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Original Article

General practitioners' experiences of a data-driven quality development process

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ABSTRACT

INTRODUCTION. Research shows that structured data use can optimise treatment in general practice clinics. This qualitative feasibility study evaluated a one-year intervention (DataSam) to assess whether increased use of population data can enhance type 2 diabetes treatment and workflows in general practice clinics.

METHODS. Audio-recordings of visits from 12 clinics at baseline, six and 12 months and end-of-intervention semi-structured interviews (n = 14) explored data use, workflow changes and implementation challenges. The data analysis was inspired by qualitative content analysis.

RESULTS. Clinics were positive about project activities and how structured data use enhanced management and patient overview while optimising treatment and prescribing practices. Most clinics experienced workflow improvements, such as nurses taking on more responsibilities and heightened staff skills, knowledge, job satisfaction and confidence in data-driven decision-making, medications and guidelines. However, approximately half of the clinics faced some implementation challenges, including technical issues and time constraints. Furthermore, some raised concerns about overtreatment, data misuse and de-prioritisation of other diagnoses.

CONCLUSIONS. DataSam emphasises the potential of population data to optimise patient care, though further attention to implementation is needed.

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TRIAL REGISTRATION. Registered as "not required approval" with the Regional Ethics Committee of the Capital Region (F-22073139).

Research highlights that structured data use in general practice can optimise treatment quality and identify patients needing specific treatment [1]. Danish studies have found that electronic feedback based on general practice treatment data can successfully underpin treatment guidelines, making it an effective tool for improving the quality of care in general practices [2, 3]. Nonetheless, clinical decision-making extends beyond treatment guidelines and research evidence. Taking into account clinical variables, patient preferences and their life circumstances is an essential clinical competency, and managing type 2 diabetes (T2D) through a comprehensive, multifactorial approach is crucial to reduce the risk of complications [4]. A population-based approach to data management can enhance clinical practice and minimise unnecessary variations in treatment by targeting specific objective measures [2]. This study was a qualitative evaluation of an intervention in general practices in Northern Zealand (Capital Region), Denmark. The intervention aimed to assess whether increased use of population data in general practices may optimise treatment and strengthen workflows. General practitioners (GPs) can access quality indicators and treatment outcomes related to national T2D guidelines at

the population level. Data indicators are displayed as interactive charts and patient-specific lists, strengthening quality development with real-time data.

Methods

In Denmark, healthcare is free of charge, and primary care is provided by self-employed GPs under contractual agreements with the public health system [5]. A GP typically has around 1,600 patients [6]. As gatekeepers of the Danish National Health Service, GPs handle nearly all referrals to specialists and hospitals. The prevalence of T2D in Denmark is 6.8%, and roughly 80% of these patients are treated by a GP [7].

The Danish research initiative – DataSam

This qualitative study is part of the research initiative DataSam, which was designed as a quality development feasibility study [8]. General practice clinics were invited to participate in a newsletter (PraksisNyt), followed by phone calls and oral presentations in general practice medical forums. A total of 19 clinics volunteered to join DataSam (four clinics dropped out during the intervention).

DataSam was a one-year intervention containing a quality development process focusing on data usage in collaboration with an experienced GP and organisational advisor. T2D population data for each clinic were accessed through an internet-based quality programme for GPs in Denmark (treatment pathways, in Danish: forløbsplaner (FLP)) [8]. DataSam aimed to optimise T2D treatment and workflows in general practices. GPs were offered:

- *Clinic visits* at baseline and at six and 12 months, focusing on data-driven quality development using FLP population data for T2D [8]. Each clinic was offered technical support to ensure proper setup and consistent coding of T2D data, followed by workflow optimisation advice. Each clinic developed a quality development plan based on its T2D population data, data management and treatment outcomes [8]. TKM participated in most of the visits in an observatory role.

- *Monthly online dialogue meetings* with local hospital specialists, including a short presentation. These 30-minute lunchtime sessions allowed attendees to ask questions and discuss cases from their clinics.

Audio records of clinic visits and participants

Most clinic visits were audio-recorded (all time points: 12 clinics). From recordings (≈ 60 minutes), we assessed clinic-specific data-driven quality development from baseline to conclusion of the intervention interviews. This included changes in the organisation of T2D care, data usage challenges and levels of acceptance of project initiatives. Characteristics are presented in **Table 1**.

