

Informant-based questionnaire for early detection of cognitive disorders in the olders in Kazakhstan

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Abstract

Aim: The purpose of this study was to identify cognitive disorders in older people by conducting a survey of their relatives (close people) by the Arizona Questionnaire.

Material and methods: The study involved people who had relatives (close ones) aged 60-74 years old. Three hundred and eighty respondents took part in the survey.

Results: Summing up all the points obtained during the survey of relatives 4-13 points 78.7% (n=299), which may indicate the presence of moderate cognitive disorders that are better not to be ignored (suggests going to the doctor) and above 13 points 6% (n=23) indicates a fairly high probability of dementia (urgent need to seek medical help). Our study revealed that family status ($p<0.001$), employment ($p=0.014$), and recitation of namaz ($p=0.009$) act as protective factors that promote social participation and build cognitive reserve. Social isolation, on the other hand, can lead to apathy, withdrawal, depression, and a greater likelihood of cognitive impairment. We also found that place of residence ($p<0.001$) and living conditions ($p=0.002$), may also influence the early formation of cognitive dysfunctions. Arizona Questionnaire has high sensitivity and specificity in detecting both mild cognitive impairments and Alzheimer's disease and allows clinicians to quickly and accurately assess people with reported cognitive problems.

Conclusion: As a result of survey informants, it was revealed that most of the olders, whose relatives have been surveyed, may be at risk of cognitive impairment and further testing is needed.

Key words: informant, early detection, cognitive impairments

Introduction

Patients with cognitive impairments seek help from a general practitioner for whom, unfortunately, the time allocated for an appointment has time limits, respectively, a timely full examination and diagnosis of the patient's existing disorders suffers. This leads to the fact that cognitive impairments not diagnosed at an early stage are aggravated and already more difficult to correct. The use of cognitive impairment detection tools such as the Mini Mental State Examination (MMSE) will allow rapid screening and timely patient care. However, the results of screening can be influenced by the level of education of patients or their family members, since people with

different degrees of education differ in mentality, level of judgment and that "can lead to false positive impairments for people with a low level of education and false negative without impairment for highly educated people" [1].

Clinicians can use the informant questionnaire for early detection of cognitive disorders [2,3]. The questionnaire for the informant provides for testing not the patient himself, but his close relatives, which speeds up the process of identifying cognitive disorders and is less susceptible to "socio-cultural biases" [4]. It is intended to be used as a selection tool to identify individuals in need of further evaluation. The rationale for weighing certain items in the AQ is that they reflect

the presence of cognitive symptoms that make it possible to predict the clinical diagnosis of AD. Given that subjective memory complaints are common among the elderly, the use of weighted elements can help to more accurately identify people with disabilities. AQ is not intended to replace a full diagnostic examination, which is carried out when assessing cognitive problems. The AQ (Alzheimer's Questionnaire) or the Arizona Questionnaire, proposed by American scientists in 2012, is used to quickly and easily interview close relatives of older people to detect cognitive impairments. The entire testing procedure takes 3 minutes. The test, according to American scientists, correlates with neuropsychological tests, is "a reliable indicator of cognitive impairment and accurately identifies Alzheimer's disease (AD) and moderate cognitive impairment (MCI), is easily interpreted and helps to identify cognitive impairment at an early stage in 90% of cases" [5,6]. It is known about the conduct and publication of a number of studies confirming the diagnostic accuracy and psychometric reliability of the Arizona Questionnaire [7]. The superiority of AQ over objective cognitive tests and comparability with other questionnaires based on informants and patients are also shown [8,9].

Material and methods

The study involved relatives (close people) of elderly people aged 60-74 years, point-selected from all over Kazakhstan, who voluntarily agreed to participate in the survey. The exclusion criteria were, respectively, people without relatives aged 60-74 years, refusal to participate in the study, the presence of mental illness.

The AQ was used for the survey. The AQ is an assessment of dementia, consisting of 21 items. AQ items are divided into five areas, including memory, orientation, functionality, visual-spatial and language perception. Tasks are presented in a "yes / no" format, with the total score for the "yes" tasks equal to the total score from 0 to 27, with higher scores corresponding to a greater impairment [10]. One of the 21 items in our survey was uninformative due to the fact that the respondents noted that their relative (close person) does not drive a car. Therefore, we excluded the question "Are there any problems with driving a car?" from the questionnaire, and as a result, 20 questions were left for the survey. The interpretation of the results of the survey of respondents about the presence of cognitive disorders in their elderly relatives (close people) is shown in Table 1.

Table 1 Interpretation of survey results

Total score for the survey	Interpretation of the result
less than 4 points	lack of significant cognitive problems
4-13 points	may indicate the presence of mild cognitive impairment, which is better not to ignore (requires access to a doctor)
above 13 points	shows a relatively high probability of dementia (an urgent need to seek help from a doctor)

Also, in parallel, with the help of a survey of the elderly themselves, their socio-demographic data were collected, such as age, gender, nationality, marital status, education, whether they are currently working, current living conditions, hobbies, alcohol consumption, smoking attitude, namaz reading in the case of muslims, church attendance, prayer reading in the case of the orthodox, the place of residence.

