

The Relationships Between Use of Quality-of-Care Feedback Reports on Chronic Diseases and Medical Engagement in General Practice

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Background: There is a limited knowledge on how medical engagement influences quality of care provided in primary care. The extent of the use of feedback reports from a national quality-of-care database can be considered as a measure of process quality. This study explores relationships between the use of feedback reports and medical engagement among general practitioners, general practitioner demographics, clinic characteristics, and services. **Methods:** A cross-sectional combined questionnaire and register study in a sample of 352 single-handed general practitioners in 2013. Logistic regression analysis was used to explore associations between the use of feedback reports for diabetes and chronic obstructive pulmonary disease and medical engagement. **Results:** For both diabetes and chronic obstructive pulmonary disease, a higher degree of medical engagement was associated with an increased use of feedback reports. Furthermore, we identified positive associations between using feedback reports and general practitioner services (spirometry, influenza vaccinations, performing annual reviews for patients with chronic diseases) and a negative association between usage of quality-of-care feedback reports and the number of consultations per patient. **Conclusion:** Using feedback reports for chronic diseases in general practice was positively associated with medical engagement and also with the provision of services in general practice.

Key words: feedback, general practice, leadership

The need to involve doctors in health care leadership in the past decades has been well recognized.^{1,2} Moreover, issues of quality of care are receiving increasing attention. Medical leadership and engagement in raising standards and improving performance has been identified as one of the key priorities for the future of the health care system.³ Medical engagement in this context is defined as follows: “The active and positive contribution of doctors within their normal working roles to maintaining and enhancing the performance of the organisation which itself

recognises this commitment in supporting and encouraging high quality care.”^{2(p88)} Well-implemented and well-integrated quality-of-care programs have been demonstrated to have significant influence on quality of care.⁴ Medical engagement can be measured by the Medical Engagement Scale (MES).⁵ This scale was developed with the conceptual premise that medical engagement is critical to implementing radical changes and improvements.⁵ There are different interpersonal and systemic approaches to improving the engagement of physicians as leaders in health care settings.⁶ How medical engagement influences quality of care delivered by general practitioners (GPs) has not been explored, but previous literature indicates that information-seeking behavior is associated with GP characteristics⁷ and that medical engagement in general practice is associated with varying GP demographics and clinic characteristics.⁸ In 2013, Danish GPs reported quality-of-care indicators for—among other selected medical conditions—diabetes and chronic obstructive pulmonary disease (COPD) to a central database. Feedback reports were generated and then the indicators were used for internal quality-of-care improvement in the individual clinics and also to monitor the primary health care sector. Clinic-level electronic landing page was used to register whether the GPs had used their quality report or not.

We hypothesized that GPs with high medical engagement were more likely to use feedback reports for diabetes and COPD. The aim of this study was to explore the relationship between process quality in terms of use of feedback reports for diabetes and COPD and medical engagement in single-handed GP clinics and

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furthermore to analyze associations between use of feedback reports and GP demographics, clinic characteristics, and services.

METHODS

Logistic regression analysis was used to explore the association between use of feedback reports and medical engagement among GPs in Denmark in 2013. The study was a nationwide cross-sectional study. All registered GPs were invited to fill in a questionnaire, which was supplemented by data from national health care registers.

The dependent variables were 2 process indicators for quality of care regardless of whether the individual GP had used the feedback report for diabetes and COPD. The extent of use of feedback reports was considered a measure of process quality. The explanatory variables were the index of the overall medical engagement based on the survey.⁸

In the analysis, individual characteristics of the GPs, age and gender, organizational characteristics, number of staff, size of practice, number of patients, participation in vocational training of junior doctors, and location (regional) of the GP clinics and patient service profiles, were included.^{7,8} Furthermore, data on selected GP services, which based on clinical practice are closely related to quality-of-care management, type and number of consultations (face-to-face, e-mail, telephone consultations, home visits, preventive health care visits, annual reviews for chronic conditions), obtaining electrocardiograms, and influenza vaccinations, were added. For the analysis of usage of the feedback report for diabetes, diabetes-related services, measurement of blood glucose, taking blood samples, and having opted for diabetes bundle pay (a politically negotiated payment with an economic incitement as an attempt to increase focusing on recommended guidelines for diabetes—opting for this payment, it was mandatory to use quality-of-care reports) were included. For the analysis for usage of feedback report for COPD, COPD-related services (clinic spirometry) were included. The additional data included are both for adjusting the analysis as potential confounders and for identifying how these are associated with usage of quality-of-care feedback reports.

Our analysis was not skewed by issues regarding calculation of medical engagement across several GPs in non-single-handed clinics, as the analysis was limited to single-handed GP clinics.

