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Several factors influenced general practitioner participation in the implementation of a disease management programme

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ABSTRACT

INTRODUCTION: Disease management programmes (DMPs) require a high degree of participation from general practitioners (GPs) in order to succeed. We aimed to describe the participation among Danish GPs in a DMP.

MATERIAL AND METHODS: A quality improvement project entitled the Chronic Care Compass (CCC) was introduced in 2010 by the Central Denmark Region. The project was based on DMPs targeting persons suffering from three chronic diseases (diabetes, chronic obstructive pulmonary disease and acute coronary syndrome). All GPs in the region were invited to participate. We obtained data from administrative registries and studied the participation and its association with characteristics of practices and patients. Differences in participation were assessed using binomial regression models.

RESULTS: A total of 271 (69.1%) practices participated in the CCC. The participation was 28.9 percentage points (pp) (confidence interval (CI): 14.3; 43.6) lower among GPs who were older than 60 years versus younger than 50 years, 32.2 pp (CI: 19.1; 45.2) lower among GPs who provided few versus many chronic care consultations, 13.7 pp (CI: 1.7; 25.6) lower among GPs with lower versus medium practice gross income, and 16.9 pp (CI:6.1; 27.8) lower among GPs with a patient population with medium versus low degree of socio-economic deprivation.

CONCLUSION: Participation in the CCC was lower among GPs who provided less chronic care, had a lower practice gross income and had a patient population with a higher degree of deprivation.

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Knowledge and awareness about the complex processes involved in implementing changes are the first important steps that must be taken to successfully implement research into evidence-based practice [1]. Disease management programmes in general practice require a high degree of participation to achieve the anticipated impact. Only few studies have quantified factors influencing the general practitioner's (GP's) participation in studies [2-4] or in specific disease management programmes introduced by healthcare authorities [5] although such information is a critical foundation for the planning of effective implementation strategies in future [1, 6].

In 2010, the Central Denmark Region invited all 838 GPs based in the 392 general practices located in the region (1.2 mill inhabitants, corresponding to approximately 20% of the Danish population) to participate in a quality improvement project coined the Chronic Care Compass (CCC). The main purpose of the CCC was to improve the quality of chronic care management in general practice for persons with chronic diseases by using various methods including a modified version of the Breakthrough Model [7]. Three chronic diseases were chosen as focus areas for the CCC; diabetes, chronic obstructive pulmonary disease (COPD) and acute coronary syndrome (ACS).

Independently of the CCC, the Central Denmark Region had developed disease management programmes for diabetes, COPD and ACS in collaboration with general practice, municipalities and hospital specialists. These disease management programmes were used in the CCC. The project ran from May 2010 to May 2012.

The Chronic Care Database was established through linkage of administrative registries and clinical databases in the Central Denmark Region in order to support the identification and management of chronic diseases in primary care.

In the present study, we aimed to describe the CCC participation rate among GPs while considering factors characterising the GP and the patients, which may affect participation.

MATERIAL AND METHODS Design and procedures

Identification of the patient population for the CCC Patients with diabetes were identified from administrative data in the Central Denmark Region using an algorithm, which is in line with a validated algorithm described in detail elsewhere [8, 9]. Patients suffering from COPD were identified using an algorithm designed to identify patients with COPD in primary care settings [10].

ORIGINAL ARTICLE

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Dan Med J 2014;61(9):A4901 TABLE 1

General practitioner participation in the Chronic Care Compass evaluated per practice among 69.1% participants (n = 271) and 30.9% non-participants (n = 121) in 2010 (all practices)

| | All | Participation | | Risk difference, | |
|---|--------------|---------------|-----------|----------------------------|------------|
| GP-related factors | practices, n | rate, % | 95% CI | adjusted ^a (pp) | 95% Cl |
| GP mean age | | | | p < 0.001 | |
| < 50 years | 91 | /8.0 | 69.4-86.7 | ret. | ret. |
| 50-60 years | 212 | /5.9 | /0.1-81./ | -0.1 | -10.4-10.3 |
| > 60 years | 89 | 43.8 | 33.3-54.3 | -28.9 | -43.614.3 |
| GP mean gender | | | | p = 0.472 | |
| All men | 166 | 59.0 | 51.5-66.6 | -9.4 | -24.7-5.9 |
| All women | 68 | 72.1 | 61.1-83.0 | -4.2 | -19.0-10.7 |
| Mixed gender | 158 | 78.5 | 72.0-85.0 | ref. | ret. |
| Number of GPs in practice | | | | p = 0.790 | |
| 1 | 189 | 61.4 | 54.4-68.4 | ref. | ret. |
| 2 | 88 | 70.5 | 60.7-80.2 | -1.9 | -17.5-13.7 |
| ≥3 | 115 | 80.9 | 73.5-88.2 | 2.3 | -15.2-19.9 |
| Practice-related factors | | | | | |
| Type of practice | | | | p = 0.990 | |
| Solo practice | 186 | 61.3 | 54.2-68.4 | ref. | ref. |
| Group practice | 206 | 76.2 | 70.4-82.1 | 0.1 | -14.0-14.2 |
| Number of 0101-consulations ^b per listed patient ^c | | | | p = 0.354 | |
| < 3 | 69 | 59.4 | 47.5-71.3 | -8.9 | -21.2-3.5 |
| 3-4 | 247 | 72.5 | 66.9-78.1 | ref. | ref. |
| > 4 | 76 | 67.1 | 56.3-77.9 | -3.5 | -15.0-7.9 |
| Number of 0106-consultations ^d per patient with chronic disease | | | | p < 0.001 | |
| <1 | 68 | 35.3 | 23.6-46.9 | -32.2 | -45.219.1 |
| ≥1 | 324 | 76.2 | 71.6-80.9 | ref. | ref. |
| Practice gross-income per listed patient | | | | p = 0.059 | |
| Low | 93 | 57.0 | 46.7-67.2 | -13.7 | -25.61.7 |
| Medium | 153 | 73.9 | 66.8-80.9 | ref. | ref. |
| High | 146 | 71.9 | 64.5-79.3 | -0.6% | -10.1-9.0 |
| Gross-income per GP | | | | p = 0.606 | |
| Low | 122 | 67.2 | 58.8-75.7 | -0.9 | -11.9-10.1 |
| Medium | 124 | 67.8 | 59.4-76.1 | ref. | ref. |
| High | 146 | 71.9 | 64.5-79.3 | 4.2 | -6.3-14.7 |
| Danish Deprivation Index | | | | p = 0.008 | |
| Low | 129 | 76.8 | 70.0-82.7 | 16.9 | 6.1-27.8 |
| Medium | 62 | 60.2 | 50.6-69.3 | ref. | ref. |
| High | 80 | 66.7 | 57.9-74.6 | 9.0 | -3.1-21.1 |
| Patient-related factors | | | | | |
| Number of listed patients per GP | | | | p = 0.190 | |
| < 1,400 | 131 | 67.9 | 59.8-76.0 | -8.2 | -18.7-2.3 |
| 1,400-1,600 | 119 | 75.6 | 67.8-83.5 | ref. | ref. |
| > 1,600 | 142 | 64.8 | 56.8-72.7 | -8.3 | -18.8-2.2 |
| Age for all listed patients (mean per practice) | | | | p = 0.919 | |
| < 38 years | 126 | 74.6 | 66.9-82.3 | -0.4 | -12.2-11.3 |
| 38-40 years | 86 | 73.3 | 63.7-82.8 | ref. | ref. |
| > 40 years | 180 | 63.3 | 56.2-70.4 | -2.2 | -13.7-9.3 |
| Number of patients with chronic disease per 1,000 listed patients | | | | p = 0.593 | |
| < 60 | 105 | 75.2 | 66.8-83.6 | 5.5 | -5.1-16.0 |
| 60-80 | 163 | 69.9 | 62.8-77 1 | ref. | ref. |
| > 80 | 124 | 62.9 | 54.3-71.5 | 2.7 | -8.1-13.4 |
| | | | | | |

a) Adjusted for type of practice and for gender and grouped mean age of the GPs, evaluated per practice.

b) 0101 consultation is a health care service for a GP consultation in the clinic.

c) Listed patients are all the patients registered with the practice (both patients with and without chronic diseases).

d) 0106 consultation is a health care service which has a preventive purpose often aimed towards chronic diseases.

