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Screening and follow-up care for cognitive and emotional problems after TIA and ischemic stroke: a national survey among neurologists in the Netherlands

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3 1 **Screening and follow-up care for cognitive and emotional problems after TIA and**
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6 2 **ischemic stroke: a national survey among neurologists in the Netherlands**
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3 **27 Abstract**
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6 **28 Background:** After stroke, many patients experience cognitive and/or emotional problems.
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9 **29** While national guidelines recommend screening for these problems, actual screening rates
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11 **30** might be limited.
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14 **31 Objective:** This study aimed to examine the clinical practice at neurology departments
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17 **32** regarding screening, information provision and follow-up care for cognitive and emotional
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19 **33** problems after TIA and ischemic stroke.
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22 **34 Methods:** A nationwide, cross-sectional, online survey was conducted between October 2018
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24 **35** and October 2019 among neurologists in all hospitals in the Netherlands.
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28 **36 Results:** Neurologists in 78 hospitals were invited to join the survey, and 52 (67%) of them
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30 **37** completed it. Thirty-one (59%) neurologists reported that screening for cognitive problems
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32 **38** after TIA and ischemic stroke was mostly or always performed. When cognitive screening
33
34 **39** was performed, 42 (84%) used validated screening instruments. Twenty-nine (56%) of the
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36 **40** respondents reported that screening for emotional problems was mostly or always performed.
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38 **41** When emotional screening was performed, 31 (63%) reported using validated screening
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40 **42** instruments. Timing of screening and information provision was highly variable, and the
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42 **43** majority reported that there was no protocol for follow-up care when cognitive or emotional
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44 **44** problems were found.
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49 **45 Conclusions:** This study demonstrates that clinical practice at neurology departments is
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52 **46** highly variable regarding screening, information provision and follow-up care for cognitive
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54 **47** and emotional problems in patients after TIA or ischemic stroke. Approximately half of the
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56 **48** participating neurologists reported that screening was performed only sometimes or never for
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58 **49** cognitive and emotional problems after TIA and ischemic stroke.
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67 **51 Keywords**8
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10 52 Screening, cognition, depression and anxiety, stroke, rehabilitation, survey
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1516 **54 Strengths and limitations of this study**
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- 20 55 • A detailed overview is provided of the current clinical practice at neurology
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- 22 56 departments with regard to screening for cognitive and emotional problems after TIA
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- 24 57 or ischemic stroke.
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- 26 58 • Multiple opportunities are identified to further optimize the clinical practice of
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- 28 59 screening and care for cognitive and emotional problems after stroke.
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- 30 60 • Neurologists in all Dutch hospitals were invited to participate and a satisfactory
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- 32 61 percentage completed the survey.
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- 34 62 • Being a survey study, the results might deviate from the actual clinical practice, for
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- 36 63 example due to social desirability.
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- 38 64 • This study focuses on the views of neurologists and their teams, which might
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- 40 65 underestimate the true screening rates for cognitive and emotional problems.
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4849 **67 Introduction**
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5152 68 Stroke is a leading cause of disability worldwide.(1) After stroke, many patients experience
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54 69 cognitive and/or emotional problems,(2-6) which affect their quality of life and
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56 70 participation.(7-11) Therefore, national guidelines recommend screening and care for
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58 71 cognitive and emotional problems after stroke.(12-15) The Dutch guideline recommends
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3 72 screening all stroke patients for cognitive problems, using the Montreal Cognitive Assessment
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5 73 (MoCA) rather than the Mini Mental State Examination (MMSE), and referral to
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7 74 rehabilitation services when cognitive problems are present.(15) With regard to emotional
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10 75 problems, multiple screening instruments are considered suitable, namely the Hospital
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12 76 Anxiety and Depression Scale (HADS), the Beck Depression Inventory (BDI), the Symptom
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14 77 CheckList (SCL-90) subscale for depression, and the Hamilton Depression Scale (HDS).(15)
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17 78 When emotional problems are present, psychotherapy or pharmacotherapy should be
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19 79 considered.(15) Previous studies in the United Kingdom found that compliance with the
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21 80 guidelines is low as regards screening for cognitive and emotional problems after transient
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24 81 ischemic attack (TIA) and ischemic stroke.(16, 17) In the Netherlands, in general, stroke
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26 82 patients are admitted to a stroke unit in the acute phase, where a neurologist functions as
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28 83 treating physician. From the stroke unit, patients are discharged home, to a rehabilitation
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30 84 centre or to a nursing home. If patients are discharged home, they are followed-up at the
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33 85 outpatient clinics of the neurology department.

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36 86 This study aimed to investigate the current clinical practice of screening for cognitive and
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38 87 emotional problems after TIA and ischemic stroke at neurology departments in hospitals in
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40 88 the Netherlands. This study examined: (1) if patients with TIA or ischemic stroke are screened
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42 89 for cognitive and emotional problems, (2) if so, which screening instruments are used, (3)
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44 90 when screening is performed, (4) whether patients receive information regarding the presence
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46 91 and nature of cognitive and emotional problems and (5) what kind of follow-up care is
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48 92 delivered when cognitive and/or emotional problems are present.
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54 55 56 94 **Materials and Methods**

57 58 59 95 *Study design and participants*

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3 96 A nationwide, cross-sectional, online survey was conducted in the Netherlands between
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5 97 October 2018 and October 2019. Neurologists in all Dutch hospitals with an inpatient
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7 98 neurology ward were invited to participate in this survey. For every neurology department,
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9 99 one neurologist with experience of stroke care was asked to complete the survey about
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11 100 screening and care for cognitive and emotional problems after TIA and ischemic stroke at
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13 101 their department. The neurologist was allowed to forward the survey to another neurologist, a
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15 102 nurse practitioner or a physician assistant within the same department with experience of
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17 103 stroke after-care.
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22 104 The data supporting the findings of this study are available from the corresponding author
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24 105 upon reasonable request. Ethical approval for this study was waived by the local ethics
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26 106 committee of OLVG Amsterdam. All data were handled in accordance with the
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28 107 EU General Data Protection Regulation 2016/679.
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36 109 *Development and content of the survey*

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39 110 The survey was developed by a multidisciplinary team, including a clinical
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41 111 neuropsychologist, a rehabilitation physician, two vascular stroke neurologists and a resident
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43 112 in neurology. A data manager verified the content and structure after the survey had been built
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45 113 in the web-based system Castor EDC.(18)
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49 114 The survey was divided into two parts: one part about screening and follow-up care for
50
51 115 cognitive consequences after TIA and ischemic stroke, and the second part about screening
52
53 116 and follow-up care for emotional consequences. Both parts included 10 multiple choice
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55 117 questions, resulting in 20 questions in total (see Table 2 and Table 3). The number of answer
56
57 118 options ranged from two to nine. The multiple choice questions were formatted either as
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3 119 single-answer multiple choice questions (only one answer allowed) or as multiple-answer
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5 120 multiple choice questions (multiple answers allowed).
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12 122 *Survey administration*

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15 123 All neurologists received an invitation by email to participate in this online survey. Non-
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17 124 respondents received up to two subsequent emails. If the questionnaire was not completed
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19 125 after invitation by email, the neurologist was contacted by telephone. Participants completed
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21 126 the survey independently online, using a computer. Data were collected anonymously.
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28 128 *Statistical analysis*

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32 129 The results of the survey were analysed using descriptive statistics. For single-answer
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34 130 multiple choice questions, all answer options were recorded as percentages of the total
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36 131 number of respondents. For multiple-answer multiple choice questions the following analysis
37
38 132 was performed. First, a dichotomous dummy variable was computed for each potential answer
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40 133 option. The options of the dummy variables were 'marked' or 'not marked' for each answer
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42 134 option. All answer options were then recorded as percentages of 'marked', divided by the
43
44 135 total number of respondents. IBM SPSS version 22.0 was used for analyses.
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51 137 *Patient and public involvement*

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55 138 Patients or the public were not involved in the design, conduct or reporting of this research.
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140 **Results**

141 *Response rate and characteristics of the participants*

142 Of the neurologists in 78 Dutch hospitals who were invited to join the survey, 52 (67%)
143 completed the survey. The characteristics of the respondents are shown in Table 1. Nineteen
144 (37%) participants were female, and the median age was 45 years (interquartile range: 40 –
145 57); seven (15%) were working at a university hospital, 44 (87%) in a large general hospital
146 (more than 100 stroke patients per year) and one (2%) in a small general hospital (less than
147 100 stroke patients per year). Of the non-respondents, one (4%) was working at a university
148 hospital, 25 (96%) at a large general hospital and none at a small general hospital.

