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RESEARCH

ASSESSMENT OF LEGAL CAPACITY IN THE GERIATRIC POPULATION: A RETROSPECTIVE STUDY

ABSTRACT

Introduction: Today the number of applications for legal guardianship has increased among geriatrics. In Turkey, the assessment of legal guardianship is made within the framework of the 405th and 408th articles of the Turkish Civil Code. To the best of our knowledge, there are no published articles dealing with reports of legal guardianship for geriatric citizens. Therefore we aimed to evaluate legal guardianship reports in light of the related literature.

Materials and Method: The records of the Department of Forensic Medicine of Hacettepe University Medical Faculty were used in this study. Patients' files and legal guardianship reports issued between the years 2011 and 2013 were investigated retrospectively. Geriatric cases (aged over 65) that had been referred for a legal capacity evaluation were included in the study. All cases were analyzed in terms of age, sex, occupation, existing psychiatric disorder or illnesses, the reason for legal guardianship, Mini Mental State Examination Test score and presence of dementia.

Results: Of a total of 1306 cases, 36 (2.7%) were elderly patients referred for a legal guardianship examination. The ages of these cases ranged between 65 and 90. Sixty-one percent of the cases were evaluated in terms of TCC article 405 and 14% in terms of article 408. Of the total elderly cases, 81% (n=29) suffered from dementia, which in turn was due to Alzheimer's disease in 83% of the dementia cases.

Conclusion: Our findings revealed that the most common medical condition requiring legal guardianship was dementia, of which the leading cause was Alzheimer's disease.

Key Words: Geriatrics; Legal Guardians/Legislation & Jurisprudence; Mental Competency/Legislation & Jurisprudence; Dementia.

ARAŞTIRMA

GERİATRİK POPÜLASYONDA HUKUKİ EHLİYETİN DEĞERLENDİRMESİ: RETROSPEKTİF ÇALIŞMA

ÖZ

Giriş: Günümüzde geriatrik popülasyonda vasi tayini için yapılan başvurular artmıştır. Ülkemizde vasi tayini değerlendirmeleri Türk Medeni Kanunu 405 ve 408. maddeleri çerçevesinde yapılmaktadır. Yapılan literatür taramasında geriatrik yaş grubunda vasi tayini raporlarını irdeleyen bir çalışmaya rastlanılmamıştır. Bu nedenle vasi tayini raporlarını literatür verileri ışığında değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Hacettepe Üniversitesi Tıp Fakültesi Adli Tıp Anabilim Dalı'nın kayıtları kullanılmıştır. 2011-2013 yılları arasındaki hasta dosyaları ve verilen vasi tayini raporları retrospektif olarak incelenmiştir. Bütün olgular gönderilen 65 yaş üstü olgular hakkında düzenlenmiş raporlar yaş, cinsiyet, yaşadığı kişiler, meslek, mevcut hastalıkları, psikiyatrik bozukluğu olup olmadığı, vasi tayini gerekçesi, Mini Mental Durum Değerlendirme Testi puanı ve demans varlığı açısından değerlendirilmiştir.

Bulgular: İncelenen 1306 olgudan 36 (%2.7) olgunun vasi tayini için gönderilen yaşlı olgular olduğu belirlenmiştir. Bu olguların yaşları 65-90 aralığındadır. Olguların %61'inin TMK'nun 405. maddesi kapsamında, %14 olgunun da 408. Madde kapsamında değerlendirilmiştir. Olguların %81'inde (n=29) demans varlığı tespit edilmiştir. Demansın da %83 Alzheimer'dan kaynaklandığı belirlenmiştir.

Sonuç: Elde edilen bulgular vasi tayinini gerektiren tıbbi durumun en sıklıkla demans olduğunu, bunun da en fazla oranda Alzheimer hastalığından kaynaklandığını ortaya koymuştur.

Anahtar Sözcükler: Geriatri; Hukuki Ehliyet/Mevzuat ve İçtihat; Demans.

Introduction

With advances in treatment and rehabilitative healthcare, the average lifespan, and more importantly, the quality of life of people has improved. Therefore, a greater number of elderly people are now involved in an active life and commercial activities (1,2). In this context, the presence of diseases affecting cognitive capacity, such as dementia, poses significant problems in terms of legal transactions.