CI = Confidence interval; pp = Percentage point; GP = General practitioner.

Patients with a history of ACS were identified by extracting data on ACS diagnoses from hospital admissions in the Central Denmark Region, in agreement with the Danish version of the 10th revision of the International Classification of Diseases (ICD-10) [11].

Identification of the study population for the present study The study population consisted of all GPs in the Central Denmark Region with listed patients with chronic diseases. Consequently, general practices in the region were included in the study if they (as per 1 May 2010) had patients on their list with at least one of the following chronic diseases: diabetes, COPD or ACS.

The practice population of patients with chronic diseases was identified from registers based on algorithms. Patients had to be above 35 years of age at age at baseline; and for a minimum of 12 months before baseline they had to be registered with the same general practice, have been living in Denmark and have been diagnosed with at least one of the chronic diseases. In this study, we defined multimorbidity as the co-occurrence of at least two of the three chronic diseases in the same person. A total of 30 practices established during the study period were not included in the present study. The primary outcome for the study was GP participation in the CCC. Participation was voluntary, but the participating general practices were obliged to register chronic diseases, implement and work with disease management programmes for the three chronic diseases, participate in five CCC education meetings and fill out evaluation questionnaires. In return, each clinic received DKK 24,000 (approximately EUR 3,200) for their participation in the project. If the clinic had more than one GP, the clinic received DKK 10,000 (approximately EUR 1,333) for each additional GP. All GPs and staff were obliged to participate in meetings when participating in the CCC.

Data

Data on the practices, GPs and patients were drawn from administrative registries for the period from 1 May 2009 to 1 May 2010.

Information on the GPs, practices and the use of healthcare services in primary care was obtained from the Danish National Health Service Register [12]. The socio-economic burden within the patient population for each practice was estimated by calculation of the Danish Deprivation Index (DADI) [13, 14]. This index takes a value between ten and 80; higher values indicate a higher proportion of deprived patients. Information on socio-economic factors for the eight key variables included in the index was obtained from Statistics Denmark [15]. Data on participation in the CCC were obtained from administrative services provided by the Central Denmark Region. For patients, all data were linked using the ten-digit Civil Registration Number assigned to all Danish residents at birth or immigration [16]. Patient information on age, gender and registration with a general practice was obtained from the Danish Civil Registration System [16].

Information on the number of consultations, practice gross income and DADI score was collected for the year before the implementation, whereas all other variables were measured at the start of the implementation period.

Statistical analyses

We included all practices in our main analyses, but performed sub-analyses on solo practices. We calculated the unadjusted participation rate within subgroups and the corresponding 95% confidence interval (CI) as given by Jeffrey's method [17]. In addition, we calculated the adjusted risk differences (RDs) using binomial regression, i.e. a generalised linear model from the Bernoulli family using the identity link function. In the analyses of all practices, absolute risks were adjusted for type of practice, gender and grouped mean age of the GPs as evaluated per practice. In the sub-analyses performed on solo practices only, all absolute risks were adjusted for gender and age group of the GPs.

Trial registration: Not relevant.