149

150 *Screening for cognitive problems after TIA and ischemic stroke*

151 The various items regarding screening for cognitive problems in patients after TIA or
152 ischemic stroke are shown in Table 2. Of the respondents, 31 (59%) reported that patients
153 were mostly or always screened for cognitive problems after TIA or ischemic stroke, while 21
154 (41%) said that patients were sometimes or never screened. When screening for cognitive
155 problems was performed, 42 (84%) stated that validated screening instruments were used.
156 When screening instruments were used, the most commonly used instruments were the MoCA
157 (n = 35; 84%), the Mini-Mental State Examination (MMSE) (n = 21; 50%) and the Checklist
158 for Cognitive and Emotional Consequences following Stroke (CLCE-24) (n = 6; 14%). The
159 timing of screening for cognitive problems varied greatly among the hospitals: 31 (62%)
160 screened during hospital admission and 19 (38%) at a follow-up visit between 4-8 weeks after
161 TIA or ischemic stroke. Fourteen (27%) stated that they screened at multiple time points.
162 According to the participants, the majority of patients received some form of information
163 about possible cognitive problems after TIA or ischemic stroke during admission or at follow-

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3 164 up visits, but 19 (37%) reported that no written information was provided at all. When
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5 165 cognitive problems were observed, it was the local neurologist, nurse practitioner or physician
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7 166 assistant, or the rehabilitation physician, who acted as the treating physician in most cases.
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10 167 Thirty-nine of the participants (75%) stated that they did not have a guideline or protocol for
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12 168 follow-up care in case of cognitive problems after TIA and ischemic stroke. The reasons for
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14 169 referral to specialized care varied considerably among the hospitals: 36 (69%) referred
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16 170 patients based on cognitive complaints, 36 (69%) based on cognitive disorders, 30 (58%)
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18 171 based on positive screening results and 14 (27%) based on deviant results during a
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20 172 neuropsychological examination.
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28 174 *Screening for emotional problems after TIA and ischemic stroke*

31 175 Table 3 shows the survey responses for the items about screening for emotional problems.
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33 176 According to 29 (56%) of the participants, patients were mostly or always screened for
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35 177 emotional problems after TIA or ischemic stroke at their hospital. When patients were
36
37 178 screened, 31 (63%) used validated screening instruments. When screening instruments were
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39 179 used, the most commonly used instrument was the Hospital Anxiety and Depression Scale
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41 180 (HADS) (n = 27; 87%). Screening for emotional problems was performed at variable time
42
43 181 points, but mostly during hospital admission (n = 14; 29%) or at a follow-up visit between 1 –
44
45 182 4 weeks after discharge (n = 21; 43%). Fifteen percent of the participants reported that
46
47 183 patients were screened at multiple time points. According to 22 (61%) of the participants,
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49 184 information about the possible emotional sequelae was given to most or all patients, and
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51 185 according to 21 (40%), written information was mostly or always given. According to the
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53 186 respondents, 42 (81%) of the hospitals had no guideline or protocol for follow-up care for
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55 187 emotional problems after TIA and ischemic stroke. When emotional problems arose, it was
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3 188 mostly the neurologist who acted as the treating physician (n = 30; 58%), followed by the
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5 189 nurse practitioner or physician assistant (n = 27; 52%), the rehabilitation physician (n = 23;
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7 190 44%) or the patient's general practitioner (n = 16; 31%). Indications for referral to specialized
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9 191 care were emotional complaints (n = 37; 71%), clinical suspicion of an emotional disorder (n
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11 = 31; 60%) and positive screening results (n = 14; 27%).
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194 **Discussion**

195 Our nationwide survey in the Netherlands found a wide variety as regards screening at
196 neurology departments for cognitive and emotional problems in patients after TIA or ischemic
197 stroke. While a small majority of the participants reported screening for cognitive and
198 emotional problems was performed in most or all patients with TIA or ischemic stroke, the
199 others did so only sometimes, or never. When patients were screened, the most commonly
200 used instruments for cognitive problems were the MoCA and the MMSE, and for emotional
201 problems the HADS. Screening for cognitive and emotional problems was performed at
202 various time points, and information provision was highly variable. The vast majority of
203 respondents indicated that their hospital lacked a protocol or a guideline for follow-up care for
204 cognitive and emotional problems after stroke.

205 A strength of this study is that neurologists in all Dutch hospitals with a neurology ward were
206 invited to participate, and that a satisfactory percentage of invited clinicians actually
207 completed the survey. A limitation of this study is its design as a survey, which might not
208 accurately reflect current clinical practice, for example due to social desirability. In addition,
209 we focused on the views of the neurologists and their teams. This might underestimate the
210 true screening rates for cognitive and emotional problems, since part of this care might be
211 provided by, for example, general practitioners or rehabilitation physicians.

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3 212 National guidelines recommend screening for cognitive and emotional problems in all stroke
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5 213 patients. Nevertheless, almost half of the respondents reported that they only sometimes, or
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7 214 even never, screened patients for cognitive and emotional problems after TIA or ischemic
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9 215 stroke, which is in accordance with the findings of other studies.(12-17, 19) Previous studies
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11 216 found considerable practice variation for other aspects of stroke care as well, such as
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13 217 secondary prevention and mobilization after stroke.(20, 21) Studies have identified multiple
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15 218 barriers to the implementation of evidence-based guidelines in clinical practice.(22, 23) With
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17 219 regard to screening for cognitive and emotional problems after stroke, multiple factors might
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19 220 explain the low rates of routine screening. First, there are numerous screening tools for
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21 221 cognitive and emotional problems, and they can be time-consuming and may be difficult to
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23 222 use for patients with language barriers or disabilities such as aphasia, hearing loss or vision
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25 223 loss.(24) Second, insufficient time, training and expertise of clinicians might further limit
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27 224 routine screening, as well as the lack of a protocol for follow-up care when a screening turns
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29 225 out to be positive.(19, 22-24) Third, stroke care predominantly focuses on secondary
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31 226 prevention, which might overshadow the importance of screening for cognitive and emotional
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33 227 problems.

