The accuracy of family physicians' dementia diagnoses at different stages of dementia: a systematic review

CRD summary
This well-conducted review concluded that many individuals with dementia were not recognised or not diagnosed, particularly those with mild dementia. The authors' conclusions reflect the evidence presented, but there were few studies available, and those that were identified had methodological limitations that could affect the reliability of the results.

Authors' objectives
To estimate the accuracy of family physicians in diagnosing different stages of dementia.

Searching
PubMed (from 1951), EMBASE (from 1974), CINAHL (from 1982), and PsycINFO (from 1887) were searched to October 2009; the search strategies were reported. The Cochrane Library and references of relevant articles were also searched.

Study selection
Cross-sectional and prospective or longitudinal studies that recruited people aged 55 years or older, who were living at home or in a home for older people, were eligible for inclusion. Cross-sectional studies could measure the practitioner's judgement for all their older patients, or for only those presenting for consultation. The studies had to use a standardised definition of dementia, resulting in a diagnosis of either the presence or absence of dementia, or the presence or absence of cognitive impairment. The diagnosis had to be compared to a reference standard in at least a random sample; acceptable reference standards were diagnosis by: a multidisciplinary team; a specially trained physician, such as a specialist in geriatrics; or a structured assessment scale (examples were given). Studies in either a selected population not representative of general primary care, or people with mild cognitive impairment, were excluded.

The method of case assessment varied, including medical record review, individual patient forms, and patient lists. The reference criteria for diagnosis also varied across studies. Where reported, the number of practitioners in the studies ranged from one to 21, and the mean age of the participants ranged from 73 to 82.5 years. All studies included people with mild and moderate-to-severe dementia.

Studies were selected by two independent reviewers; disagreements were resolved by discussion.

Assessment of study quality
Study quality was assessed, using the 14-point Quality Assessment of Diagnostic Accuracy Studies (QUADAS) tool, by two independent reviewers; disagreements were resolved by discussion or consultation with a third reviewer.

Data extraction
Data to construct 2x2 tables of test performance were extracted by two independent reviewers. The sensitivity, specificity, positive and negative predictive values, positive and negative likelihood ratios, diagnostic odds ratio, and number needed to screen were calculated; 95% confidence intervals were calculated, but were not presented for all estimates. Disagreements were resolved by discussion or consultation with a third reviewer. In studies using a stratified random sample of patients, bootstrapping was performed to extrapolate the measures for diagnostic accuracy and their confidence intervals to the general population.

Methods of synthesis
Studies were combined in a narrative synthesis. Differences between studies were discussed extensively in the text and the study details and results were tabulated.
Results of the review
Six studies met the inclusion criteria, with 2,980 patients (range 81 to 1,252); all studies were cross-sectional in design. Three studies asked all eligible people to participate, two used a random sample, and one used a sample of those presenting for consultation. All six used an appropriate reference standard, avoided partial verification bias, blinded the interpreters of the index test, and avoided clinical review bias. Five studies recruited a representative population, four avoided progression bias, four avoided differential verification bias, five avoided incorporation bias, two blinded interpreters of the reference standard, four explained withdrawals, and none reported results that could not be interpreted.

Cognitive impairment and dementia diagnoses combined: Three studies reported that the practitioner's judgement had a sensitivity ranging from 35% to 77% and specificity from 94% to 100% for all stages of dementia. For mild dementia, sensitivity ranged from 21% to 67%, and from two studies, specificity was 99% and 100%, the positive predictive value was 79% and 100%, the negative predictive value was 96% and 99%, the diagnostic odds ratio was 147.8 and 252.4, and the number needed to screen was 35.2 and 95.2. For moderate-to-severe dementia, sensitivity ranged from 50% to 85%, and from two studies, specificity was 99% and 100%, the positive predictive value was 85% and 92%, the negative predictive value was 98% and 99%, the diagnostic odds ratio was 542.0 and 729.3, and the number needed to screen was 23.2 and 47.3.

Dementia diagnosis: All six studies reported that the practitioner's judgement had a sensitivity ranging from 26% to 78% and specificity from 78% to 100% for all stages of dementia. For mild dementia, five studies reported sensitivity ranging from 9% to 60%, and four studies reported specificity ranging from 85% to 100%, the positive predictive value ranging from 30% to 100%, the negative predictive value ranging from 95% to 97%, the diagnostic odds ratio ranging from 8.25 to 142.0, and the number needed to screen ranging from 19.5 to 211.5. For moderate-to-severe dementia, five studies reported sensitivity ranging from 28% to 95%, and four studies reported specificity ranging from 87% to 100%, positive predictive value ranging from 41% to 100%, negative predictive value ranging from 92% to 99%, diagnostic odds ratio ranging from 112.3 to 1,000.0, and the number needed to screen ranging from 11.9 to 41.5.

Authors' conclusions
Many individuals with dementia were not recognised or not diagnosed, particularly those with mild dementia.

CRD commentary
The review addressed a clear research question with well-developed inclusion criteria. An extensive search was made for published studies. It was unclear whether language restrictions were applied and unpublished studies were not sought. Each stage of the review process was conducted in duplicate, reducing the risk of error and bias. Appropriate criteria were used to assess study quality, and the results were published in full. There did not appear to be sufficient clinical variety across studies to rule out a summary receiver operating characteristic model, but the small number of studies would limit its usefulness. Therefore, the decision to combine studies in a narrative synthesis seems appropriate.

This was a well-conducted review, and the authors conclusions reflect the evidence presented, but there were very few studies available, and those that were identified had methodological limitations that could affect the reliability of the results.

Implications of the review for practice and research
Practice: The authors stated that practitioners should explore their attitudes to diagnosing dementia and challenge the validity of their arguments not to diagnose it. Given the proven benefits of therapy, diagnostic restraint was not justifiable. They stated that, given practitioners reluctance to mislabel patients, they should refer any cases where a diagnosis was uncertain. Collaboration within primary care, and education focusing on knowledge and attitudes, were recommended to improve the accuracy of dementia diagnosis.

Research: The authors stated that research on early detection could include the development and evaluation of information and communication technology tools to identify those at risk of dementia and those at risk of a missed dementia diagnosis, based on risk factors readily available in primary care. Educational interventions should be developed with more emphasis on the practitioners' perceptions of their own suitability and capability in diagnosing dementia, their skills for communicating the diagnosis, and the importance of an early diagnosis. They also recommended the development and testing of criteria that support practitioners in deciding whether to refer or not to
refer patients for specialist diagnostic evaluation.

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