Dementia arises from impaired cognitive functions due to impairment in the brain cells or communication among these cells as a result of several diseases or conditions (3). The most common form of dementia is caused by Alzheimer's disease (4). It is reported that one out of every nine people (11%) over the age of 65 and one out of every three people (32%) over the age of 85 has Alzheimer's disease in the USA. Dementia develops in an average of 60-80% of these patients (5). Since a person with dementia becomes deprived of the mental capacity to protect his/her own interests in official transactions such as banking operations and merchandise transactions in daily life, there are risks for this person in making unconscious decisions against him/herself and in being exposed to abuse; therefore, s/he requires legal protection. This is achieved in practice by the appointment of a legal representative who can be a guardian, a curator, or a legal advisor.

Guardianship is the restriction of legal capacity through a legal representative for the purpose of protecting all interests of a person with regard to his/her personality and assets, and representing him/her in legal transactions. Guardianship is assigned ex officio for those who are under age as specified by the civil code, those who have mental illness or defect, and those who lead themselves or their family into poverty due to a harmful lifestyle and bad habits. Guardianship can also be assigned at a person's own request for people who can prove that they cannot duly manage their activities due to old age, inexperience, or severe diseases (6).

The appointment of a guardian may be required due to Alzheimer's, dementia, or psychiatric diseases, but the need for guardianship may also occur when the capacity to act is no longer present, as in the case of organic brain damage due to disease or trauma.

The appointment of a guardian for a person is conducted in accordance with Turkish Civil Code (TCC) Articles 405 and 408 (6). Article 405 of this law states: "Every adult who cannot conduct his duties or requires constant assistance for protection or care, or endangers the safety of others due to mental illness or defectiveness is restricted." Article 408 states: "Every adult who proves that he/she cannot duly manage his activities due to old age, disability, inexperience, or severe diseases may require restriction." The first of these articles prescribes restriction regardless of the person's request, whereas the second article requires the request of the person.

In the literature review, no studies were found that assess the appointment of guardianship/legal capacity within Articles 405 and 408 of the TCC in the geriatric population. Since geriatric patients are known to be more involved in an active life due to the currently increasing lifespan, the present study aimed to explore the significance of capacity assessments and the conditions for removing the capacity to act for cases in this age group who have had reports issued by the Department of Forensics concerning the appointment of a guardian.

Materials and Method

The present study employed polyclinic data from the Department of Forensics, Faculty of Medicine, Hacettepe University; files from the archives of the Department Polyclinic dated from January 1, 2011 to December 31, 2013 were retrospectively reviewed. Ethics committee approval was obtained from Non-interventional Clinical Researches Ethics Board, Hacettepe University (05.06.2014/16969557-615). The present study included patients over the age of 65 (n=36), who were referred by the Civil Courts of Peace for an assessment as to whether the appointment of a guardian was required within TCC Articles 405 or 408. The cases were evaluated for sociodemographic characteristics, reasons for admission, psychiatric diagnoses, and existing diseases. Assessment report results and findings are discussed below, in the context of the literature.

Results

Thirty-six (2.7%) of 1306 reports issued between 2011 and 2013 in the Department of Forensics, Faculty of Medicine, Hacettepe University included patients over the age of 65 who were sent for the appointment of a guardian. Twenty (56%) of these patients were male and 16 (44%) were female. The age of the patients was between 65 and 90 and the mean age was 78.7; the distribution of ages is presented in Table 1. In the assessment reports of the cases included in the present study, it was concluded that all of the patients required the appointment of a guardian. It was also conclud-

Table 1— Sociodemographic Data.

Characteristics	n	%
Age		
65-74	6	17.0
75-84	25	69.0
≥85	5	14.0
Sex		
Male	20	56.0
Female	16	44.0
Living with		
Children	16	44.0
Husband/wife and children	12	34.0
Alone	4	11.0
Other (nursing home, relative, unknown)	4	11.0
Occupation		
Housewife	16	44.0
Retired	14	39.0
Other	6	17.0
Total	**36**	**100.0**

Table 2— Medical Condition.