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35 228 Remarkably, when screening for cognitive problems was performed, 50% of our respondents
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37 229 who used screening instruments reported using the MMSE. However, two reviews have
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39 230 demonstrated that the MMSE is not sufficiently sensitive to the cognitive consequences of
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41 231 stroke, as it was originally designed to screen for the presence of dementia.(15, 25, 26) It is
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43 232 recommended to use the MoCA as a screening instrument for cognitive disorders in patients
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45 233 with stroke.(15, 26) When patients were screened for emotional problems after stroke, the
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47 234 vast majority of the respondents said they used the HADS, as has been recommended.(15)

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52 235 Apart from screening, information provision and follow-up care for cognitive and emotional
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55 236 problems were also highly variable in our study, and most respondents reported that a

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3 237 protocol for follow-up care was lacking. Nonetheless, cognitive and emotional problems are
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5 238 very common after stroke, and a previous evaluation among patients identified information
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7 239 provision after stroke as a major target for improvement.(27) Moreover, patients' evaluations
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9 240 underline the importance of the cognitive and emotional sequelae, and patients even rated
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11 241 these consequences as among the top 10 of research priorities in stroke.(28) Fortunately,
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13 242 attention is increasingly being drawn to the cognitive and emotional consequences of stroke,
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15 243 and screening rates seem to be increasing.(29) Still, our results suggest that further
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17 244 improvement is possible and, in our opinion, desirable. Therefore, we recommend to perform
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19 245 screening for all patients after stroke for cognitive and emotional problems with validated
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21 246 screening instruments such as the MoCA and HADS, respectively. In our opinion, the
22
23 247 additional use of stroke-specific patient-reported screening instruments that measure
24
25 248 subjective cognitive complaints and a wider spectrum of emotional problems will provide
26
27 249 even better and valuable insights into the consequences of stroke. An example of such an
28
29 250 instrument is the Checklist for the Detection of Cognitive and Emotional Consequences After
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31 251 Stroke (CLCE-24). Additionally, we recommend that such screenings should be performed
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33 252 by health care professionals with experience in screening for cognitive and emotional
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35 253 problems, and with sufficient time to use appropriate screening instruments. In our opinion,
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37 254 these screenings can be performed in primary care, in hospitals or in rehabilitation centres.
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39 255 However, to ensure that all patients are actually screened, it is important to have clear
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41 256 agreements embedded in the collaborative network of stroke care. Furthermore, guidance for
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43 257 stroke patients with proven cognitive and emotional problems can be further optimized by
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45 258 implementing local protocols for follow-up care. Follow-up care for cognitive problems can
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47 259 include referral to a rehabilitation physician for treatment such as cognitive rehabilitation.(30)
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49 260 With regard to follow-up care for emotional problems, psycho-education, psychotherapy and
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51 261 pharmacotherapy can be considered.(15)
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3 262 In conclusion, this study indicates that stroke care practice at neurology departments in the
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5 263 Netherlands is highly variable with regard to screening, information provision and follow-up
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7 264 care for cognitive and emotional problems in patients after TIA or ischemic stroke. Almost
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10 265 half of the respondents reported that they only sometimes or never screened for cognitive and
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12 266 emotional problems after TIA and stroke. Therefore, in order to optimize stroke care,
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14 267 screening rates should be improved and should include suitable screening instruments and a
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17 268 protocol for follow-up care.
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20
21 275 number 843004122.
22
23

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25
26 277 not subjected to procedures and because the questions were not regarded as confrontational or
27
28 278 time-consuming.
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32 279 Ethical approval: Ethical approval for this study was waived by the local ethics committee of
33
34 280 OLVG Amsterdam. This study was completed in accordance with the Helsinki Declaration as
35
36 281 revised in 2013.
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39 282 Data availability statement: The data that support the findings of this study are available from
40
41 283 the corresponding author upon reasonable request.
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44

45 284 Contributorship: RvdB, CH, VK, JS and AV were involved in the conception of the study
46
47 285 design. RvdB, VK and JS were involved in participant recruitment. JS was involved in
48
49 286 researching the literature, gaining ethical approval and data analysis. JS wrote the first draft of
50
51 287 the manuscript. All authors reviewed and edited the manuscript and approved the final version
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53 288 of the manuscript.
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367 **Table 1. Characteristics of respondents and non-respondents**

Characteristic	Respondents, n= 52	Non-respondents, n = 26
Female sex (%)	19 (37)	-
Age, median (interquartile range)	45 (40 – 57)	-
Neurologist (%)	49 (94)	-
Nurse practitioner or physician assistant at the neurology department (%)	3 (6)	-
Type of hospital		
University (%)	7 (15)	1 (4)
Large general (%)	44 (87)	25 (96)
Small general (%)	1 (2)	0 (0)

368

369 **Table 2. Screening for cognitive problems after TIA and ischemic stroke**

Item	Answer options	n	(%)
1. Are patients screened for cognitive problems?	Always	8	(15)
	Mostly	23	(44)
	Sometimes	19	(37)
	Never	2	(4)
2. Are validated screening instruments used? *	Yes	42	(84)
	No	8	(16)
3. Which screening instrument(s) is / are used? † ‡	MoCA	35	(83)
	MMSE	21	(50)
	CLCE-24	6	(14)
	Other	4	(9)
4. When does screening take place? * † ‡	During hospital admission	31	(62)
	< 1 week after discharge	2	(4)
	1 – 4 weeks after discharge	5	(10)
	4 – 8 weeks after discharge	19	(38)
	>8 weeks after discharge	14	(28)
5. Do patients receive information about possible cognitive problems?	Always	15	(28)
	Mostly	25	(48)
	Sometimes	12	(23)
	Never	0	(0)
6. Do patients receive written information about possible cognitive problems?	Always	13	(25)
	Mostly	13	(25)
	Sometimes	7	(14)
	Never	19	(37)
7. Do caregivers receive information about possible cognitive problems?	Always	13	(25)
	Mostly	23	(44)
	Sometimes	15	(29)
	Never	1	(2)
8. Reasons for referral to specialized care ‡	Cognitive complaints	36	(69)
	Clinical suspicion of cognitive disorders	36	(69)
	Abnormal screening results	30	(58)
	Abnormal results during neuropsychological examination	14	(27)
9. Who is the treating physician for cognitive problems? ‡	Neurologist	35	(67)
	Resident in neurology	3	(6)
	Nurse practitioner or physician assistant	23	(55)
	Rehabilitation physician	30	(58)
	Psychologist	6	(12)
	Geriatrician	8	(15)
	Nursing home doctor	6	(12)
	General practitioner	16	(31)
Occupational therapist	5	(10)	
10. Does your hospital have a protocol or	Yes	12	(23)

guideline for follow-up care for cognitive problems?	No	39 (75)
	Missing	1 (2)

- 370 MoCA: Montreal Cognitive Assessment; MMSE: Mini-Mental State Examination; CLCE-24:
 371 Checklist for Cognitive and Emotional Consequences following Stroke.
 372 * Items 2 and 4 were only asked if item 1 had been marked 'Always', 'Mostly' or 'Sometimes'.
 373 † Item 3 was only asked when item 2 had been marked 'Yes'.
 374 ‡ These items allowed multiple answers and were analysed accordingly, see 'Statistical Analysis'
 375 paragraph; consequently, the sum of the percentages is not 100%.