All data were analyzed using dummy variables (either high or low); for spirometry and annual reviews for chronic diseases, quartiles were used. Pearson correlation analysis was performed to identify possible correlations that might affect the analyses.

Medical engagement was measured by the Danish version of the MES for primary care, which is a questionnaire consisting of 36 questions.⁸ Medical engagement for each GP was an overall index of medical engagement. The data set described the composition of the responding GP sample using the biographic cate-

gories collected in the medical engagement questionnaire. The data set consisted of 352 single-handed GPs who fully completed the questionnaire. The age of GPs was divided into 4 groups (up to 40 years, from 41 to 55 years, 56-64 years, and older than 65 years).

Medical engagement was subdivided into intervals, and usage of quality-of-care reports for diabetes and COPD was determined for each interval. Dummy variables for medical engagement were used—for diabetes, GPs were categorized as either high or low, and for COPD, GPs were divided into 3 categories, where the GPs with the top third medical engagement score were assigned to a separate category and were compared with the lowest two-thirds. Classifying GPs in this manner ensured that the latter category, which had the least usage of quality-of-care reports, would serve as the appropriate reference group for comparing the categories.

Models with odd ratios (ORs) with 95% confidence intervals were used. All analyses were performed using Stata Release 13.0 (StataCorp, College Station, Texas). A *P* value of less than .05 was considered statistically significant.

Setting

Primary care has a strong tradition in Denmark, with a primary health care model focused on the GP.⁹ Approximately 98% of all Danes are enrolled with a GP. In 2013, there were 3536 GPs in Denmark, and of these, 1189 GPs were working single-handed and 2346 GPs were in partnership clinics. In all, there were 2002 registered GP clinics in Denmark,⁸ and of these, 1783 were registered within the quality-of-care database.

General practitioners in Denmark have to use electronic medical files, and it is mandatory for the GPs to register diagnoses for 8 selected medical conditions. The diagnoses have to be International Classification of Primary Care (ICPC), using the most updated Danish version called ICPC-2-DK. In 2013, the program for this activity was the Sentinel Data Capture. The 8 specific medical conditions included diabetes and COPD and their related quality-of-care indicators. In Denmark, 5.2% of the population has been diagnosed with diabetes, making this as one of the most prevalent chronic diseases and a condition primarily treated in general practice. Approximately 400 000 Danes of a total of 5.6 million have COPD, which today is the fourth most common cause of death in Denmark.¹⁰ When GPs register these 2 diagnoses in their medical electronic files, data regarding quality-of-care indicators are transferred electronically to the national quality-of-care primary care database—Dansk Almen Medicinsk Database (DAMD).¹¹ This gives GP clinics an opportunity to see a report of their enrolled patients with the specified conditions. The report indicates management against clinical recommendations in a “quality-of-care report” for each diagnosis, as well as a comparison with data from colleagues. When using the quality-of-care reports, the GPs have to log in using an individual digital signature distributed to all GPs by the Danish public authorities. When a GP opens one of the

quality-of-care reports, this is registered in the database. In addition, the collection of data provides an opportunity for quality-of-care monitoring of the GP sector. Many GPs have used ICPC for years, with an increasing number of GPs using it as a diagnostic tool. In this study, we used the quality indicators for diabetes and COPD using ICPC-2-DK coding (T90 and R95, respectively).

Registers

From the Danish General Practitioners' Organisation's register, information about GPs who had a contract with the National Health Insurance in Denmark as of January 2013 was obtained. From the survey, MES and additional data for clinic characteristics (ie, participation in vocational training of junior doctors, and number of staff) were obtained. From Statistics Denmark, data for sociodemographics of patients and use of health services were collected.

From DAMD, data regarding usage and outcome of quality-of-care indicators for diabetes and COPD from 1793 sentinel clinics were received.

The questionnaire

A Web-based survey program (SurveyXact) to send out the questionnaire electronically to the GPs was used. In total, 36 questions from the Danish version of the MES for primary care were added to the survey program. For most of the questions, the respondent could choose a specific answer by ticking the preferred answer or by choosing from a drop-down menu. The questions were mandatory and based on a 5-point Likert scale (strongly agree to strongly disagree). Additional information and questions were added to the questionnaire. The questionnaire was distributed electronically by e-mail to all registered GPs in April 2013, followed by a reminder to those who had not yet answered 2 weeks later.

Information regarding address, authorization number, practice number, and number of GPs was corrected using the official national register of authorized health workers in Denmark (Autorisationsregisteret) at the National Board of Health and the official Internet home page of the national health care system (www.sundhed.dk).

