in the intervention group received four motivational interviewing sessions at 28 days, 3, 6, and 9 months' post stroke. Only the first session was conducted face-to-face in all patients, subsequent sessions were conducted by telephone for the majority of patients.²³ Summarizing these results, it seems that the effect of motivational interviewing on risk factor modification in ischemic stroke and TIA patients is limited. However, follow-up in previous studies was short and none of them focused on the behaviourally modifiable risk factors, except for medication non-adherence. The latter is of particular interest since in other areas of preventive medicine motivational interviewing has been found especially useful in influencing the behaviourally modifiable risk factors. In this study we found a significant increase in lifestyle targets attainment for smoking status and waist circumference and this effect appeared to be sustainable over time. Further studies on the effect of motivational interviewing on risk factor modification in individuals with ischemic stroke or TIA should therefore focus both

on the behaviourally modifiable risk factors and on the long-term effects of this counselling technique.

Several limitations of our study deserve comment. First, despite our systematic approach to care for patients after ischemic stroke or TIA, a substantial part (24%) of the included patients discontinued the intervention or were lost to follow-up. Second, primary care services were not involved in the present study. One might argue that treatment with regard to secondary prevention should, at least partially, occur in primary care, since primary care services are better equipped to monitor patient vascular risk factors and encourage lifestyle change with lower costs. However, since these patients frequently suffer from physical and cognitive limitations that need appropriate attention, in our opinion neurologists should manage the medically modifiable risk factors during the early phase after the event. Third, the prospective structure of this cohort study does not allow any conclusions on causality.

In conclusion, in this study a motivational interviewing-based risk factor management program resulted in a substantial increase in the attainment of secondary prevention targets after one year. After two years we found a significant decrease in the number of patients who achieved these targets. As current medical care increasingly focuses on managing long-term conditions, clinicians experience a growing need for effective behaviour change interventions to motivate patients to make and consolidate lifestyle changes that modify vascular risk factors in order to achieve secondary prevention and lifestyle targets. Further studies are needed to elucidate which type of intervention is most effective in individuals after ischemic stroke or TIA.

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