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376 **Table 3. Screening for emotional problems after TIA and ischemic stroke**

Item	Answer options	n	(%)
1. Are patients screened for emotional problems?	Always	10	(19)
	Mostly	19	(37)
	Sometimes	20	(39)
	Never	3	(6)
2. Are validated screening instruments used? *	Yes	31	(63)
	No	18	(37)
3. Which screening instrument(s) is / are used? † ‡	HADS	27	(87)
	CLCE-24	4	(13)
	HDRS	1	(3)
	BDI	1	(3)
	SIGEB	2	(6)
4. When does screening take place? * ‡	During hospital admission	14	(29)
	< 1 week after discharge	1	(2)
	1 – 4 weeks after discharge	13	(27)
	4 – 8 weeks after discharge	21	(43)
	>8 weeks after discharge	12	(25)
5. Do patients receive information about possible emotional problems?	Always	11	(21)
	Mostly	21	(40)
	Sometimes	18	(35)
	Never	2	(4)
6. Do patients receive written information about possible emotional problems?	Always	9	(17)
	Mostly	12	(23)
	Sometimes	12	(23)
	Never	19	(37)
7. Do caregivers receive information about possible emotional problems?	Always	8	(15)
	Mostly	13	(25)
	Sometimes	12	(23)
	Never	19	(37)
8. Reason for referral to specialized care ‡	Emotional complaints	37	(71)
	Clinical suspicion of emotional disorders	31	(60)
	Abnormal screening results	14	(27)
9. Who is the treating physician for emotional problems? ‡	Neurologist	30	(58)
	Resident in neurology	3	(6)
	Nurse practitioner or physician assistant	27	(52)
	Rehabilitation physician	23	(44)
	Psychiatrist	1	(2)
	Psychologist	14	(27)
	Geriatrician	5	(10)
	General practitioner	16	(31)
10. Does your hospital have a protocol or guideline for follow-up care for emotional problems?	Yes	9	(17)
	No	42	(81)
	Missing	1	(2)

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3 377 HADS: Hospital Anxiety and Depression Scale; CLCE-24: Checklist for Cognitive and Emotional
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5 378 Consequences following Stroke; HDRS: Hamilton Depression Rating Scale; BDI: Beck Depression
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7 379 Inventory; SIGEB: Assessment tool for long-term Consequences After Stroke
8
9 380 (*'Signaleringsinstrument voor de lange termijn Gevolgen van een Beroerte'*)(31)
10
11 381 * Items 2 and 4 were only asked when item 1 had been marked 'Always', 'Mostly' or 'Sometimes'.
12
13 382 † Item 3 was only asked when item 2 had been marked 'Yes'.
14
15 383 ‡ These items allowed multiple answers and were analysed accordingly, see 'Statistical Analysis'
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17 384 paragraph; consequently, the sum of the percentages is not 100%.
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Checklist for preparing the report of a survey

1. Burns et al., *A guide for the design and conduct of self-administered surveys of clinicians*, *CMAJ*.

2008 Jul 29; 179(3): 245–252. doi: [10.1503/cmaj.080372](https://doi.org/10.1503/cmaj.080372)

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Abstract

Is the objective clearly stated?	Yes, see subhead 'Objectives', page 3.
Is the design of the study stated?	Yes, see subhead 'Methods', page 3.
Is the study setting well described?	Yes, see subhead 'Methods', page 3.
Is the survey population described?	Yes, see subhead 'Methods', page 3.
Are the outcome measures identified?	Partly, we described to conduct a survey, see subhead 'Methods', page 4, but a full explanation on all different items was not considered suitable for the abstract.
Are the main results clearly reported?	Yes, see subhead 'Results', page 3.
Are the conclusions appropriate?	Yes, the conclusion answers the objective and is in line with the results. See subhead 'Conclusion', page 4.

Introduction

Is the problem clearly stated?	Yes, see paragraph 'Introduction', page 4-5.
Is the pertinent literature cited and critically appraised?	Yes, see paragraph 'Introduction', page 4-5.
Is the relevance of the research question explained?	Yes, see paragraph 'Introduction', page 5.
Is the objective clearly stated?	Yes, see paragraph 'Introduction', page 5.

Methods

Is the study design appropriate to the objective?	Yes, neurologists in all hospitals in the Netherlands were invited to participate, therewith enhancing its generalizability. As we did not intend to measure change over time, a cross-sectional survey sufficed.
Is the setting clearly described?	Yes, see subhead 'Study design and participants', page 6.
Are the methods described clearly enough to permit other researchers to duplicate the study?	Yes, see subhead 'Study design and participants', page 6. Moreover, all items of the questionnaire are displayed in Table 2 and Table 3, page 18 – 21.
Is the survey sample likely to be representative of the population?	Yes, neurologists in all hospitals in the Netherlands were invited to participate. The response rate was acceptable (67%) ¹ and responders were spread across the country. No further inclusion or exclusion criteria were applied.
Is the questionnaire described adequately?	The questionnaire is described in paragraph

<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p>26</p> <p>27</p> <p>28</p>	<p>Have the validity and reliability of the questionnaire been established?</p> <p>Was the questionnaire administered in a satisfactory way?</p> <p>Are the statistical methods used appropriately?</p>	<p>‘Development and content of the survey’, page 6-7. All items of the questionnaire are displayed in Table 2 and Table 3, page 18 – 21.</p> <p>Face validity was tested by a multidisciplinary team, including a clinical neuropsychologist, a rehabilitation physician, two vascular stroke neurologists and a resident in neurology.</p> <p>As the questionnaire was specifically developed for this purpose only, further testing for validity and reliability was not considered feasible.</p> <p>Yes, the survey was administered online in a web-based system called Castor EDC. We ensured that all potential respondents had access to electronic mail. A data manager verified the content and structure after the survey had been built. Non-respondents received up to two subsequent emails.</p> <p>Yes, descriptive analyses were used to display the results. Only the results of multiple-answer multiple choice questions were transformed, as is described in paragraph ‘Statistical analysis’, page 7.</p>
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Results

<p>30</p> <p>31</p> <p>32</p> <p>33</p> <p>34</p> <p>35</p> <p>36</p> <p>37</p> <p>38</p> <p>39</p> <p>40</p> <p>41</p> <p>42</p> <p>43</p> <p>44</p> <p>45</p> <p>46</p> <p>47</p> <p>48</p> <p>49</p> <p>50</p>	<p>Do the results address the objective?</p> <p>Are all respondents accounted for?</p> <p>Are the results clearly and logically presented?</p> <p>Are the tables and figures appropriate?</p> <p>Are the numbers consistent in the text and the tables?</p>	<p>Yes, the results address the current clinical practice of screening for cognitive and emotional problems after TIA and ischemic stroke at neurology departments in hospitals in the Netherlands, see paragraph ‘Results’, page 7 – 10.</p> <p>Yes, the total number of surveys sent is considered as well as the number of respondents and non-respondents.</p> <p>Yes, the results in the Results section follow a clear logic and follow the same structure as Table 2 and Table 3. Only important (selected) results are shown in text.</p> <p>Yes, both tables support the findings in text and show all items of the questionnaire in order to increase transparency.</p> <p>Yes.</p>
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Discussion

<p>51</p> <p>52</p> <p>53</p> <p>54</p> <p>55</p> <p>56</p> <p>57</p> <p>58</p> <p>59</p> <p>60</p>	<p>Are the results succinctly summarized?</p> <p>Are the implications of the results stated?</p> <p>Are other interpretations considered and refuted?</p> <p>Are appropriate conclusions drawn?</p>	<p>The results are summarized in the first section of the ‘Discussion’, see page 10.</p> <p>The implications are stated and discussed on page 11.</p> <p>The limitation section considers other possibilities for low screening rates.</p> <p>A conclusion is drawn in the last section of the</p>
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‘Discussion’ that answers the objective and is supported by the results shown in text and tables.

