Reviewer's report

Title: Specialist involvement and referral patterns in ambulatory medical care for patients with dementia in Germany - Results of a case-control-study

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Reviewer: Harald J Hampel

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This is a case-control study that compared longitudinal changes of referral patterns between patients with incident dementia (N= 1848) and those without (N= 7392). Subjects were older than 65 years and matched for gender, age and other variables. The dementia diagnosis was out of the following ICD-10 codes: [F00, F01, F02.0, F02.3, F03, G30, G31.0, G31.1, G31.82 and G1.9] during at least three of four quarters of the observation year. Data was acquired from the “Gmünder Ersatzkasse”, one of Germany’s large statutory health insurances, counting 1.7 million members.

The scientific aim of the study was to “analyze the driving forces and steering mechanisms in the referrals within the ambulatory medical care system for demented patients in the time period before, during and after the diagnosis process”

The main outcome of this study was a relative increase of referrals by appr. 30% in the incidence quarter, of which most were attributed to referrals from general practitioners to neuropsychiatrists. Referrals to radiologists and clinical chemistry were not notably increased in the incidence group.

Most of the dementia-incidence patients (80%) visited the neuropsychiatrist in a continuous manner during the subsequent year after incidence.

Comments:

This study provides some very interesting insights about the impact of dementia diagnosis on referrals from general practitioners to other specialists. It shows that approximately 30% of dementia patients get referred to a neuropsychiatrist, most probably because of extended diagnostics and appropriate therapy (e.g. prescription of antidementia medication).

The scientific goals were clearly defined and – presumably - because of the exploratory approach no clear hypotheses have been defined.

The methods of data acquisition and analysis are sound, however, there are some major issues which need to be addressed [Major compulsory revisions]:

1. The authors need to address the question in how far the “Gmünder Ersatzkasse” in general and the analyzed sample in special is actually
representative for total population. Because socioeconomical status being a potential confounding factor of referrals, the authors should try to obtain data on the socioeconomic status of their investigated sample.

2. The authors state that they did not differentiate between various dementia diagnoses and that “lack of validity” of dementia diagnoses was a major concern. This is indeed a major concern and needs to be addressed in the following way: As an internal control, whether a dementia diagnosis was valid or not, patients who have been referred to a neuropsychiatrist (in the incidence or its subsequent quarter) and kept dementia diagnosis during the next 2 quarters, can be regarded as validly diagnosed. Moreover, it would be of interest to see changes of the specific ICD-10 diagnostic code after referral to a neuropsychiatrist. It is certainly plausible to assume that the general practitioner would more frequently use a general code (e.g. F03) while the neuropsychiatrist will change this into a more specific code. The authors should elaborate this issue thoroughly and provide additional data.

3. Another problem is the validity of the “non-dementia” control group: Some recent work indicates that general practitioners do indeed apply dementia-related diagnostic codes to actual dementia patients with much better specificity than sensitivity, missing to recognise mild or incipient dementia cases (poor sensitivity). It would be helpful, if the authors would also check for diagnoses such as mild cognitive impairment [ICD-10 F06.7] or other psychiatric codes which might be associated with affections of cognition (e.g. such as in major depression etc.). The authors should at least discuss this point and its potential relevance to the analysis they performed.

4. The finding that only around 30% of patients with a dementia-spectrum diagnosis get referred to a specialist (neuropsychiatrist) is alarming suggesting that a vast majority of dementia patients do most probably never receive a proper / extensive diagnostics, let alone therapy that is in accordance with the guidelines, since large recent surveys from Germany suggest that general practitioners are not well versed in the application of current diagnostic and therapeutic guidelines. The implications of this situation and potential consequences need some deeper discussion.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests