Proximity to death is associated with frequency of GP contacts in the oldest old: the Leiden 85-plus study

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Abstract

Background: the relationship between proximity to death and the amount of care provided by general practitioners (GPs) is largely unknown.

Objective: to examine the influence of the proximity to death on the frequency and length of GP contacts in the oldest old.

Study design: this population-based follow-up study included 599 inhabitants of Leiden, the Netherlands. At ages 85–90 years, the frequency and length of GP contacts during the previous year were collected.

Methods: the influence of age and proximity to death on contact frequency and time was analysed with linear mixed modelling.

Results: in a model including ‘age’ alone, mean contact frequency during surviving years increased with 0.25 contacts/year [95% confidence interval (CI) 0.04–0.45, \(P = 0.019\)] and mean contact time with 11.04 min/year (95% CI: 5.42–16.67, \(P < 0.001\)). In a model including ‘age’ and ‘proximity to death’, those who died compared with those who survived had 11.94 contacts (95% CI: 10.86–13.01) more that year and 323 min (95% CI: 294–353, \(P < 0.001\)) more time, with no effect of ‘age’.

Conclusions: the observed increase in utilisation of GP care of the oldest old depends more on the proximity to death and less on age alone. Being old only results in a small increase in the GP’s workload.

Keywords: health costs, ageing/geriatrics, primary care, elderly

Introduction

There are various views on the predictions of change in healthcare expenditure in our ageing society. For example: is it mainly age itself, or is it the proximity to death that determines the extra costs? [1–4]. Also, people are living longer and face longer periods with deteriorating health, multi-morbidity and loss of function, with a subsequent increase in costs of healthcare technology [5–7]. However, others refute this expectation, stating that proximity to death has a significant effect on health care costs in the higher age groups [8–11].

Hospital costs and costs for long-term care are generally used in cost calculations and predictions [1, 5, 12, 13], whereas changes in costs of care provided by the general practitioner (GP) are not well documented. Understandably, the elderly have a higher contact frequency with their GP than younger persons [14, 15]. For future practice and healthcare service planning, we need to know whether the increased contacts with GPs are concentrated in the last year before dying, or whether they start earlier when persons start to suffer from multi-morbidity and/or loss of function. To gain insight into the relation between age, proximity to death and utilisation of GP care, this study explores the influence of proximity to death on contact frequency with the GP in the elderly.

Methods

Participants and procedures

The Leiden 85-plus study is a population-based follow-up study of inhabitants of Leiden, the Netherlands. Between September 1997 and September 1999, all 705 members of the 1912–14 birth cohort were invited to participate within 4 weeks after their 85th birthday. There were no exclusion criteria related to health or demographic characteristics. Fourteen persons died before they could be enrolled and
92 refused to participate. Finally, data were obtained from 599 participants (response rate 87%). The subjects who participated did not differ from the source population from which they originated [16].

Each year for 5 years, all participants were visited a few weeks after their birthday by research nurses. During these home visits, structured face-to-face interviews and function tests were conducted. The participants’ GPs were also interviewed each year using structured questionnaires.

The study was approved by the Medical Committee, Leiden University Medical Center. Informed consent was obtained from all participants.

For the present study, we excluded participants who were living in a nursing home at baseline (n = 30) and during the follow-up (n = 37). Participants moving to a nursing home during the follow-up were excluded from the analysis from that specific date onwards.

**Mortality/proximity to death**

All participants were followed for mortality until the age of 90 years. The date of death of the participants was obtained from the municipal registries.

**Outcomes**

For each participant, the number of consultations at the GP’s office as well as home visits made by the GP was collected during face-to-face interviews. The total number of contacts was the sum of consultations and home visits (telephone contacts not included). To compare contact frequencies between participants who died and survived, the frequencies were standardised to the number of contacts per year. Owing to yearly measurements, some participants who died early in the year had a short follow-up period and, therefore, a high number of contacts per year after standardisation.

The duration of a GP consultation was determined to be 10 min. Home visits were determined to be 30 min (including the GP’s travelling time).

**Statistical analyses**

Since the data are skewed, the numbers of contacts and contact time are presented as medians and inter-quartile range (IQR) range (P_{25}–P_{75}). We use an ordered trend test (Jonckheere-Terpstra) for the change in median contact frequency and time by proximity to death and age [17].

To efficiently use the data, we also analysed data with linear mixed modelling. We constructed a model for annual contact frequency and time including age alone for surviving participants and a model including age and a variable for surviving years and a variable for year of death reflecting contact frequency and time in the year of death.

All analyses were performed with SPSS version 16.0.

**Results**

At the age of 85, 197 (35%) out of 569 participants in the Leiden 85-Plus study is male; 66% is either widowed, divorced or never married, 64% only completed primary school, 18% are living on a state allowance without extra pension. Fourteen per cent has an MMSE score of <19 and 24% has 2 or more chronic diseases.