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1. *Sierles FS. How to do research with self-administered surveys. Acad Psychiatry 2003;27:104-13*

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BMJ Open

Screening and follow-up care for cognitive and emotional problems after transient ischemic attack and ischemic stroke: a national, cross-sectional, online survey among neurologists in the Netherlands

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-046316.R1
Article Type:	Original research
Date Submitted by the Author:	01-May-2021
Complete List of Authors:	Slenders, Jos; OLVG, Neurology Van den Berg-Vos, RM; OLVG, Neurology; Amsterdam UMC Locatie AMC, Neurology Visser-Meily, Johanna; UMC Utrecht Brain Center Rudolf Magnus, Department of Rehabilitation, Physical Therapy Science & Sports; UMC Utrecht Brain Center Rudolf Magnus, Center of Excellence for Rehabilitation Medicine van Heugten, Caroline M.; Maastricht University, Department of Neuropsychology & Psychopharmacology; Maastricht University Medical Centre+, School for Mental Health & Neuroscience Kwa, Vincent; OLVG, Neurology
Primary Subject Heading:	Neurology
Secondary Subject Heading:	Patient-centred medicine, Mental health, Neurology, Rehabilitation medicine
Keywords:	Stroke < NEUROLOGY, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, REHABILITATION MEDICINE, Depression & mood disorders < PSYCHIATRY

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3 1 **Screening and follow-up care for cognitive and emotional problems after transient**
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5 2 **ischemic attack and ischemic stroke: a national, cross-sectional, online survey among**
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7 3 **neurologists in the Netherlands**
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- 25 Total number of tables: 3
- 26 Total number of figures: not applicable
- 27 Word count: [2674/4000]

For peer review only

1
2
3 **Abstract**
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6 **Background:** After stroke, many patients experience cognitive and/or emotional problems.
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9 While national guidelines recommend screening for these problems, actual screening rates
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11 might be limited.
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14 **Objective:** This study aimed to examine the clinical practice at neurology departments
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16 regarding screening, information provision and follow-up care for cognitive and emotional
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18 problems after TIA and ischemic stroke.
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22 **Methods:** A nationwide, cross-sectional, online survey was conducted between October 2018
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24 and October 2019 among neurologists in all hospitals in the Netherlands.
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28 **Results:** Neurologists in 78 hospitals were invited to join the survey, and 52 (67%) of them
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30 completed it. Thirty-one (59%) neurologists reported that screening for cognitive problems
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32 after TIA and ischemic stroke was mostly or always performed. When cognitive screening was
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34 performed, 42 (84%) used validated screening instruments. Twenty-nine (56%) of the
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36 respondents reported that screening for emotional problems was mostly or always performed.
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38 When emotional screening was performed, 31 (63%) reported using validated screening
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40 instruments. Timing of screening and information provision was highly variable, and the
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42 majority reported that there was no protocol for follow-up care when cognitive or emotional
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44 problems were found.
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48 **Conclusions:** This study demonstrates that clinical practice at neurology departments is highly
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50 variable regarding screening, information provision and follow-up care for cognitive and
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52 emotional problems in patients after TIA or ischemic stroke. Approximately half of the
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54 participating neurologists reported that screening was performed only sometimes or never for
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56 cognitive and emotional problems after TIA and ischemic stroke.
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6 52**Keywords**7
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9 53 Screening, cognition, depression and anxiety, stroke, rehabilitation, survey
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1516 55 **Strengths and limitations of this study**

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- 19 56
- 20 • A detailed overview is provided of the current clinical practice at neurology departments
21 with regard to screening for cognitive and emotional problems after TIA or ischemic
22 stroke.
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24 57
 - 25 • Multiple opportunities are identified to further optimize the clinical practice of
26 screening and care for cognitive and emotional problems after stroke.
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28 58
 - 29 • Neurologists in all Dutch hospitals were invited to participate and a satisfactory
30 percentage completed the survey.
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32 59
 - 33 • Being a survey study, the results might deviate from the actual clinical practice, for
34 example due to social desirability.
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36 60
 - 37 • This study focuses on the views of neurologists and their teams, which might
38 underestimate the true screening rates for cognitive and emotional problems.
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 - 41 • This study focuses on the views of neurologists and their teams, which might
42 underestimate the true screening rates for cognitive and emotional problems.
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50 65 **Introduction**51
52 66 Stroke is a leading cause of disability worldwide.(1) After stroke, many patients experience
53 cognitive and/or emotional problems,(2-6) which affect their quality of life and participation.(7-
54 11) Therefore, national guidelines recommend screening and care for cognitive and emotional
55 problems after stroke.(12-15) The Dutch guideline recommends screening all stroke patients for
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3 73 cognitive problems, using the Montreal Cognitive Assessment (MoCA) rather than the Mini
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5 74 Mental State Examination (MMSE), and referral to rehabilitation services when cognitive
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8 75 problems are present.(15) With regard to emotional problems, multiple screening instruments
9
10 76 are considered suitable, namely the Hospital Anxiety and Depression Scale (HADS), the Beck
11
12 77 Depression Inventory (BDI), the Symptom CheckList (SCL-90) subscale for depression, and
13
14 78 the Hamilton Depression Scale (HDS).(15) When emotional problems are present,
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17 79 psychotherapy or pharmacotherapy should be considered.(15) Previous studies in the United
18
19 80 Kingdom found that compliance with the guidelines is low as regards screening for cognitive
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21 81 and emotional problems after transient ischemic attack (TIA) and ischemic stroke.(16, 17) In
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23
24 82 the Netherlands, in general, stroke patients are admitted to a stroke unit in the acute phase,
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26 83 where a neurologist functions as treating physician. From the stroke unit, patients are
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28 84 discharged home, to a rehabilitation centre or to a nursing home. If patients are discharged
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31 85 home, they are followed-up at the outpatient clinics of the neurology department.

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34 86 This study aimed to investigate the current clinical practice of screening for cognitive and
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36 87 emotional problems after TIA and ischemic stroke at neurology departments in hospitals in the
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38 88 Netherlands. This study examined: (1) if patients with TIA or ischemic stroke are screened for
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40 89 cognitive and emotional problems, (2) if so, which screening instruments are used, (3) when
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42 90 screening is performed, (4) whether patients receive information regarding the presence and
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44 91 nature of cognitive and emotional problems and (5) what kind of follow-up care is delivered
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46 92 when cognitive and/or emotional problems are present.

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52 53 54 94 **Materials and Methods**

55 56 57 95 ***Study design and participants***

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3 96 A nationwide, cross-sectional, online survey was conducted in the Netherlands between
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5 97 October 2018 and October 2019. Neurologists in all Dutch hospitals with an inpatient neurology
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7 98 ward were invited to participate in this survey. In the Netherlands only neurologists, and no
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9 99 other specialists, act as treating physicians at stroke units. For every neurology department, one
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11 100 neurologist with experience of stroke care was asked to complete the survey about screening
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13 101 and care for cognitive and emotional problems after TIA and ischemic stroke at their
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15 102 department. The neurologist was allowed to forward the survey to another neurologist, a nurse
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17 103 practitioner or a physician assistant within the same department with experience of stroke after-
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19 104 care.

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25 105 The data supporting the findings of this study are available from the corresponding author upon
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27 106 reasonable request. Ethical approval for this study was waived by the local ethics committee of
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29 107 OLVG Amsterdam. All data were handled in accordance with the EU General Data
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31 108 Protection Regulation 2016/679.