Ethics

The study was performed according to national and international ethical guidelines and legislation. Prior to the initiation of the study, approval from the Danish Data Protection Agency was obtained (J.nr. 2012-41-1043). No approval from Medical Ethical Committee for this study was needed, as Danish legislation requires only an approval for biomedical research.

RESULTS

Of a total of 1189 single-handed GPs in Denmark, 428 responded to our questionnaire. Of these, 352 were registered in the quality-of-care database for general practice. Thus, we ended up with a response rate of

29% of single-handed GPs and a population comprising 10% of all registered GPs in Denmark.

Table 1 shows the descriptive GP and clinic characteristics of the included GPs. In 2013, 82.7% of the GPs had activated the log-in to the quality-of-care database, and 70.4% and 53.1% had opened the feedback report for diabetes and COPD, respectively. There was substantial variation in GP services including the ones specifically related to diabetes and COPD.

Table 2 shows the crude and adjusted results of the estimated association between process quality in terms of use of quality-of-care feedback reports for diabetes and COPD among single-handed GPs in Denmark.

The analyses show a positive association between a high medical engagement and the ORs for using quality-of-care reports for both diabetes and COPD.

The OR for usage of quality-of-care report for diabetes was 1.914 ($P = .006$) crude and 1.831 ($P = .021$) adjusted and for COPD 1.877 ($P = .0006$) crude and 1.672 ($P = .049$) adjusted. The models are able to explain 1.6%-14.3% and 1.8%-12.8% of the variation in usage of feedback reports for COPD and diabetes, respectively. There was a decrease in the OR for usage of feedback reports among older GPs compared with younger GPs, but this was only statistically significant for diabetes. None of the other GP demographics, GP clinic characteristics, regional location, or patient service profiles were associated with usage of quality-of-care reports. However, GP service delivery revealed that there was an association between the OR for usage of feedback reports and a high number of influenza vaccinations and annual review for chronic conditions for COPD and diabetes. There was a negative association between categories for the number of consultations per patient face-to-face and usage of both reports and for COPD also the number of telephone consultations. Of the specific COPD- and diabetes-related services, there was an increased usage of reports for spirometry and diabetes bundle payment.

DISCUSSION

Summary

This study demonstrated that GPs with high medical engagement were more likely to use feedback reports—for both diabetes and COPD. General practitioner demographics, clinic characteristics, and patient service profiles did not influence the results in this study. However, there was a decreased use of feedback reports among older GPs. Positive associations between the usage of feedback reports and GP services (spirometry, influenza vaccinations, performing annual reviews for patients with chronic diseases) were identified. It is noteworthy to mention a negative association between usage of feedback reports and the number of consultations per patient was found.

Strengths and weaknesses

This study included data exclusively from single-handed GP clinics. It is likely that in larger GP partnerships,

Table 1. Descriptive GP Demographics and Clinic Characteristics for GPs in Single-Handed Clinics, 2013 (N = 352)

	Mean	CV	P5	P50	P95
Activated the electronic quality-of-care report system	0.827				
Usage of quality-of-care report for diabetes	0.704				
Usage of quality-of-care report for COPD	0.531				
Medical Engagement Index	− 0.221	− 4.586	− 1.827	0.187	1.302
GP demographic markers					
Male gender	0.670				
Age of GPs	51.590	0.118	40.08	52.33	60.37
Age group <39 y	0.045				
Age group 40-54 y	0.639				
Age group 55-64 y	0.301				
Age group > 65 y	0.014				
Organizational markers					
Number of staff	2.09	0.801	1	2	5
Number of patients enrolled	1749	0.292	1055	1684	2651
Single-handed GP, %	64.4				
Single-handed in cooperation, %	35.6				
Postgraduate training clinics, %	19.6				
Regional markers					
Capital Region of Denmark (%)	44.9				
Zealand Region (%)	13.1				
South Denmark Region (%)	14.5				
Central Region of Denmark (%)	16.8				
North Denmark Region (%)	10.8				
GP service per patient					
Annual review for chronic diseases	0.0928	0.9223	0.0004	0.0719	0.2680
Preventive health care visits	0.0059	1.4696	0	0.0033	0.0196
ECG	0.0682	1.1051	0	0.0469	0.2239
Influenza vaccination	0.1041	0.5628	0.0279	0.1007	0.1926
Consultations face-to-face	3.4667	0.2080	2.3461	3.4674	4.7209
E-mail consultations	0.7319	0.7445	0.0654	0.6161	1.8158
Telephone consultations	2.3403	0.4180	1.0345	2.1933	4.1574
Home visits	0.0861	1.4972	0.0082	0.0595	0.2219
Diabetes-related services					
Glucose measures in clinics	0.1207	1.2717	0.0019	0.0542	0.4487
Blood samples	0.5024	0.5607	0.0156	0.4809	1.0071
Diabetes bundle pay	0.3892	1.2545	0	0	1
COPD-related services					
Spirometry	0.0445	0.8059	0	0.0359	0.1150
Patient service profile					
Male gender	0.398	0.189	0.245	0.420	0.489
Age 0-17 y (%)	8.7	0.325	0.048	0.082	0.137