Ninety four per cent of all participants lived independently, semi-independently or in a home for the elderly, and relied on the GP for medical care. At the age of 90 years, 92.3% of the participants relied on the GP for medical care.

Of the participants included in the present analysis, at baseline, 65% were women. Most participants still had good cognitive function and relatively high competence in activities of daily living. The overall mortality rate for the elderly relying on GP care at baseline was 12.0/100 persons/year.

The overall median contact frequency and median GP-time increased from the age of 85 to the age of 90 from 5.0 [inter-quartile range (IQR) 2.0–8.0] to 6.0 (IQR: 3.0–10.0) and 90 (IQR: 40–180) to 130 (IQR: 60–230), respectively. In the present study, the contact frequency/contact time with the GP mainly depended on the proximity to death (Figure 1). In Figure 1, participants are categorised in groups of length of survival. Every line represents a group with a certain length of survival. For all participants who deceased during the follow-up, the figure shows that contact frequency and time mainly increases in the last year before death. The bottom dark line is the line for participants who survive during the follow-up. Their contact frequency and time remains relatively stable.

Overall, the median number of contacts increased from 5.0 (IQR: 2.0–8.0) in the surviving years to 11.7 (IQR: 5.8–20.5) in the last year of life (P < 0.001). The median contact time increased from 90 (IQR: 30–180) min to 298.9 (IQR: 136.3–556.2) min/person/year (P < 0.001).

In the year of death, contacts with the GP were mainly via home visits, i.e., 9.5 visits (IQR: 3.9–18.9) vs. 0 consultations (IQR: 0–2.7). Of the total time spent by GPs (consultations and home visits) with participants aged ≥85 years, 26.3% was related to care during the last year of life.

Additional analyses with linear regression models (Table 1) showed that in a model with only ‘age’ included, during the follow-up the mean contact frequency of participants during surviving years increased with 0.25 contacts/year [95% confidence interval (CI) 0.04–0.45, P < 0.019] and mean contact time increased with 11.04 min/year (95% CI: 5.42–16.67, P < 0.001). A model including ‘age’ and ‘proximity to death’ shows that the mean number of
contacts increases to 11.94 contacts for those who died that year compared with those who survived (95% CI: 10.86–13.01) that year and mean contact time increases to 323.80 min (95% CI: 294.52–353.08, \( P < 0.001 \)).

**Discussion**

In the present study, the increasing number of contacts with the GP from the age of 85 years onwards was mainly explained by an increase in contacts in the last year before death. With proximity to death, the contact frequency and contact time were \( \geq 2 \) times higher than during the surviving years. Contact frequency and contact time with the GP showed a significant increase in the last year before death. The increase related to age was significant in a model including only age, but small compared with the increase related to proximity to death.

There is still a general belief that higher age leads to higher healthcare costs, despite reports showing that proximity to death increases healthcare costs rather than age [2, 3, 5, 8, 9, 13, 18–20]. One Dutch study concluded that increases in costs with age were largely due to hospital costs in relation to the last year before death [21]. Others conclude that costs due to long-term care and costs of health technology at the end of life are the main cause of the increase in costs in later life [1, 5, 7]. To our knowledge, no data are available on the use of care provided by the GP to community-dwelling older people, in relation to age and proximity to death. The reliability of our data on GP contacts is high because GPs register most contacts in the electronic patient record. Moreover, because interviews were held once a year with the patients and GPs it was relatively easy to remember any unregistered contacts. Although the data were collected between 1997 and 1999, we believe the demand for GP care largely resembles the care today as no changes in the Dutch healthcare system have been made that are likely to influence this demand.

Our evaluation of the use of care provided by GPs in the elderly contributes to the debate on increasing healthcare costs at old age. In the present study, proximity to death is shown to account for a high increase in contact frequency/contact time with the GP. Although a limitation of this study is the narrow age group, age alone in this group causes only a slight increase in the utilisation of GP care. During the 5-year study period, a quarter of the total GP contact time (mainly home visits) was generated by the proximity to death. In view of the ongoing demographic developments, this has important consequences for the GP's workload. Much of the demand for care, and primary care expenditure in the elderly, will be related to the end-stage of life. To supply this care, especially regarding home visits, GPs will need additional support. Possibly just old age does not necessarily result in an increase in the GP's workload. Combined with the increase in the life expectancy, this might lead to additional years of relatively low-contact frequency leading to a postponement of, or a more prolonged increase in, the demand for GP care. Although the results of this study cannot be directly translated into policy decisions, the
data offer useful information related to the debate on the future of a healthy and sustainable primary care.

Key points

• There is only a small increase in demand for GP care based solely on increasing age in the very old age group.
• Both the frequency and the length of contact provided by the GP and proportion of home visits increase in the last year before death.
• Impact of the increase in contact frequency and time on the workload of GPs needs to be taken into account in further research.

Conflicts of interest

None declared.

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References


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