TABLE 1 Characteristics of clinics participating in visits.

	n	%
Profession		
GPs	22	
Nurses	11	
Total	33	
Sex: females	22	
Type of practice: > 1 GPs		74
Type 2 diabetes prevalence among patients		4.1

GP = general practitioner.

Conclusion of the intervention interviews

At the end of the one-year period, each clinic was invited to participate in a semi-structured evaluation interview. Invitations were extended at the final visit, and participation was voluntary. In total, 14 clinics participated (**Table 2**). The semi-structured interview guide included open-ended questions on data use, workflow changes and implementation challenges. Participants were encouraged to share other perspectives to address unforeseen issues. Interviews lasted between 13 and 39 minutes (median: 20 minutes), were audio-recorded and conducted individually via Teams, except for two, where a GP and nurse were interviewed together. The interviewer (LH) had no prior DataSam involvement.

TABLE 2 Characteristics of participants from semi-structured interviews.

	n	%
Profession		
GPs	14	
Nurses	2	
Total	16	
Sex: females	10	
Type of practice: > 1 GPs		80
Type 2 diabetes prevalence among patients		4.1

GP = general practitioner.

Data analysis of visits and interviews

All audio-recordings were transcribed verbatim, and the analysis was inspired by qualitative content analysis [9], involving:

- Conducting line-by-line open coding, identifying statements of potential interest while remaining open to emerging categories.

- Organising recurring codes into themes.

- Performing focused coding after determining themes and searching for patterns developed during coding [10].

The sub-theme “Positive experience of clinic visits” was developed based on codes derived from statements like “It has been useful to share knowledge and tips with another experienced colleague. It is a competence boost …” and “The visits keep you on your toes.&;You remember to pull data out and pay attention …”. Such expressions reflected how clinic visits were perceived as quality development opportunities. The analysis was conducted cross-sectionally [11], with data analysed at baseline, six and 12 months to identify changes over time. Subsequently, common changes across clinics were identified.

The analysis was iterative, moving back and forth between open and focused coding to allow new themes to emerge. LH and SSEB conducted the primary analysis, while TKM and NB reviewed and discussed the content.

Ethical considerations

As a quality project, the study was registered as “not required approval” by the Regional Ethics Committee of the Capital Region (F-22073139), but it was conducted following the Declaration of Helsinki. Participants were informed orally and in writing that their participation was voluntary and that the interviews would be recorded and used for evaluation on an anonymous, aggregate level. All provided informed consent.

Trial registration: Registered as "not required approval" with the Regional Ethics Committee of the Capital Region (F-22073139).

Results

Initially, GPs were positive and expected that the optimised data structure would simplify data and FLP management, enabling more focused work. They anticipated enhancements in population monitoring, a more structured internal overview and optimised treatment. One clinic raised concerns about the possible effect on core values and emphasised worries about the required time investment.

Shared experiences of data use from baseline to the end of the intervention

Table 3 presents shared experiences across clinics. This primarily included how the T2D care organisation within clinics changed, and the high acceptance of project initiatives. Technical issues and time constraints were encountered.

TABLE 3 Data use changes among clinics from baseline to the end of the intervention.

Shared changes	Sub-theme description	n
Use of population data	Clinics obtained an *increased focus on maintaining a systematic overview* of their T2D population using FLP data	10
Changes in the organisation of diabetes treatment	The management of patients with diabetes and *uncomplicated treatment courses was increasingly delegated to nurses* under the supervision of GPs *GPs focused on more complex cases*, including patients with multiple comorbidities	7
Challenges encountered in data-inspired quality development	Clinics *encountered various technical data challenges*, originating from limited knowledge about the technical capabilities of their in-clinic electronic medical records and FLP	7
	Clinics faced *time constraints* in reviewing population overviews	6
	Staffing challenges, such as resignations and sick leave, further exacerbated this situation	4
Acceptance of project initiatives	Clinics were *positive towards project initiatives* and wished to continue using population data systematically, including their clinic staff	13
	Clinics created several FLPs	6
Initiatives implemented by clinics to enhance systematic utilisation of population overviews	Clinics used the *population overview for organisational purposes* and to maintain a clear patient overview	5
	Clinics *implemented and updated staff guidelines* for diabetes population treatment	3

FLP = treatment pathways; GP = general practitioner; T2D = type 2 diabetes.