RESULTS

Participation for all practices

A total of 271 practices comprising 609 GPs participated in the project, corresponding to a participation rate of 69.1% (**Table 1**). Overall, participation was 28.9 percentage points (pp) (CI: 14.3; 43.6) lower among GPs who were older than 60 years than among GPs who were younger than 50 years, 32.2 pp (CI: 19.1; 45.2) lower among GPs who provided few compared with many chronic care consultations, 13.7 pp (CI: 1.7; 25.6) lower among GPs who had a low compared with a medium practice gross income, and 16.9 pp (CI:6.1; 27.8) lower among GPs with a patient population with a medium compared with a low degree of deprivation (Table 1).

Participation for solo practices

Overall, 114 (61.3%) solo practices participated in the project. Participation was associated with the same characteristics as those described for the entire group of GPs (**Table 2**).

Characteristics of the patient population

The patients listed with participating and non-participating GPs were similar in regard to age, gender and prevalence of chronic diseases (**Table 3**). Overall, 24,913 perTABLE 2

General practitioner participation in the Chronic Care Compass evaluated per practice among 61.3% participants (n = 114) and 38.7% non-participants (n = 72) in 2010 (solo practices only)

| CP. related factors | Solo prac- | Participation | 95% CI | Risk difference, | 95% CI |
|--|------------|---------------|------------|------------------|------------|
| GP age | tices, ii | 1ate, 76 | 55% CI | n < 0.001 | 5570 CI |
| < 50 years | 28 | 78.6 | 62 3-94 8 | ref | ref |
| 50-60 years | 88 | 70.5 | 60 7-80 2 | -6.8 | -25 2-11 6 |
| > 60 years | 70 | 42.9 | 31 0-54 7 | -33.9 | -54 013 8 |
| GP gender | ,,, | 72.5 | 51.0 54.7 | n = 0.588 | 54.0 15.0 |
| Men | 142 | 58.2 | 49 9-66 4 | –4 4 | -20 3-11 5 |
| Women | 44 | 69.8 | 55 5-84 1 | ref | ref |
| Practice-related factors | | 0010 | 5515 6 112 | | . cii |
| Number of 0101-consulations ^b per listed patient ^c | | | | p = 0.190 | |
| <3 | 37 | 48.7 | 31.8-65.5 | -13.0 | -30.9-4.9 |
| 3-4 | 103 | 63.1 | 53.6-72.6 | ref. | ref. |
| > 4 | 46 | 67.4 | 53.3-81.5 | 5.5 | -9.6-20.6 |
| Number of 0106-consultations ^d per patient with chronic disease | | | | p < 0.001 | |
| <1 | 45 | 33.3 | 19.1-47.7 | -29.7 | -46.313.1 |
| ≥1 | 141 | 70.2 | 62.6-77.8 | ref. | ref. |
| Practice gross-income per listed patient | | | | p = 0.025 | |
| Low | 54 | 48.2 | 34.4-61.9 | -16.0 | -33.0-1.0 |
| Medium | 61 | 63.9 | 51.5-76.3 | ref. | ref. |
| High | 71 | 69.0 | 58.0-80.0 | 7.2 | -8.1-22.6 |
| Gross-income per GP | | | | p = 0.070 | |
| Low | 43 | 53.5 | 38.0-69.0 | 4.5 | -14.6-23.6 |
| Medium | 55 | 50.9 | 37.3-64.5 | ref. | ref. |
| High | 88 | 71.6 | 62.0-81.2 | 17.8 | 1.8-33.8 |
| DADI index | | | | p = 0.080 | |
| Low | 62 | 69.4 | 57.2-79.8 | 18.7 | 2.4-35.0 |
| Medium | 52 | 53.9 | 40.4-66.9 | ref. | ref. |
| High | 71 | 60.6 | 49.0-71.3 | 10.2 | -6.7-27.2 |
| Patient-related factors | | | | | |
| Number of listed patients per GP | | | | p = 0.229 | |
| < 1,400 | 40 | 50.0 | 33.8-66.2 | -14.2 | -33.5-5.0 |
| 1,400-1,600 | 56 | 71.4 | 59.2-86.6 | ref. | ref. |
| > 1,600 | 90 | 60.0 | 49.7-70.3 | -11.0 | -25.6-3.7 |
| Age groups for all listed patients | | | | p = 0.784 | |
| < 38 years | 45 | 68.9 | 54.8-83.0 | -2.7 | -23.3-18.0 |
| 38-40 years | 33 | 66.7 | 49.7-83.6 | ref. | ref. |
| > 40 years | 108 | 56.5 | 47.0-66.0 | -6.4 | -24.6-11.9 |
| Number of patients with chronic disease per 1,000 listed patients | | | | p = 0.156 | |
| < 60 | 39 | 59.0 | 42.8-75.1 | -17.4 | -35.2-0.3 |
| 60-80 | 71 | 67.6 | 56.4-78.8 | ref. | ref. |
| > 80 | 76 | 56.6 | 45.2-68.0 | -4.5 | -19.3-10.3 |