Condition (n=36)	n	%
Alzheimer's disease	24	67.0
Cerebrovascular diseases	19	53.0
Psychiatric disorder	13	36.0
Depression	6	46.0
Anxiety	3	23.0
Delirium	2	15.0
Psychosis	1	8.0
Bipolar affective disorder	1	8.0
Hypertension	11	31.0
Parkinson	5	14.0
Osteoporosis	4	11.0
Chronic kidney failure	2	6.0
Diabetes mellitus	2	6.0
Glioblastoma multiforme	1	3.0
Creutzfeldt-Jakob disease	1	3.0
Hydrocephaua	1	3.0

ed that among these patients, 22 (61%) patients required guardianship pursuant to TCC Article 405 and five (14%) patients required guardianship pursuant to Article 408. Nine (25%) patients could not have a mental health assessment since they were in an intensive care unit, or were unconscious or aphasic patients. The appointment of guardianship as per Article 408 could not be recommended since the patients did not have the ability to make their own requests due to impaired consciousness. Further, the appointment of guardianship as per Article 405 could not be conducted due to the lack of a mental health assessment in this patient group; however, the medical conditions of the patients were clearly specified and the need of the patients for the a guardian was indicated irrespective of the two civil code articles. Two patients had previous reports on the same matter and their status of guardianship had not change with their most recent assessments. Fifteen patients were given a Mini Mental State Examination Test (MMSE), and their scores ranged from 7-24 points, with a mean score of 13.5. Of the patients, 44% were living with their children, 34% were living with their spouses and children, and 11% were living alone. With respect to occupations, 44% were housewives (all of the female patients) and 39% were retired. All of the patients except for two (34 patients, or 94%) had multiple diseases. The most common disease was Alzheimer's (67%). This was followed by cerebrovascular disease (CVD, 53%), hypertension (31%), and Parkinson's disease (14%). Psychiatric diseases were identified in 36% (n=13) of patients, and the most common disease among these patients was depression (46%). Of the reasons for the appointment of guardianship, 58% (n=21) were non-organic or psychiatric, whereas the remainder were due to organic causes. Eighty-one percent of the patients (n=29) had dementia: 24% of these cases were due to Alzheimer's, 14% were due to Parkinson's, and 3% were due to both diseases.

Discussion

Impaired mental functions may occur in the geriatric population due to factors such as old age, disease, or trauma. The will of these people is consequently restricted and their capacity to make healthy decisions in legal transactions is reduced. They require protection through a legal representative (guardian, curator, or legal advisor). The assessments for the appointment of a guardian reviewed in the present study were made within the framework of TCC Articles 405 and 408 in Turkey.

Article 405 states: "Every adult who cannot perform his/her duties or requires constant assistance for protection or care, or endangers the safety of others due to mental illness or defectiveness is restricted" (6). As per the terms of this article,

Table 3— Appointment of Guardianship Data.

Characteristics	n	%
Reason for Appointment of Guardianship		
TCC 405	22	61.0
TCC 408	5	14.0
State of consciousness can not be evaluated due to lack of communication	9	25.0
Mini Mental State Examination Score	16	44.0
0-9	3	19.0
10-19	11	69.0
20-30	2	13.0
The presence of dementia	29	81.0
Alzheimer's dementia	24	83.0
Parkinson's dementia	4	14.0
Alzheimer's and Parkinson's dementia	1	3.0

an assessment of the person's capacity is made, and a guardian is appointed when considered necessary.

Article 408 of the same law states: "Every adult who proves that he/she cannot duly manage his/her activities due to old age, disability, inexperience, or severe diseases may require restriction" (6). This Article differs from Article 405 in that the requirement for a restriction is at the person's own request.

The present study evaluated patients referred for the appointment of a guardian to the Department of Forensics, Faculty of Medicine, Hacettepe University between 2011 and 2013. Thirty-six (2.7%) of 1306 reports were for patients over the age of 65. A study that evaluated patients referred to the Forensic Psychiatry Unit, Faculty of Medicine, Gaziantep University, reported that 150 of 314 patients admitted during the three-year investigation were referred within the scope of the civil code and 118 of these patients (37.6% of all patients) were referred for an assessment for guardianship (7).