Benefits of data use and changes in workflows

Findings from the clinic visits were contextualised during the semi-structured interviews. Three overall themes were identified (**Table 4**). In Theme 1, focusing on the benefits of data use, all clinics shared how they had adjusted workflows and made data use more systematic. All clinics reported that structured data utilisation improved the use of FLP, and nurses assumed more responsibilities. This allowed many clinics to gain a T2D population overview, optimised treatment, along with increased staff skills, knowledge, job satisfaction and confidence (Table 4). One clinic noted time consumption as a drawback, and another felt minimal impact of the study. Nonetheless, all clinics except one (Table 3) reported increased confidence in a data-driven approach, with some aiming to apply it to other diagnoses.

TABLE 4 Themes and quotes from semi-structured interviews.

Theme Sub-themes	Content	Quotes	n
1: Benefits of data use and changes in workflows			
Structured data use and optimisation of workflows	Structured data use *improved the scheduling of patient appointments*, the systematic conduct of annual check-ups and the creation of FLP for individual patients The population data were often easily accessible, *aiding goal achievement*, underpinning the need to stay updated on guidelines and simplifying the identification of patient groups	"We realised how easy it is to use FLP ... to see who is missing an annual check-up, medication, etc., which we probably would not have noticed otherwise" (GP, clinic with 3 GPs) "You assess whether you comply with the guidelines and make a note of slightly vulnerable patients" (GP, clinic with 1 GP)	14
Optimisation of diabetes treatment	Clinics increasingly engaged with patients, and GPs gained *more confidence in their treatment through the systematic data approach*	"I feel more confident in the treatment and more familiar with the target values I aim for" (GP, clinic with 1 GP)	9
Change in the use of the population overview	Clinics reported an improved *population overview*, more active use of information and *treatment optimisation*	"It has certainly changed our tradition of actively using the patient overview... Now we have an active tool that helps improve our patients' treatments" (GP, clinic with 2 GPs)	9
Change in the use of FLP	*Shared knowledge* from FLP increased systematic data use, enabling other staff members to take over parts of the uncomplicated treatments. FLP shifted from being a burdensome obligation to *a tool for identifying new focus areas*	"The FLP has gotten better and better. Today, it is a win for us. I do not think it was in the beginning. It was a tough extra duty. Today, it is a win for both the GP and the patient. I believe it is a good working tool" (GP, clinic with 2 GPs)	8
New fixed routines and systematic use of phrases and templates for quality assurance	Clinics revised *templates and procedures* for scheduling annual and interim check-ups GPs included *treatment goals* in individual patient lab cards during check-ups, enhancing easy access to treatment goals This systematic approach *prompted staff* to consider comorbidities and medication thoroughly GPs experienced heightened motivation for quality follow-up, with some adopting stricter treatment approaches while correcting data errors	"I created an annual check-up phrase. It says that you must consider whether people have kidney or heart disease. There is a footnote now, so you must consider it" (GP, clinic with 2 GPs). "We have gained motivation to do quality follow-up. DataSam has given us more fixed routines, so the plan is to follow up every six months..." (GP, clinic with 2 GPs)	8
Medication and individualised treatment	Increased knowledge and *awareness of medication, guidelines and treatment rationale* influenced prescribing practices and encouraged individual approaches This shift led to a greater focus on multimorbidity, avoiding overmedication and prompting holistic treatment	"I often sit and consider whether I should give the patient more medicine for diabetes, what the consequences are... or if they get more side effects from it. We must think about the whole patient, other diseases and life situations" (GP, clinic with 1 GP)	8
Skills development and staff involvement	*Structured use of population data* led to skills enhancement and experience-sharing among staff	"It has been a breath of energy ... to look at quality data in a busy everyday life ... to stick to good habits and routines and get a little extra input for new ways of doing things" (GP, clinic with 3 GPs)	7
Increased employee engagement	Clinics experienced *increased motivation and employee job satisfaction*	"It gives a positive energy in the clinic to be told that we are doing well. The numbers are good. It just makes everyone sit back and think it is nice to go to work..." (Nurse, clinic with 2 GPs) "It gives me job satisfaction, I can feel it in myself, my colleagues and my staff "(GP, clinic with 2 GPs)	5