(continues)

Table 1. Descriptive GP Demographics and Clinic Characteristics for GPs in Single-Handed Clinics, 2013 (N = 352) (Continued)

	Mean	CV	P5	P50	P95
Age 18-67 y (%)	61.7	0.145	0.478	0.605	0.785
Age 68-80 y (%)	18.4	0.340	0.073	0.187	0.282
Age >80 y (%)	11.1	0.444	0.033	0.109	0.184
Unemployed	0.059	0.506	0.022	0.054	0.116
Single status	0.347	0.172	0.250	0.343	0.445
Immigrant first generation	0.088	0.802	0.020	0.071	0.228

Abbreviations: COPD, chronic obstructive pulmonary disease; CV, coefficient of variation (aka relative standard deviation [RSD]); ECG, electrocardiogram; GP, general practitioner; P5, 5% percentile; P50, median; P95, 95% percentile.

quality-of-care reports are used more frequently as data are shared across the partnership between GPs. Data from partnership are skewed according to the number of GPs in larger GP partnerships and the statistically likelihood of using the quality-of-care reports naturally increases with the number of GPs in the clinics. The sample is thus not representative of all general practice clinics, as only data from single-handed clinics were collected. However, we do not have reasons to believe that GPs from partnership clinics practice differently. This study defined usage of quality-of-care feedback reports as GP log-in and opening of a report. How the GPs in the clinical setting used the quality-of-care reports or how this affected the clinical outcomes was not analyzed. Previous studies have demonstrated that usage of quality-of-care reports in diabetes is likely to be associated with improved care for patients diagnosed with diabetes.^{12,13} Using data on clinical procedures, we assumed equal distribution of patients with diabetes and COPD. This was an estimate and the assumption can only be made, as the frequency of these conditions is relatively high.

Perspectives and implications

Use of information feedback reports is only one of many ways to improve quality of care, but the positive effects of this kind of initiative cannot be overlooked.¹⁴ It has been suggested that medical engagement of physicians is one of the markers of better performing hospitals in terms of improving patient care and program efficiency.¹⁵ Our findings that medical engagement in general practice was associated with an increased use of quality-of-care feedback reports contribute to the literature that engaged GPs do not see their role as very narrowly and specifically defined, providing the minimum required of them, but rather see themselves as appreciative and proud of the organization in which they work and wishing it to be seen as such by others.²

Our study finds that older GPs were less likely to make use of feedback reports. Previous studies have demonstrated that older GPs less frequently consult guidelines, drug information Web sites, and medical Web sites, which, along with medical journals, provide the most updated information.⁷ This may indicate that older GPs are less likely to embrace new initiatives for quality-of-care improvement than younger GPs. Per-

haps, older GPs simply have greater knowledge and experience than their junior colleagues, but a review of how quality of care is associated with age actually implies decreasing performance with increasing years in practice or that performance initially increased with increasing experience, peaked, and then decreased.¹⁶

Our study found a positive association between the usage of feedback reports and performing annual reviews for patients with chronic diseases. Performing spirometry is also associated with use of feedback reports for COPD, which is likely to be due to an increased attention for either screening for obstructive lung diseases or managing diagnosed patients. As expected, opting for diabetes bundle payment was also associated with usage of feedback reports for diabetes. Interestingly, only 38.9% of GPs had opted for this lucrative payment, but more than 70% of the GPs did make use of the quality-of-care feedback reports anyhow. General practitioners who used quality-of-care feedback reports performed better in carrying out services directly linked to the process of quality of care in general practice.¹⁴

Promoting medical engagement has been an increasingly advocated priority since it lies at the core of the belief that as more doctors become more directly involved in service change and innovation, performance and productivity will improve. Many such arguments have been derived as much from commonsense inference as from directly relevant evidence. Our findings provide an opportunity to focus on specific areas of interest in order to increase medical engagement among GPs. Previous studies demonstrated that medical doctors value leadership development activities and report changes in attitudes, knowledge, skills, and behavior and that certain program characteristics seem to be associated with positive outcomes.^{17,18}