In forensic psychiatry, the parameters of a mental state assessment have been established as a psychiatric examination supported by psychometric tests, and by other tests when considered necessary. Many tests can be used for these assessments, such as the MMSET, the Legal Capacity Assessment Form (HEDEF), the MacArthur Competence Assessment Tools for Clinical Research, the Clinical Interview Scale for Financial Capacity, the Wechsler Memory Scale – Revised, and the Neuropsychological Test Battery for Cognitive Potentials (BILNOT) (8, 9, 10, 11).

The MMSET is the most commonly used test to assess cognitive impairment in the elderly (12, 13). This test evaluates the basic cognitive skills of the person such as short term memory, distant memory, orientation, writing, and linguistic skills. In the MMSET, a score of 26-30 points is considered normal, 20-25 points is considered mild cognitive impairment, 10-20 points is considered moderate cognitive impairment, and 0-9 points suggest severe cognitive impairment (14). Pachet et al. have also suggested that the decision of the legal representative is more important in the decision-making process for individuals with ≤ 19 points, whereas the decision of the person has a greater role for people with ≥20 points (15). This test had been administered to sixteen of the patients in the present study. Of the patients who had this test, 88% (n=14) had a score ≤ 19 points and the remaining two patients had scores of ≥20 points. Gungen et al. reported that the MMSET was an appropriate and reliable test for the diagnosis of dementia in the Turkish population, and the threshold of the test for a diagnosis of normal functioning was 23/24 points (16). One of our two patients who had ≥20 points had 20 points and the other had 24 points; both patients had dementia.

Eighty-one percent of the patients in our study (n=29) were diagnosed with dementia. With this ratio, dementia was prominent as the reason they had been placed under guardianship. Of these, the dementia was caused by Alzheimer's disease in 83% (n=24) and by Parkinson's disease in 14% (n=4); one patient had both Alzheimer's and Parkinson's. It has been reported that approximately one out of every nine people (11%) over the age of 65 and one out of every three people (32%) over the age of 85 has Alzheimer's disease in the USA. A study conducted in Istanbul found that the incidence of Alzheimer's disease was 11% among people over the age of 70 (17). A study with 490 people over the age of 65 in Izmir found the prevalence of dementia to be 12.9% (18). Dementia develops in an average of 60-80% of patients with Alzheimer's disease (5). The risk for developing Alzheimer's disease over the age of 60 doubles every five years (19). Of 24 patients with Alzheimer's disease in our study, one was in the age range of 65-74, 18 were in the age range of 75-84, and five were over the age of 85. As a result, 17% of the patients from the 65-74 age group, 72% of the patients from the 75-84 age group, and all of the patients over the age of 85 had Alzheimer's disease and, accordingly, dementia. When evaluated based on age group, the incidence of Alzheimer's disease increased incrementally with increasing age, which is consistent with the literature. The classification of patients in the

present study based on age distribution is presented in Table 1.

Forgetfulness and learning disabilities are at the forefront in early Alzheimer's disease, whereas the cognitive functions of the person are maintained (20). In this stage, the person has still insight, so these changes in mental state and/or neurophysiological changes in the central nervous system may cause depression. Both the still unsettled symptoms of the disease and the person's ability to maintain his/her daily life without any assistance from others may cause the symptoms of early Alzheimer's disease to be explained by a diagnosis of depression. Additionally, the mild symptoms of the disease in its early stage and the still non-impaired functionality also prevent family members and attendants at institutions, such as notaries and marriage registry officers, who are not healthcare professionals, from suspecting these people and requesting a capacity report. For these reasons, it can be seen that those in the early stage of Alzheimer's disease appear less frequently in applications for the appointment of a guardian. We also suspect that this is the reason why all of the Alzheimer patients in the current study group who had been assessed for guardianship were at a moderate or advanced stage of the disease, and all had dementia.

One meta-analysis that evaluated the incidence and prevalence of studies on Parkinson's disease in European countries reported that the incidence of this disease in people over the age of 65 varied from 1.28% to 1.5% (21), and another analysis reported an incidence of 1.8% (22). Further, dementia was reported in an average of 10-30% of patients with Parkinson's disease (23, 24). Of the patients included in the present study, 14% had Parkinson's disease, and 3% had both Alzheimer's and Parkinson's disease; all of these patients had dementia and the dementia was considered to have resulted from these diseases.