a) Adjusted for gender and grouped age of the GPs.

b) 0101 consultation is a health care service for a GP consultation in the clinic.

c) Listed patients are all the patients registered with the practice (both patients with and without chronic diseases).

d) 0106 consultation is a health care service which has a preventive purpose often aimed towards chronic diseases.

CI = Confidence interval; pp = Percentage point; GP = General practitioner

sons with chronic diseases (comprising 29.9% of the entire patient population) were not included due to GP non-participation, hereof 13,023 with diabetes (comprising 30.0% of the diabetes population), 11,912 with COPD (comprising 29.7% of the COPD population) and 1.912 with ACS (comprising 30.2% of the ACS population) (Table 3).

DISCUSSION

Seven out of ten GPs in the Central Denmark Region participated in the CCC. The participation was lower among GPs who were older than 60 years, had fewer chronic care consultations, had a lower practice gross income and a patient population with a higher degree of deprivation. Similar results were found when evaluating solo

TABLE 3

Characteristics of patients with chronic diseases registered with a general practitioner who was invited to participate in the Chronic Care Compass (n = 83,284) at baseline (2010), hereof 58,371 (70.1%) patients registered with a participating general practitioner and 24,913 (29.9%) patients registered with a non-participating general practitioner

| | Patients registered with a participating GP, n (%) | Patients registered with a non-partici- pating GP, n (%) |
|---|--|--|
| Chronic diseases | | |
| Diabetes | 30,374 (52.0) | 13,023 (52.3) |
| COPD | 28,227 (48.4) | 11,912 (47.8) |
| ACS | 4,410 (7.6) | 1,912 (7.7) |
| Multimorbidity ^a | 4,474 (7.7) | 1,863 (7.5) |
| Gender | | |
| Men | 29,136 (50.0) | 12,583 (50.5) |
| Women | 29,235 (50.0) | 12,330 (49.5) |
| Age groups for patients with chronic diseases | | |
| < 40 years | 2,631 (4.5) | 1,062 (4.3) |
| 40-49 years | 7,806 (13.4) | 3,210 (12.9) |
| 50-59 years | 11,635 (19.9) | 5,128 (20.5) |
| 60-69 years | 16,360 (28.0) | 6,852 (27.5) |
| 70-79 years | 12,820 (22.0) | 5,631 (22.6) |
| ≥ 80 years | 7,119 (12.2) | 3,030 (12.2) |

a) In this study multimorbidity was defined as the co-occurrence of at least two of the three chronic diseases (e.g. diabetes, COPD, or ACS) in the same person.

GP = General practitioner; COPD = Chronic obstructive pulmonary disease; ACS = Acute coronary syndrome

practices only. The patients of the GPs who participated in the CCC were comparable with the patients of nonparticipating GPs in regard to the distributions of chronic diseases, age and gender.