The Ethics Committee of the Semey Medical University (Semey, Kazakhstan) approved our study before it began (protocol №2 of October 18, 2019).

Before the survey, informed consent was obtained from

the respondents. The protection of individual data of study participants is guaranteed. Participants were encoded with a unique code.

Statistical analysis

Descriptive statistics were used to analyze the data. For qualitative data, Pearson's chi-square was used. The level of statistical significance was set at $p < 0.05$. Statistical analysis was performed using SPSS version 20.0 (IBM Ireland Product Distribution Limited, Ireland).

Results

A survey of elderly people was conducted. The study involved 380 respondents. The survey results are presented in Table 2.

It can be seen from the Table 2, nearly half of respondents 49.7% (n=189) gave positive answer to the question: "Does the patient have memory loss?" For the question "If so, is their memory it worse than a few years ago?" 44.7% (n=170) answered "yes" (1 point). Less than half of the respondents 43.4% (n=165) answered that an elderly relative repeats the same question or expresses the same idea several times during the day. The majority of respondents 79.2% (n=301) said that their relative does not forget about scheduled meetings or events. Almost a third of the survey participants, 32.1% (n=122), replied that their elderly relative puts things in unusual places more than once a month. The majority of respondents 93.7% (n=356) noted that their close one does not suspect them of hiding or stealing his things when he cannot find them. Most of participants, 94.2% (n=358), answered that their elderly relative does not often experience difficulties when trying to remember the current day of the week, month, year. Many respondents 64.2% (n=244) noted that their elderly relative had cases when he/she could not remember whether he/she had already taken the medicine. 82.9% (n=315) of the survey participants answered that their relative did not have any difficulties when using household appliances, telephone, or television remote control. Also, 85.8% (n=326) of the respondents answered that their elderly relative does not experience any difficulties doing housework. It is good that the majority of respondents 90.3% (n=343) noted that their elderly close ones has not lost interest in their usual hobbies. Only 0.8% (n=3) of the participants noted that their elderly relative could get lost in familiar territory. Almost all respondents 96.1% (n=365)

Table 3 Results of the survey to identify problems in the cognitive sphere

Total score for the survey	% (n)
less than 4 points	15,3% (58)
4-13 points	78,7% (299)
above 13 points	6% (23)

answered that their close one did not lose the sense of the right direction of movement. Slightly more than half of respondents 52.9% (n=201) answered that there are cases that their close one not only forgets names, but also cannot remember the right word. At the same time, 71.1% (n=270) of the respondents noted that their close one confuses the names of relatives or friends. But almost many respondents 88.2% (n=335) answered that their close one has no problems recognizing familiar people.

Table 3 shows the final results of the survey to identify problems in the cognitive sphere.

Correlation analysis between the age of older persons and the scores obtained as a result of interviewing relatives (close persons) showed a statistically significant, direct, weak

Table 2

Answers of respondents to the questions of the questionnaire

№	Question	Yes		No	
		% (n)	score	% (n)	score
1	Does the patient have memory loss?	49,7% (189)	1	50,3% (191)	0
2	If so, is their memory it worse than a few years ago?	44,7% (170)	1	55,3% (210)	0
3	Does the patient repeat questions OR statements OR stories in the same day?	43,4% (165)	2	56,6% (215)	0
4	Have you had to take over tracking events OR appointments? OR Does the patient forget appointments?	20,8% (79)	1	79,2% (301)	0
5	Does the patient misplace items more than once a month? OR Does the patient misplace objects so that he or she cannot find them?	32,1% (122)	1	67,9% (258)	0
6	Does the patient suspect others are moving, hiding or stealing items when they cannot find them?	6,3% (24)	1	93,7% (356)	0
7	Does the patient frequently have trouble knowing the day, date, month, year, time? OR Does the patient have to use cues like the newspaper or the calendar to know the day and date more than once a day?	5,8% (22)	2	94,2% (358)	0
8	Does the patient become disoriented in unfamiliar places?	40,3% (153)	1	59,7% (227)	0
9	Does the patient become more confused outside the home or when traveling?	27,1% (103)	1	72,9% (277)	0
10	Excluding physical limitations (e.g., tremor, hemiparesis, etc.), does the patient have trouble handling money (tips, calculating change?)	7,6% (29)	1	92,4% (351)	0
11	Excluding physical limitations (e.g., tremor, hemiparesis, etc.), does the patient have trouble paying bills or doing finances OR Are family members taking over finances because of concerns about ability?	18,2% (69)	2	81,8% (311)	0
12	Does the patient have trouble remembering to take medications or tracking medications taken?	64,2% (244)	1	35,8% (136)	0
13	Is the patient having trouble using appliances (e.g., microwave, oven, stove, remote control, telephone, alarm clock)?	17,1% (65)	1	82,9% (315)	0
14	Excluding physical limitations, is the patient having difficulty in completing home repair or other home related tasks (housekeeping)?	14,2% (54)	1	85,8% (326)	0
15	Excluding physical limitations, has the patient given up or significantly reduced activities such as golfing, dancing, exercising, or crafts?	9,7% (37)	1	90,3% (343)	0
16	Is the patient getting lost in familiar surroundings (own neighborhood)?	0,8% (3)	2	99,2% (377)	0
17	Does the patient have a decreased sense of direction?	3,9% (15)	1	96,1% (365)	0
18	Does the patient have trouble finding words other than names?	52,9% (201)	1	47,1% (179)	0
19	Does the patient confuse names of family members or friends?	71,1% (270)	2	28,9% (110)	0
20	Does the patient have difficulty recognizing people familiar to him/her?	11,8% (45)	2	88,2% (335)	0

