

The dynamics of quality: a national panel study of evidence-based standards

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Scientific summary

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Background

Life expectancy at birth in high-income countries has increased by about 8 years since 1950, and approximately half of this can be attributed to health care. Improvements in health care offer many opportunities to increase the quality and length of life, and avoid some of the approximately 60,000 potentially avoidable deaths experienced annually by the population of England, which is more than in comparable countries. Deficits in quality of care have been reported from high-income countries over many years, and we have previously reported substantial variations in quality standards achieved in England for older people with long-term conditions.

International evidence has identified effective care processes that can be described in quality indicators of health care for many conditions. Quality indicators describe the minimum levels of acceptable health care, based on evidence of effectiveness in increasing patient health and reducing the risk of morbidity.

Objectives

We aimed to assess changes over time in the receipt of effective healthcare interventions for people aged 50 years or older in England with cardiovascular disease, depression, diabetes or osteoarthritis; to identify how quality varied with participant characteristics; and to compare the distribution of illness burden in the population with the distributions of diagnosis and treatment.

Our three research questions were:

1. How does the prevalence of good quality of health care vary over time?
2. What characteristics are shared by people aged 50 years or older who received, or did not receive, specific items of recommended NHS or non-NHS care for cardiovascular disease, depression, diabetes and osteoarthritis, in a national population-based study followed up for 6 years?
3. Are factors such as wealth, patient education, physical activity, obesity and co-existing other chronic conditions, or practical factors such as good eyesight and marital status, independently associated with the quality of health care received, from burden of illness to diagnosis and, finally, to treatment?

Methods

The English Longitudinal Study of Ageing (ELSA) is a national panel survey of people aged 50 years or older living in private households in England. The original cohort was drawn from households that had previously responded to the Health Survey for England (HSE) in 1998, 1999 and 2001, in order that it should be nationally representative. The first wave was conducted in 2002–3, with successive waves collected every 2 years since, up until 2010–11 (fifth wave). Replenishment cohorts were added in 2006–7 (sampled from HSE 2001–4) and 2008–9 (sampled from HSE 2006) to correct for the original cohort ageing and loss to follow-up. Data collection took place via face-to-face interviews in participants' homes, with additional biomedical information collected during nurse visits in 2004–5 and 2008–9. ELSA interviews obtained in-depth data on participants' demographics, finances, health, lifestyle and psychosocial characteristics.

Samples

The four waves of ELSA that we studied comprised 16,773 participants. For the longitudinal analyses of ELSA we used data from the 5114 participants in the original cohort who responded at every successive wave, excluding proxy responders. We also used cross-sectional samples including all eligible participants at each wave: 2004–5, 2006–7, 2008–9 and 2010–11. For analysis of the diabetes care bundle, we used a cross-sectional sample of all eligible participants in 2010–11, who had also been non-proxy participants in 2008–9 ($n = 8222$).

Outcome measures (quality indicator achievement)

Questions on quality of care for a range of conditions have been implemented in ELSA since 2004–5. The quality indicators were developed using a rigorous process by researchers at RAND Corporation in the USA, who combined the best available evidence with expert opinion to assess appropriateness of treatment. They were then adapted for use in the UK by an expert panel of clinicians. The quality indicators were selected for suitability of use in patient interviews and underwent testing before implementation in ELSA. The quality indicators describe health-care processes, rather than health outcomes, and were designed to describe minimum acceptable levels of care.

The English Longitudinal Study of Ageing included 32 quality indicators overall, of which 19 were used in this study: seven quality indicators for cardiovascular disease (including five for ischaemic heart disease and one quality indicator for each of hypertension and cerebrovascular disease), three for depression, five for diabetes and four for osteoarthritis. ELSA also included seven questions about patient-centred health care. We calculated achievement rates for the 19 quality indicators by dividing the number of participants who reported receiving the indicated care by the number eligible for that care, expressed as a percentage. If a participant was eligible for an indicator, the indicator was described as 'triggered'. Quality scores at a condition level were the total number of times indicators for each condition were achieved, divided by the total number of times they were triggered for that condition.