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36 37 38 110 ***Development and content of the survey***

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41 111 The survey was developed by a multidisciplinary team, including a clinical neuropsychologist,
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43 112 a rehabilitation physician, two vascular stroke neurologists and a resident in neurology. A data
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45 113 manager verified the content and structure after the survey had been built in the web-based
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47 114 system Castor EDC.(18)

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51 115 The survey was divided into two parts: one part about screening and follow-up care for
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53 116 cognitive consequences after TIA and ischemic stroke, and the second part about screening and
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55 117 follow-up care for emotional consequences. Both parts included 10 multiple choice questions,
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57 118 resulting in 20 questions in total (see Table 1 and Table 2). The number of answer options
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3 119 ranged from two to nine. The multiple choice questions were formatted either as single-answer
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5 120 multiple choice questions (only one answer allowed) or as multiple-answer multiple choice
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8 121 questions (multiple answers allowed).
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12 13 14 123 *Survey administration*

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17 124 All neurologists received an invitation by email to participate in this online survey. Non-
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20 125 respondents received up to two subsequent emails. If the questionnaire was not completed after
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22 126 invitation by email, the neurologist was contacted by telephone. Participants completed the
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25 127 survey independently online, using a computer. Data were collected anonymously.
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29 30 31 129 *Statistical analysis*

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34 130 The results of the survey were analysed using descriptive statistics. For single-answer multiple
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36 131 choice questions, all answer options were recorded as percentages of the total number of
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39 132 respondents. For multiple-answer multiple choice questions the following analysis was
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41 133 performed. First, a dichotomous dummy variable was computed for each potential answer
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43 134 option. The options of the dummy variables were 'marked' or 'not marked' for each answer
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46 135 option. All answer options were then recorded as percentages of 'marked', divided by the total
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48 136 number of respondents. IBM SPSS version 22.0 was used for analyses.
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52 53 54 55 138 *Patient and public involvement*

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58 139 Patients or the public were not involved in the design, conduct or reporting of this research.
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6 141 **Results**
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10 142 *Response rate and characteristics of the participants*
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13 143 Of the neurologists in 78 Dutch hospitals who were invited to join the survey, 52 (67%)
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15 144 completed the survey. The characteristics of the respondents are shown in Table 3. Nineteen
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17 145 (37%) participants were female, and the median age was 45 years (interquartile range: 40 – 57);
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19 146 seven (15%) were working at a university hospital, 44 (87%) in a large general hospital (more
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21 147 than 100 stroke patients per year) and one (2%) in a small general hospital (less than 100 stroke
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23 148 patients per year). Of the non-respondents, one (4%) was working at a university hospital, 25
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25 149 (96%) at a large general hospital and none at a small general hospital.
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33 151 *Screening for cognitive problems after TIA and ischemic stroke*
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36 152 The various items regarding screening for cognitive problems in patients after TIA or ischemic
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38 153 stroke are shown in Table 1. Of the respondents, 31 (59%) reported that patients were mostly
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40 154 or always screened for cognitive problems after TIA or ischemic stroke, while 21 (41%) said
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42 155 that patients were sometimes or never screened. When screening for cognitive problems was
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44 156 performed, 42 (84%) stated that validated screening instruments were used. When screening
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46 157 instruments were used, the most commonly used instruments were the MoCA (n = 35; 84%),
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48 158 the Mini-Mental State Examination (MMSE) (n = 21; 50%) and the Checklist for Cognitive and
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50 159 Emotional Consequences following Stroke (CLCE-24) (n = 6; 14%). The timing of screening
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52 160 for cognitive problems varied greatly among the hospitals: 31 (62%) screened during hospital
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54 161 admission and 19 (38%) at a follow-up visit between 4-8 weeks after TIA or ischemic stroke.
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59 162 Fourteen (27%) stated that they screened at multiple time points. According to the participants,
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3 163 the majority of patients received some form of information about possible cognitive problems
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5 164 after TIA or ischemic stroke during admission or at follow-up visits, but 19 (37%) reported that
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7 165 no written information was provided at all. When cognitive problems were observed, it was the
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9 166 local neurologist, nurse practitioner or physician assistant, or the rehabilitation physician, who
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11 167 acted as the treating physician in most cases. Thirty-nine of the participants (75%) stated that
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13 168 they did not have a guideline or protocol for follow-up care in case of cognitive problems after
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15 169 TIA and ischemic stroke. The reasons for referral to specialized care varied considerably among
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17 170 the hospitals: 36 (69%) referred patients based on cognitive complaints, 36 (69%) based on
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19 171 cognitive disorders, 30 (58%) based on positive screening results and 14 (27%) based on
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21 172 deviant results during a neuropsychological examination. All respondents from university
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23 173 hospitals (100%) reported to use validated screening instruments when a screening was
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25 174 performed, whereas 35 respondents from general hospitals (83%) reported to use validated
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27 175 screening instruments when screening was performed. Apart from the use of validated
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29 176 screening instruments, screening for cognitive problems after TIA and ischemic stroke was
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31 177 overall comparable between university and general hospitals.
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179 ***Screening for emotional problems after TIA and ischemic stroke***

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45 180 Table 2 shows the survey responses for the items about screening for emotional problems.
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47 181 According to 29 (56%) of the participants, patients were mostly or always screened for
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49 182 emotional problems after TIA or ischemic stroke at their hospital. When patients were screened,
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51 183 31 (63%) used validated screening instruments. When screening instruments were used, the
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53 184 most commonly used instrument was the Hospital Anxiety and Depression Scale (HADS) (n =
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55 185 27; 87%). Screening for emotional problems was performed at variable time points, but mostly
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57 186 during hospital admission (n = 14; 29%) or at a follow-up visit between 1 – 4 weeks after
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3 187 discharge (n = 21; 43%). Fifteen percent of the participants reported that patients were screened
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5 188 at multiple time points. According to 22 (61%) of the participants, information about the
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7 189 possible emotional sequelae was given to most or all patients, and according to 21 (40%),
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9 190 written information was mostly or always given. According to the respondents, 42 (81%) of the
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11 191 hospitals had no guideline or protocol for follow-up care for emotional problems after TIA and
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13 192 ischemic stroke. When emotional problems arose, it was mostly the neurologist who acted as
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15 193 the treating physician (n = 30; 58%), followed by the nurse practitioner or physician assistant
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17 194 (n = 27; 52%), the rehabilitation physician (n = 23; 44%) or the patient's general practitioner
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19 195 (n = 16; 31%). Indications for referral to specialized care were emotional complaints (n = 37;
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21 196 71%), clinical suspicion of an emotional disorder (n = 31; 60%) and positive screening results
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23 197 (n = 14; 27%). Apart from the timing of screening, screening for emotional problems after TIA
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25 198 and ischemic stroke was overall comparable between university and general hospitals.
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35 200 **Discussion**