relationship ($R=0.156$; $p=0.002$). Using the Chi-square test, a statistically significant relationship was found between the scores obtained as a result of the survey of relatives (close persons) with the marital status of older persons ($\chi^2=109.849$; $p<0.001$), their education ($\chi^2=38.324$; $p<0.001$), place of residence ($\chi^2=22.973$; $p<0.001$), current living condition ($\chi^2=12.815$; $p=0.002$), whether he/she currently works ($\chi^2=12.428$; $p=0.014$), reading of namaz by muslims ($\chi^2=9.478$; $p=0.009$) and reading prayer by orthodox ($\chi^2=9.953$; $p=0.007$).

Discussion

As shown in the Table 3 below 4 points were noted in 15.3% ($n=58$), which indicates the absence of significant problems in the cognitive sphere in elderly people who are relatives of the respondents; 4-13 points - 78.7% ($n=299$), which indicates the presence of moderate cognitive impairments, which are better not to be ignored (suggests going to a doctor) and above 13 points - 6% ($n=23$), indicates a fairly high probability of dementia (it is necessary to urgently seek medical help).

Our study revealed that family status ($p<0.001$), employment ($p=0.014$), and recitation of namaz ($p=0.009$) act as protective factors that promote social participation and build cognitive reserve. Social isolation, on the other hand, can lead to apathy, withdrawal, depression, and a greater likelihood of

cognitive impairment. We also found that place of residence ($p<0.001$) and living conditions ($p=0.002$), may also influence the early formation of cognitive dysfunctions. Cognitive reserve, on the other hand, allows the brain to compensate for the negative effects of disorders that lead to the death of brain neurons, and postpones the development of cognitive impairment.

In our study, we used the AQ. The survey of respondents revealed the absence of significant cognitive problems in 15.3% of their elderly relatives (close people), which is confirmed by research of scientists from China, Arizona and the United States [5,11,12]. Many studies have confirmed the usefulness of using AQ for the early detection of MCI [11]. In the study of scientists from Arizona, AQ demonstrated high sensitivity and specificity for detecting MCI. AQ is a powerful awareness-based tool for identifying cognitive impairments that can be easily implemented in clinical practice. A study conducted in Taiwan showed that most of elderly relatives (close people) had moderate cognitive impairment, and a smaller number of them already had a high probability of developing dementia [13]. It was also confirmed in our study, according to the results of the survey, the presence of moderate cognitive impairment in elderly relatives was revealed. However, a small number of people have a fairly high probability of dementia. In their study, Malek-Ahmadi et al. show that certain cognitive symptoms reported by informants can help clinicians distinguish people

with MCI from people with normal cognition [12]. The items related to the repetition of statements, orientation, financial management ability and visual-spatial disorientation had a high discriminatory force [12]. According to our study the majority of respondents, 92.4% (n=351), answered that their relative does not have any problems when counting the change in the store, but 18.2% (n=69) answered that their elderly close one has difficulties with paying bills and financial transactions less than half of the respondents, 40.3% (n=153) noted that their elderly close one is experiencing a problem with orientation in an unfamiliar place. Almost a quarter of the respondents, 27.1% (n=103), answered that their relative becomes more distracted outside the home, while traveling.

Lack of self-awareness of cognitive decline is a characteristic feature of dementia and people with dementia tend to deny their condition and refuse the test [14]. The detection of dementia is preferably carried out without disturbing the patient much. Surveys of informants are more suitable for this [15]. Questionnaires for informants are extremely useful for clinicians, since these tools are less affected by cognitive reserve than objective cognitive tests [16].

The using of informant-based questionnaires also helps alleviate problems related to biases in self-assessment of cognitive functions. Informants can often provide a more objective assessment of a patient's cognitive and functional status, since patients themselves may associate their deficits with age-related changes, lifestyle changes, stress and other

factors. Given the new requirements for cognitive screening in the elderly, informant-based questionnaires will allow primary care physicians and other clinicians to quickly and accurately screen for cognitive decline. The using of informant-based questionnaires in the evaluation of MCI will continue to be of great importance for both clinicians and researchers, and is becoming an increasingly important component of clinical diagnosis and clinical research [17].

Conclusion

According to our investigation the most of the elderly people whose relatives (close ones) indicated of the presence of moderate cognitive disorders, only small amount of respondents indicates the absence of significant problems in the cognitive sphere and 6% respondents of elderly person showed a fairly high probability of dementia who need to seek medical help.

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