Participant characteristics

Possible covariates for modelling receipt of care were selected by a multidisciplinary panel consisting of academics, clinicians and public and patient representatives. The choices were based on clinical relevance, feasibility to extract the data from ELSA and previous work. Covariates were grouped into five domains: demographics, health and disability, health behaviours, physical measures, and psychological and social. Continuous variables were transformed into tertiles or quintiles. Missing data were coded as an extra category to maximise the sample available for analysis.

We used the slope order of inequality as an independent variable to estimate the relationship between the illness burden, diagnosis and treatment, respectively, and the categorised measure of wealth. The slope order of inequality consisted of wealth quintiles with values of 0.1, 0.3, 0.5, 0.7 and 0.9, that is the mid-points of each quintile on a scale of zero (least wealthy) to one (most wealthy). Advantages of this method of quantifying inequality are that it includes all participants; instead of just comparing the highest and lowest quintiles, it accounts for the number of participants in each category and it provides a single overall measure of inequality.

Analyses

The primary outcome was achievement of each quality indicator, which was the number of times the indicator was achieved divided by the number of times it was triggered, expressed as a percentage, with possible values between 0% and 100%. The quality indicator achievement at the level of each condition (cardiovascular disease, depression, diabetes and osteoarthritis) was the number of times any indicator for that condition was achieved divided by the number of times any indicator for that condition was triggered, expressed as a percentage, with possible values between 0% and 100%. We calculated the percentage change in quality indicator achievement between wave 2 and the most recent year of follow-up, and tested the statistical significance of any changes in quality indicator achievement over time with a

Pearson's chi-squared test for comparing proportions. We generated a 'care bundle' of the three diabetes quality indicators that described monitoring checks.

Logistic regression models investigated which participant characteristics were independently associated with receipt of better-quality health care, at the level of health conditions. Each participant might have been eligible for more than one quality indicator within each condition, and so for the regression modelling we reshaped the data into 'long' format in Stata statistical software (StataCorp LP, College Station, TX, USA), with each participant having a separate record for each indicator. Intraperson correlation of outcomes was accounted for, and all data were weighted for historical non-response and non-response since the last wave.

For the diabetes quality indicators, including the care bundle of three routine monitoring indicators, we additionally explored which patient characteristics from one wave earlier (2008–9) were associated with subsequent non-receipt of diabetes care at the latest wave (2010–11), using the 2010–11 cross-sectional sample ($n = 8222$). Potential covariates were entered into logistic regressions on outcomes for achievement of the care bundle and the fourth quality indicator [which assessed offering angiotensin-converting enzyme (ACE) inhibitors to patients with diabetes and an additional cardiac risk factor]. All models were adjusted for age, sex and differential non-response.

Multivariable logistic regression analysis was used to test for associations between age, sex and slope order of wealth inequality, with respect to illness burden, diagnosis and treatment. Further tests of possible covariates that might affect the population distribution of illness burden, diagnosis and treatment were performed.

Results

The prevalence of receipt of indicated health care varied over time. Quality scores for condition were 82.7% [95% confidence interval (CI) 79.9% to 85.5%] in 2004–5 and 84.2% (95% CI 82.1% to 86.2%) at follow-up (2010–11) for cardiovascular disease ($p = 0.53$), 63.3% (95% CI 57.6% to 69.0%) and 59.8% (95% CI 52.4% to 64.3%) for depression ($p = 0.21$), 76.0% (95% CI 74.1% to 77.8%) and 76.5% (95% CI 74.8% to 78.1%) for diabetes ($p = 0.67$), and 31.2% (95% CI 28.5% to 33.8%) and 35.6% (95% CI 34.2% to 37.1%) for osteoarthritis ($p < 0.001$).

Achievement of the diabetes care bundle was 67.8% (95% CI 64.5% to 70.9%) in 2010–11. The diabetes care bundle was not fully received in nearly one-third of participants (32.8% in 2008–9, 32.2% in 2010–11) and nearly half of those eligible were not offered ACE inhibitors (44.6% in 2008–9, 44.5% in 2010–11). Previous non-achievement of the diabetes care bundle was the biggest predictor of non-achievement 2 years later [odds ratio (OR) 3.3, 95% CI 2.2 to 4.7]. Participants were also more likely to not receive the full bundle if they lacked diabetes self-management knowledge (OR 2.0, 95% CI 1.3 to 3.2) or were cognitively impaired (OR 1.8, 95% CI 1.1 to 2.9).