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38 201 Our nationwide survey in the Netherlands found a wide variety as regards screening at
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40 202 neurology departments for cognitive and emotional problems in patients after TIA or ischemic
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42 203 stroke. While a small majority of the participants reported screening for cognitive and emotional
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44 204 problems was performed in most or all patients with TIA or ischemic stroke, the others did so
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46 205 only sometimes, or never. When patients were screened, the most commonly used instruments
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48 206 for cognitive problems were the MoCA and the MMSE, and for emotional problems the HADS.
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50 207 Screening for cognitive and emotional problems was performed at various time points, and
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52 208 information provision was highly variable. The vast majority of respondents indicated that their
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54 209 hospital lacked a protocol or a guideline for follow-up care for cognitive and emotional
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56 210 problems after stroke. These results were comparable between university and general hospitals.
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3 211 A strength of this study is that neurologists in all Dutch hospitals with a neurology ward were
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5 212 invited to participate, and that a satisfactory percentage of invited clinicians actually completed
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7 213 the survey. A limitation of this study is its design as a survey, which might not accurately reflect
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9 214 current clinical practice, for example due to social desirability. In addition, we focused on the
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11 215 views of the neurologists and their teams. This might underestimate the true screening rates for
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13 216 cognitive and emotional problems, since part of this care might be provided by, for example,
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15 217 general practitioners or rehabilitation physicians. Besides, in the current questionnaire, no
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17 218 distinction was made between TIA and ischemic stroke. While patients with TIA and ischemic
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19 219 stroke receive comparable follow-up treatment in the Netherlands, it is not known whether the
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21 220 results of the current paper differ between TIA and ischemic stroke.
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27 221 National guidelines recommend screening for cognitive and emotional problems in all stroke
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29 222 patients.(12-15) Nevertheless, almost half of the respondents reported that they only sometimes,
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31 223 or even never, screened patients for cognitive and emotional problems after TIA or ischemic
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33 224 stroke. Our findings focussed on the clinical practice in the Netherlands and are in accordance
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35 225 with international studies, viz. from the United Kingdom and Canada, which also showed low
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37 226 compliance rates with guideline recommendations to screen for cognitive and emotional
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39 227 problems after stroke.(15-17, 19, 20) Since cognitive and emotional problems after stroke are
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41 228 universal, these low compliance rates might hinder optimal treatment of the consequences of
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43 229 stroke internationally. Therefore, it is important to identify and overcome barriers for screening.
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45 230 Studies have identified multiple barriers to the implementation of evidence-based guidelines in
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47 231 clinical practice.(21, 22) With regard to screening for cognitive and emotional problems after
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49 232 stroke, multiple factors might explain the low rates of routine screening. First, there are
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51 233 numerous screening tools for cognitive and emotional problems, and they can be time-
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53 234 consuming and may be difficult to use for patients with language barriers or disabilities such as
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55 235 aphasia, hearing loss or vision loss.(23) Second, insufficient time, training and expertise of
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3 236 clinicians might further limit routine screening, as well as the lack of a protocol for follow-up
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5 237 care when a screening turns out to be positive.(19, 21-23) Third, stroke care predominantly
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7 238 focuses on secondary prevention, which might overshadow the importance of screening for
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9 239 cognitive and emotional problems.

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13 240 Remarkably, when screening for cognitive problems was performed, 50% of our respondents
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15 241 who used screening instruments reported using the MMSE. However, two reviews have
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17 242 demonstrated that the MMSE is not sufficiently sensitive to the cognitive consequences of
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19 243 stroke, as it was originally designed to screen for the presence of dementia.(15, 24, 25) It is
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21 244 recommended to use the MoCA as a screening instrument for cognitive disorders in patients
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23 245 with stroke.(15, 25) When patients were screened for emotional problems after stroke, the vast
24
25 246 majority of the respondents said they used the HADS, as has been recommended.(15)

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30 247 Apart from screening, information provision and follow-up care for cognitive and emotional
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32 248 problems were also highly variable in our study, and most respondents reported that a protocol
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34 249 for follow-up care was lacking. Nonetheless, cognitive and emotional problems are very
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36 250 common after stroke, and a previous evaluation among patients identified information provision
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38 251 after stroke as a major target for improvement.(26) Moreover, patients' evaluations underline
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40 252 the importance of the cognitive and emotional sequelae, and patients even rated these
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42 253 consequences as among the top 10 of research priorities in stroke.(27) Fortunately, attention is
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44 254 increasingly being drawn to the cognitive and emotional consequences of stroke, and screening
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46 255 rates seem to be increasing.(28) Still, our results suggest that further improvement is possible
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48 256 and, in our opinion, desirable. Therefore, we recommend to perform screening for all patients
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50 257 after stroke for cognitive and emotional problems with validated screening instruments such as
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52 258 the MoCA and HADS, respectively. In our opinion, the additional use of stroke-specific patient-
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54 259 reported screening instruments that measure subjective cognitive complaints and a wider
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56 260 spectrum of emotional problems will provide even better and valuable insights into the

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3 261 consequences of stroke. An example of such an instrument is the Checklist for the Detection of
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5 262 Cognitive and Emotional Consequences After Stroke (CLCE-24). Additionally, we
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8 263 recommend that such screenings should be performed by health care professionals with
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10 264 experience in screening for cognitive and emotional problems, and with sufficient time to use
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12 265 appropriate screening instruments. In our opinion, these screenings can be performed in primary
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14 266 care, in hospitals or in rehabilitation centres. However, to ensure that all patients are actually
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17 267 screened, it is important to have clear agreements embedded in the collaborative network of
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19 268 stroke care. Furthermore, guidance for stroke patients with proven cognitive and emotional
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21 269 problems can be further optimized by implementing local protocols for follow-up care. Follow-
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24 270 up care for cognitive problems can include referral to a rehabilitation physician for treatment
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26 271 such as cognitive rehabilitation.(29) With regard to follow-up care for emotional problems,
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28 272 psycho-education, psychotherapy and pharmacotherapy can be considered.(15)

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31 273 In conclusion, this study indicates that stroke care practice at neurology departments in the
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33 274 Netherlands is highly variable with regard to screening, information provision and follow-up
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35 275 care for cognitive and emotional problems in patients after TIA or ischemic stroke. Almost half
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37 276 of the respondents reported that they only sometimes or never screened for cognitive and
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40 277 emotional problems after TIA and stroke. Therefore, in order to optimize stroke care, screening
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42 278 rates should be improved and should include suitable screening instruments and a protocol for
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45 279 follow-up care.

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12 283 **Declarations**
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19
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22
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26 288 not subjected to procedures and because the questions were not regarded as confrontational or
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29 289 time-consuming.
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32 290 Ethical approval: Ethical approval for this study was waived by the local ethics committee of
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34 291 OLVG Amsterdam. This study was completed in accordance with the Helsinki Declaration as
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36 292 revised in 2013.
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39 293 Data availability statement: The data that support the findings of this study are available from
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42 294 the corresponding author upon reasonable request.
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45 295 Contributorship: RvdB, CH, VK, JS and AV were involved in the conception of the study
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47 296 design. RvdB, VK and JS were involved in participant recruitment. JS was involved in
48
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50 297 researching the literature, gaining ethical approval and data analysis. JS wrote the first draft of
51
52 298 the manuscript. All authors reviewed and edited the manuscript and approved the final version
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54 299 of the manuscript.
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373 Table 1. Screening for cognitive problems after TIA and ischemic stroke