With respect to patients with CVD, risk factors for dementia include hypertension and advanced age (25). Of the CVD patients included in the present study, 74% were over the age of 75, and 32% had hypertension.

Nine patients in the present group had such severe cognitive impairment that the mental health assessment could not be completed, and a report within Article 405 could not be issued for these patients. However, the records indicated that guardianship was required by specifying the person's current clinical conditions, the characteristics of his/her diseases and need for care; it was further stated that, on a case-by-case basis, the requirement for guardianship would be reconsidered after the completion of treatment. Patients were examined during their stay in clinical or intensive care units.

For all of the patients in the present study, consultation was requested from the departments of neurology and/or psychiatry, and a detailed and systematic assessment was conducted. Neuropsychological tests were administered to the patients in addition to the forensic psychiatric and clinical assessments.

In cases where a person's mental capacity is in doubt, notaries, real estate registration offices, and marriage registry offices can request that an appropriate health institution issue a report on whether the person has the capacity to act. In such cases, a single physician may suggest an opinion within a report. However, these reports are valid only for the day of the transaction and do not have continuity. On the other hand, the authority for guardianship lies in the civil court of peace, as per the law, and these courts request an assessment of these people within the scope of TCC Articles 405 and 408 in order to appoint a guardian under TCC. As a result of the assessments made in this regard, 61% of the patients included in the present study were deemed suitable for guardianship pursuant to Article 405 and 19% were suitable pursuant to Article 408. An assessment of the remaining 19% of patients could not be made within the scope of these articles for various reasons, including being unconscious and being unable to speak. Nevertheless, decisions were made in favor of guardianship for these patients upon evaluation of their medical conditions, the diagnoses of their diseases, and whether there was a need for constant care in combination with the current examination results.

With the increase in average lifetime, the involvement of the geriatric population in having an active life and in commercial activities has also increased. Given the increased incidence of some diseases in this population, such as dementia, the significance of legal capacity assessments has also increased (2). Impaired cognitive functions and the onset of dementia in particular, affect an individual's capacity to act and sometimes completely remove this capacity. The assessment of the capacity to act in patients with suspected dementia, especially in the geriatric age group, should be made by experienced physicians who have expertise in the subject, and the significance of this decision for the person's transactions should be taken into consideration. The family and, when appropriate, the said persons, should be informed about the onset of dementia, especially with progressive causes of dementia such as Alzheimer's disease; they should be advised that re-assessment is required from time to time for the protection of personal rights, even though guardianship is not necessary in the initial phase of Alzheimer's disease. The

appointment of a legal consultant should be recommended if required.

In acute cases such as CVD, which especially affects consciousness in the elderly, the person's banking and merchandise transactions and even some activities related to his/her own treatment may be interrupted. In such cases, the course of the acute disease, which can affect consciousness, as well as the person's medical condition after treatment, becomes uncertain when the person's age and the comorbid diseases are also added to the situation. This leads family members to request the appointment of a guardian for the aforementioned transactions. In this study, we found that nine patients referred by the courts who were unconscious or aphasic during the assessment, due to diseases such as CVD that directly affect the central nervous system, did not fall under the scope of either Article 405 or Article 408 of the civil code; however, guardianship was recommended because of the patient's condition. The articles within the civil code with regard to the appointment of guardians should be revised so that it will cover such patients.