A recent British report concluded that quality improvement initiatives must consider the heterogeneity in general practice [18]. Little is known about factors influencing GP participation in studies [2-4] or in disease management programmes in primary care [5]. Another British study evaluated the GP participation in a prospective design and showed that forgetfulness and time pressure among the GPs were the main factors inhibiting recruitment [2]. A British review showed that time constraints, lack of staff, lack of rewards and recognition, and an insufficiently interesting research question also reduced GP participation in randomised controlled trials [3]. Finally, another British study found that financial incentives, peer pressure and a desire to improve patient care and maintain professional autonomy and pride were factors that motivated GPs to participate in quality improvement programmes for chronic diseases [5]. These studies all focused on barriers to and facilitators of GP participation in order to address causal mechanisms for non-participation, whereas our study focused on describing the characteristics of GPs, practices and

patients influencing GP participation in a disease management programme. However, some overlap and consistency exist.

We found that GPs with lower practice gross income were less likely to participate in the CCC, despite remuneration. This finding indicates that financial incentive is an important, but not a decisive motivation for participation, which is consistent with previous findings [18, 19]. On the other hand, this reluctance to participate could also be explained by the fact that low productivity for GPs is associated with characteristics associated with demanding patients (e.g. old age, low socio-economic status, high use of pharmaceuticals) [20]. Denmark has a fee-for-service healthcare system, which rewards short consultations with presentation of few and simple medical problems. This implies that practices with a complex patient population comprising many older patients, patients with multimorbidity or ethnic minorities will tend to have a lower practice gross income despite excessive busyness. Consequently, the association between low gross income and non-participation could, in fact, be explained by an association between non-participation and time constraints, as also stated in previous studies [2, 3].

Furthermore, we showed a lower participation among GPs who serve a patient population with a higher deprivation score, which could also be explained by time constraints. GPs who serve a patient population with a higher degree of deprivation have formerly been shown to have a lower productivity [20].

In addition, the participating GPs were more actively engaged in chronic care, which indicates that GPs already focusing on chronic care management were more likely to participate. These results are in line with the findings in other studies indicating that the desire to improve patient care, professional pride and an interesting research question were key motivating factors for participation [4, 5].

Finally, the association between non-participation and a GP age above 60 years was unsurprising, as older GPs may have less focus on long-term initiatives in their practice.

Our study has several strengths, including a large cohort comprising all GPs and patients in the Central Denmark Region. This allowed for a population-based design with high statistical accuracy. Therefore, bias due to selection of study participants, loss to follow-up and non-response cannot explain our findings. The Danish National Health Service Register is used to remunerate the GPs. The completeness of this national register is therefore considered to be high [12], and data entries in the Danish Civil Registration System are known to be very accurate [16]. Accordingly, we do not expect any serious information bias on this account. Chronic care management in general practice.



This study evaluates GP participation for a specific implementation strategy used. Consequently, these data do not allow us to suggest what the results would have been if a different implementation strategy for the disease management programmes had been used by the Central Denmark Region.

Failure to successfully implement evidence-based practice has been suggested to involve barriers at different levels of the healthcare sector (e.g. the individual healthcare professional, the patient as well as the organisational_, social, economic and political contexts) [6]. Our study has primarily focused on characterisation of the participating GPs and their practices, and the collected data do not allow us to address barriers at other levels or to present exact explanations for non-participation among individual GPs.

CONCLUSIONS

Recruitment of GPs to the CCC was successful in terms of participation rates, as a relatively high proportion of GPs participated in the implementation of the disease management programmes. Patients of non-participating GPs did not differ from patients enlisted with participating GPs in regard to type of disease or socio-demographic factors. Despite remuneration, GP participation was associated with being more chronic care active, having a patient population with a lower degree of deprivation and having a higher practice gross income. Our findings suggest that financial incentives alone are insufficient to recruit GPs to the disease management programmes. More efforts are needed to secure participation of more GPs in future disease management programmes. Incentives must be explored prior to recruitment for implementation of specific disease management programmes. Thus, this study indicates that tailored recruitment strategies are critical for ensuring GP participation in future quality development projects.

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CONFLICTS OF INTEREST: Disclosure forms provided by the authors are available with the full text at www.danmedj.dk.

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