Item	Answer options	n	(%)	University hospital (n = 7)	General hospital (n = 45)
1. Are patients screened for cognitive problems?	Always	8	(15)	0	8
	Mostly	23	(44)	5	18
	Sometimes	19	(37)	2	17
	Never	2	(4)	0	2
2. Are validated screening instruments used? *	Yes	42	(84)	7	35
	No	8	(16)	0	8
3. Which screening instrument(s) is / are used? † ‡	MoCA	35	(83)	6	29
	MMSE	21	(50)	3	18
	CLCE-24	6	(14)	2	4
	Other §	4	(9)	0	4
4. When does screening take place? * ‡	During hospital admission	31	(62)	5	26
	< 1 week after discharge	2	(4)	0	2
	1 – 4 weeks after discharge	5	(10)	1	4
	4 – 8 weeks after discharge	19	(38)	3	16
	>8 weeks after discharge	14	(28)	2	12
5. Do patients receive information about possible cognitive problems?	Always	15	(28)	2	13
	Mostly	25	(48)	2	23
	Sometimes	12	(23)	3	9
	Never	0	(0)	0	0
6. Do patients receive written information about possible cognitive problems?	Always	13	(25)	2	11
	Mostly	13	(25)	1	12
	Sometimes	7	(14)	1	6
	Never	19	(37)	3	16
7. Do caregivers receive information about possible cognitive problems?	Always	13	(25)	0	13
	Mostly	23	(44)	4	19
	Sometimes	15	(29)	3	12
	Never	1	(2)	0	1
8. Reasons for referral to specialized care ‡	Cognitive complaints	36	(69)	5	31
	Clinical suspicion of cognitive disorders	36	(69)	5	31
	Abnormal screening results	30	(58)	3	27
	Abnormal results during neuropsychological examination	14	(27)	2	12
9. Who is the treating physician for cognitive	Neurologist	35	(67)	4	31
	Resident in neurology	3	(6)	1	2

problems? ‡	Nurse practitioner or physician assistant	23	(55)	3	20
	Rehabilitation physician	30	(58)	5	25
	Psychologist	6	(12)	0	6
	Geriatrician	8	(15)	1	7
	Nursing home doctor	6	(12)	1	5
	General practitioner	16	(31)	2	14
	Occupational therapist	5	(10)	0	5
10. Does your hospital have a protocol or guideline for follow-up care for cognitive problems?	Yes	12	(23)	2	1
	No	39	(75)	5	44
	Missing	1	(2)	0	

374 MoCA: Montreal Cognitive Assessment; MMSE: Mini-Mental State Examination; CLCE-24:

375 Checklist for Cognitive and Emotional Consequences following Stroke.

376 * Items 2 and 4 were only asked if item 1 had been marked 'Always', 'Mostly' or 'Sometimes'.

377 † Item 3 was only asked when item 2 had been marked 'Yes'.

378 ‡ These items allowed multiple answers and were analysed accordingly, see 'Statistical Analysis' paragraph; consequently, the sum of the percentages is not 100%.

380 § Other screening instruments included the Cambridge Cognitive Examination (CAMCOG) (n = 1),
 381 the Symbol Digit Modalities Test (SDMT) (n = 1), the Assessment tool for long-term Consequences
 382 After Stroke (SIGEB) (n = 1) and a neuropsychological examination (n = 1).

383 Table 2. Screening for emotional problems after TIA and ischemic stroke

Item	Answer options	n	(%)	University hospital	General hospital
1. Are patients screened for emotional problems?	Always	10	(19)	1	9
	Mostly	19	(37)	3	16
	Sometimes	20	(39)	3	17
	Never	3	(6)	0	3
2. Are validated screening instruments used? *	Yes	31	(63)	6	25
	No	18	(37)	1	17
3. Which screening instrument(s) is / are used? † ‡	HADS	27	(87)	6	21
	CLCE-24	4	(13)	0	4
	HDRS	1	(3)	0	1
	BDI	1	(3)	0	1
	SIGEB	2	(6)	0	2
4. When does screening take place? * †	During hospital admission	14	(29)	0	14
	< 1 week after discharge	1	(2)	0	1
	1 – 4 weeks after discharge	13	(27)	4	9
	4 – 8 weeks after discharge	21	(43)	1	20
	>8 weeks after discharge	12	(25)	2	10
5. Do patients receive information about possible emotional problems?	Always	11	(21)	1	10
	Mostly	21	(40)	3	18
	Sometimes	18	(35)	3	15
	Never	2	(4)	0	2
6. Do patients receive written information about possible emotional problems?	Always	9	(17)	0	9
	Mostly	12	(23)	2	10
	Sometimes	12	(23)	3	9
	Never	19	(37)	2	17
7. Do caregivers receive information about possible emotional problems?	Always	8	(15)	0	8
	Mostly	13	(25)	3	10
	Sometimes	12	(23)	2	10
	Never	19	(37)	2	17
8. Reason for referral to specialized care ‡	Emotional complaints	37	(71)	5	32
	Clinical suspicion of emotional disorders	31	(60)	4	27
	Abnormal screening results	14	(27)	2	12
9. Who is the treating physician	Neurologist	30	(58)	5	25

	for emotional problems? ‡	Resident in neurology	3	(6)	1	2
		Nurse practitioner or physician assistant	27	(52)	4	23
		Rehabilitation physician	23	(44)	3	20
		Psychiatrist	1	(2)	0	1
		Psychologist	14	(27)	1	13
		Geriatrician	5	(10)	1	4
		General practitioner	16	(31)	1	15
10.	Does your hospital have a protocol or guideline for follow-up care for emotional problems?	Yes	9	(17)	2	7
		No	42	(81)	5	37
		Missing	1	(2)	0	1

384 HADS: Hospital Anxiety and Depression Scale; CLCE-24: Checklist for Cognitive and Emotional
 385 Consequences following Stroke; HDRS: Hamilton Depression Rating Scale; BDI: Beck Depression
 386 Inventory; SIGEB: Assessment tool for long-term Consequences After Stroke
 387 (*'Signaleringsinstrument voor de lange termijn Gevolgen van een Beroerte'*)(30)

388 * Items 2 and 4 were only asked when item 1 had been marked 'Always', 'Mostly' or 'Sometimes'.

389 † Item 3 was only asked when item 2 had been marked 'Yes'.

390 ‡ These items allowed multiple answers and were analysed accordingly, see 'Statistical Analysis'
 391 paragraph; consequently, the sum of the percentages is not 100%.

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393 **Table 3. Characteristics of respondents and non-respondents**

Characteristic	Respondents, n= 52	Non-respondents, n = 26
Female sex (%)	19 (37)	-
Age, median (interquartile range)	45 (40 – 57)	-
Neurologist (%)	49 (94)	-
Nurse practitioner or physician assistant at the neurology department (%)	3 (6)	-
Type of hospital		
University (%)	7 (15)	1 (4)
Large general (%)	44 (87)	25 (96)
Small general (%)	1 (2)	0 (0)

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60STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 1/ line 1-3 Page 3/ line 29 – 50
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 4 – 5 / line 69 – 86
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 5 / line 87 – 93
Methods			
Study design	4	Present key elements of study design early in the paper	Page 6 / line 97 – 98
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 6 - line 97 – 105 Page – 7 / line 116 – 128
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	Page 6 / line 98 – 105
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 6 – 7 – line 112 – 122
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 6 – 7 / line 112 – 128
Bias	9	Describe any efforts to address potential sources of bias	Page 11 / line 217 - 225
Study size	10	Explain how the study size was arrived at	Page 6 / line 98 - 100
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 7 / line 131 - 137

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2	Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding
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6			(b) Describe any methods used to examine subgroups and interactions
7			(c) Explain how missing data were addressed
8			(d) If applicable, describe analytical methods taking account of sampling strategy
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10			(e) Describe any sensitivity analyses
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13	Results		
14	Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
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20			(b) Give reasons for non-participation at each stage
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22			(c) Consider use of a flow diagram
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24	Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
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30			(b) Indicate number of participants with missing data for each variable of interest
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33	Outcome data	15*	Report numbers of outcome events or summary measures
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39	Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
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45			(b) Report category boundaries when continuous variables were categorized
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47			(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
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50	Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
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53	Discussion		
54	Key results	18	Summarise key results with reference to study objectives
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59	Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any
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		potential bias	217 - 225
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 11 – 13 / line 226 – 278
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 11 / line 217 - 225
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 14 / line 291 - 292

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.