REFERENCES

1. Jacobsen LA, Kent M, Lee M, Mather M. America's aging population. Population Bulletin 2011;(1)1-16.
2. Moye J, Marson DC. Assessment of decision-making capacity in older adults: An emerging area of practice and research. J Gerontol B Psychol Sci Soc Sci 2007;62:3-11. (PMID:17284555).
3. Eker E. Dementia in Elderly, In: Engin Eker (Ed). Depression, Somatization and Psychiatric Emergencies, İ.U. Continuing Medical Education Symposium Series, Istanbul, 1999, pp 63-73.
4. Yazıcı TG, Şahin HA. Alzheimer's disease. Journal of Clinical Development 2010;(23):48-52.
5. Alzheimer's Association. Alzheimer's Disease Facts and Figures. Alzheimer's & Dementia 2013;(9)2. [Internet] Available from: http://www.alz.org/downloads/facts_figures_2013.pdf Accessed:21.4.2014.
6. Turkish Civil Code. Law Number 4721, Official Gazette No. 24607 Dated 08.12.2001. [Internet] Available from: http://www.tbmm.gov.tr/kanunlar/k4721.html Accessed:20.8.2014.
7. Kalenderoğlu A, Yumru M, Selek S, Savaş HA. Evaulation of cases referred to Forensic Psychiatry Unit in Gaziantep University. Archives of Neuropsychiatry 2007;44:86-90.
8. Bingöl A. Workup methods in dementia. Demantia Series 1999;3:82-9.
9. Kim SYH, Caine ED, Currier GW, Leibovici A, Ryan JM. Assessing the competence of persons with Alzheimer's disease in providing informed consent for participation in research. Am J Psychiatry 2001;158:712-7. (PMID: 11329391).
10. Palmer BW, Dunn LB, Appelbaum PS, et al. Assessment of capacity to consent to research among older persons with schizophrenia, Alzheimer disease, or diabetes mellitus: comparison of a 3-item questionnaire with a comprehensive standardized capacity instrument. Arch Gen Psychiatry 2005;62:726-33. (PMID:15997013).
11. Can Y, Sercan M, Saatçioğlu Ö, Soysal H, Uygur N. Legal capacity assessment form (HEDEF) validity, reliability and sensitivity. Journal of Clinical Psychiatry 2006;9(1):5-16.
12. Molloy DW, Standish TM. Mental status and neuropsychological assessment. A guide to the standardized mini-mental state examination. Int Psychogeriatr 1997;9(Suppl 1):87-94.
13. Dick JP, Guiloff RJ, Stewart A, et al. Mini-mental state examination in neurological patients. J Neurol Neurosurg Psychiatry 1984;47:496-9. (PMID:6736981).
14. Vertesi A, Lever JA, Molloy DW, et al. Standardized mini-mental state examination. Use and interpretation. Can Fam Physician 2001;47:2018–23. (PMID:11723596).
15. Pachet A, Astner K, Brown L. Clinical utility of the mini mental status examination when assessing decision-making capacity. J Geriatr Psychiatry Neurol 2010;23(1):3-8. (PMID:19661490).
16. Güngen C, Ertan T, Eker E, Yaşar R, Engin F. Reliability and validity of the standardized mini mental state examination in the diagnosis of mild dementia in Turkish population. Turkish Journal of Psychiatry 2002;13(4):273-81.
17. Gurvit H, Emre M, Tinaz S, et al. The prevalence of dementia in an urban Turkish population. Am J Alzheimers Dis Other Demen 2008;23(1):67-76. (PMID:18276959).
18. Keskinoğlu P, Yaka E, Uçku R, Yener G, Kurt P. Prevalence and risk factors of dementia among community dwelling elderly people in Izmir, Turkey. Turkish Journal of Geriatrics 2013;16(2):135-41.
19. Can H, Karakaş S. The dementia of Alzheimer type and neuropsychological assessment in primary health care. Journal of Continuing Medical Education 2005;14(2):22-25.
20. Kane MN. Legal guardianship and other alternatives in the care of elders with Alzheimer's disease. Am J Alzheimers Dis Other Demen 2001;16(2):89-96. (PMID:11302077).
21. Von Campenhausen S, Bornschein B, Wick R, et al. Prevalence and incidence of Parkinson's disease in Europe. Eur Neuropsychopharmacol 2005;15(4):473-90. (PMID:15963700).
22. De Rijk MC, Launer LJ, Berger K, et al. Neurologic diseases in the elderly research group. Prevalence of Parkinson's disease in Europe: A collaborative study of population-based cohorts. Neurology 2000;54(11 Suppl 5):21-3. (abstract) (PMID:10854357).
23. Aarsland D, Zaccai J, Brayne C. A systematic review of prevalence studies of dementia in Parkinson's disease. Mov Disord 2005;20(10):1255-63. (PMID:16041803).
24. Rajput AH, Birdi S. Epidemiology of Parkinson's disease. Parkinsonism Relat Disord 1997;3:175-86. (PMID:18591073).
25. Aydemir Ç, Kısa C. Dementia in consultation-liaison psychiatry. Clinical Psychiatry 2001;4:203-11.