Participants' characteristics associated with quality indicator achievement over time were assessed on the 5114 participants who were interviewed in all four waves. There were few statistically significant associations. Quality indicator achievement in diabetes was lower with cognitive impairment (OR 0.5, 95% CI 0.4 to 0.7) and higher for those living alone (OR 1.7, 95% CI 1.3 to 2.0). Quality indicator achievement in hypertension was higher for those aged 75 and over (vs. 50–64 years) (OR 3.2; 95% CI 2.0 to 5.3). For osteoarthritis, quality indicator achievement was higher for those with severe (vs. mild) pain (OR 1.8, 95% CI 1.4 to 2.2), limiting illness (OR 1.8, 95% CI 1.5 to 2.1) and obesity (OR 1.6, 95% CI 1.2 to 2.0).

Wealth was the major factor associated with illness burden and diagnosis. Poorer participants were always more likely than wealthier participants to have illness burden (statistically significant OR 3.9 to 16.0), but not always more likely to be diagnosed or receive treatment (statistically significant OR 0.2 to 5.3).

Conclusions

Shortfalls in quality of care have persisted over 6 years, with less than half of indicated health care achieved for osteoarthritis, compared with the other three conditions, although osteoarthritis was the only condition where quality had improved over time. Illness burden was much more common in poorer participants, but after diagnosis, there was remarkably little variation by participant characteristics, suggesting that while treatment for these four conditions is usually equitable, barriers to equity may exist at the stage at diagnosis. The shortfalls in quality of care by condition are much larger than the relatively few small variations found by participant characteristics.

This project is the first to investigate a wide range of clinical, behavioural, psychosocial and sociodemographic patient characteristics associated with subsequent receipt of care in older people in England, encompassing four common health conditions. Using the ELSA cohort, we were able to link reports of receipt of care indicated by evidence- and consensus-based standards developed specifically for older people with in-depth, sophisticated measures of a range of patient characteristics. This approach contrasts with previous research, which has typically been limited to exploring basic patient descriptors, such as age and sex, available from routine records.

Limitations include that, although the ELSA cohort was selected to be representative of older people in England, there has inevitably been some loss to follow-up with each wave. The effect has been minimised by the ELSA sample replenishment, and by weighting of all analyses for differential non-response using sampling weights. Quality of care was based on self-reports of care received up to 2 years previously, but recall problems were minimised by the selection for ELSA of only those quality indicators that were suitable for self-report, and by excluding participants if they had cognitive impairment and needed a proxy responder to help them to answer the questions.

Implications for health care and research recommendations

The results are likely to be generalisable to the population of England aged 50 years or over, bearing in mind the limitations discussed above, because the sample was large and selected to be nationally representative, the results were weighted for non-response, and achievement rates were comparable with the Quality and Outcomes Framework. They may also be generalisable with caution to other countries with similar population demographics, but are likely to vary according to health system and availability of care.

Further research is needed to compare the results with measurements of quality of care from directly observed clinical care and from medical records. As this research has shown that the substantial variations in quality of care are generally not explained by participant characteristics, further research is needed into the association between quality and health system characteristics at micro (individual clinician), meso (general practice or hospital) and macro (regional and national) levels. Future research could use linked data sets to examine the effect of health service characteristics on the quality of care received at individual patient level. Different models of health care may improve quality of care received by older people, with common features being strong primary care, the use of care plans and complete electronic medical records. Promising models need to be tested in specific health-care contexts, and successful models implemented in routine health care.

Further research could explore why quality is so much lower in osteoarthritis than for other conditions studied, and also follow-up our preliminary finding that there may be system-level inequalities in the receipt of diagnosis that make it harder for disadvantaged people with specific illness burden to receive an appropriate diagnosis. These questions would benefit from a mixed qualitative and quantitative approach to explore the delivery of care in different systems and link to outcomes.

We found that participant's self-reported receipt of indicated health care across time was variable both between and within the four conditions studied. Shortfalls in quality of care have hardly changed over 6 years, with less than half as many quality indicators achieved for osteoarthritis as for the other conditions studied. Barriers to equity may exist at the stage at diagnosis, but for those with one of the four diagnosed health conditions studied, the persistent system-level deficits in the provision of care were generally distributed equitably across the population.

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