Our study demonstrated a decreased use of feedback reports in clinics where there were frequent encounters per patient, which could be because these clinics were so busy that the GPs had neither the energy nor the resources for quality-of-care initiatives or, simply, that their focus was in another direction. General practitioners should pay attention to the balance between volume of patients and quality of care. This as patient volume has an impact on the services provided by GPs during consultations. These trade-offs should

Table 2. Odds Ratios of Usage Feedback Reports Versus GP, Clinic, and Patient Service Profile Proportions^a

	COPD		Diabetes	
	OR Crude	OR Adjusted	OR Crude	OR Adjusted
Dummy for medical engagement	1.877 ^b (.006)	1.6725 ^c (.049)	1.914 ^b (.006)	1.831 ^c (.021)
GP demographic markers				
Male gender		0.607 (.218)		1.085 (.852)
Age group <39 y (ref)				
Age group 40-54 y		0.592 (.448)		0.202 (.074)
Age group 55-64 y		0.308 (.146)		0.126 ^c (.039)
Age group >65 y		0.867 (.917)		0.113 (.154)
Organizational markers				
Number of staff		1.040 (.894)		1.433 (.259)
Number of patients		1.274 (.348)		1.049 (.862)
Single-handed (ref)				
Single-handed in cooperation		1.051 (.851)		0.938 (.822)
Postgraduate training clinics		1.160 (.634)		1.374 (.365)
Regional markers				
Capital Region of Denmark (ref)				
Zealand Region		1.139 (.761)		1.164 (.753)
South Denmark Region		1.577 (.298)		0.798 (.652)
Central Region of Denmark		0.952 (.909)		1.164 (.753)
North Denmark Region		0.698 (.459)		0.516 (.195)
GP service delivery				
Preventive health care visits		0.972 (.916)		0.914 (.760)
ECG		0.802 (.511)		1.160 (.686)
Influenza vaccinations		2.451 ^b (.008)		1.767 (.102)
Consultations		0.450 ^b (.007)		0.533 ^c (.043)
E-mail consultations		1.335 (.253)		0.826 (.490)
Telephone consultations		0.523 ^c (.012)		1.044 (.877)
Home visits		1.556 (.139)		0.972 (.928)
Annual review first quartile				
Annual review second quartile		1.874 (.082)		2.021 (.058)
Annual review third quartile		1.832 (.117)		2.335 ^c (.031)
Annual review fourth quartile		1.998 (.096)		5.149 ^d (.000)
Diabetes-related services				
Blood glucose samples				1.394 (.279)
Blood samples				1.054 (.886)
Diabetes bundle payment				2.476 ^b (.002)
COPD-related services				
Spirometry first quartile				
Spirometry second quartile		2.965 ^b (.004)		
Spirometry third quartile		3.389 ^b (.002)		
Spirometry fourth quartile		3.054 ^b (.007)		

(continues)

Table 2. Odds Ratios of Usage Feedback Reports Versus GP, Clinic, and Patient Service Profile Proportions^a (Continued)

	COPD		Diabetes	
	OR Crude	OR Adjusted	OR Crude	OR Adjusted
Patient service profile				
Male gender		2.294 (.764)		0.137 (.493)
Unemployed		33.88 (.615)		0.0310 (.633)
Single status		0.0107 (.085)		1.019 (.994)
Immigrant first generation		8.541 (.477)		0.473 (.803)
N	352	352	352	352
r ² _p	0.0161	0.143	0.0178	0.128
df _m	1	30	1	30
K	2	31	2	31
chi ²	7.836	69.79	7.602	54.75
Rank	2	31	2	31

Abbreviations: COPD, chronic obstructive pulmonary disease; ECG, electrocardiogram; GP, general practitioner; OR, odds ratio.

^aExponentiated coefficients; *P* values in parentheses.

^b*P* < .01.

^c*P* < .05.

^d*P* < .001.

be carefully considered by GPs and health care systems in their expectations of productivity.¹⁹

The findings suggest that health authorities, GPs, and other executive colleagues should consider medical workforce engagement a priority. It is hoped that more doctors will emerge who are better equipped in these areas through the increased focus on leadership and management in the health care sector and through continuous medical education and vocational training of junior doctors.²⁰

This study confirms our hypothesis that GPs with high medical engagement are more likely to use quality-of-care feedback reports into use. The MES was developed on the conceptual premise that medical engagement is critical to implementing radical changes and improvements.⁵

CONCLUSION

Medical engagement is positively associated with better process quality in terms of use of feedback report in general practice and also with the provision of services in general practice. Improving medical engagement among GPs is thus likely to enhance quality-of-care initiatives.

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