Changes in work role distribution	A *clearer procedure for task distribution* between nurses and GPs was established. Nurses assumed *greater responsibility* for scheduling and conducting annual check-ups, using the *FLP as a tool*	"There is common ground now. What we practice much more than before is that patients are seen by a team. In other words, the same nurse and GP" (nurse, clinic with 4 GPs)	4
2: Implementation challenges in practice			
Potential downsides and harm	Clinics expressed concerns that the increased focus on population data might lead to overmedication or overtreatment in pursuit of favourable outcomes. Some were worried about the *potential for errors* and misuse of data. Additionally, shared knowledge, interest and responsibility remained largely *concentrated among project coordinators*, as colleagues had not yet accessed or prioritised data	"In the excitement of achieving all parameters and giving all people the medicine that a programme suggests, because it should look good in your data overview, research, etc., you may risk overtreatment" (GP, clinic with 2 GPs) "I think the others are also interested in it, but... there are some competitors with time in general practice" (GP, clinic with 5 GPs)	9
Occupancy in one area and prioritisation	The DataSam focuswas on the cost of other diagnoses - it *required more time* to explore the data	"It is always at the expense of patients with other diagnoses, but in everyday life, you must prioritise... I wish I had more time to sit down and investigate data" (GP, clinic with 1 GP)	4
Staff challenges	Staff turnover, new training, sick leaves and unfilled positions strained productivity and placed additional *pressure on staff*	"We had to bring in a new nurse.... It required training to familiarise her with the data" (GP, clinic with 3 GPs)	3
3: Experiences with project activities			
Positive experience of clinic visits	Clinic visits from an experienced GP and organisational advisor were positively received, as they *enhanced data extraction, provided valuable insights, and created a population overview* Sharing knowledge with *an experienced colleague proved beneficial*, especially for feedback and planning, allowing *for consideration of potential changes*	"It has been useful to share knowledge and tips with another experienced colleague. It is a competence boost. We sit in the clinic and exchange a few words after the visit. I think it was a good way to get the staff involved" (GP, clinic with 1 GP) "The visits keep you on your toes. You remember to pull data out and pay attention to whether you are coding, following up and registering properly" (GP, clinic with 3 GPs)	9
De-prioritisation of dialogue meetings	Dialogue meetings were well-conceived but hard to implement due to *timing conflicts*, limited resources and some staff not seeing the need to attend	"[The dialogue meetings] have been good but difficult to establish in the clinic" (GP, clinic with 2 GPs)	9
Positive experience of dialogue meetings	The meetings were *tailored to the project setting and educational in nature*, but case studies would have been beneficial. Meetings helped maintain engagement	"The meetings have been adapted to our level, pedagogical and respectful. They have helped maintain a commitment to what was happening" (nurse, clinic with 2 GPs)	

FLP = treatment pathways; GP = general practitioner.

Implementation challenges in practice

All clinics faced some level of implementation challenges. Although working with data was frequently beneficial, it was not always intuitive, and staff needed time to familiarise themselves with it. The general practices reported spending an average of 4.5 hours (2-14 hours) working with FLP data between visits 1 and 2, which decreased to 2.2 hours (1-4 hours) between visits 2 and 3. Some noted that data use could lead to overtreatment and expressed concerns about potential errors and misuse. Moreover, the knowledge and responsibility obtained remained mainly with the clinic project coordinators. Additionally, some reported that the emphasis on T2D required deprioritising other diagnoses due to time constraints.

Experiences with project activities

The visits were generally positively received, with most clinics noting improvements in data extraction and overview (Table 4). Sharing knowledge with an experienced GP was appreciated, providing feedback and reinforcing adherence to procedures. Only one clinic found the visits stressful, comparing them to an exam and expressing a need for more guidance on treatment due to uncertainty about the adequacy of their actions.

Dialogue meetings were well-conceived and contributed to maintaining engagement, but they were challenging to implement due to timing conflicts and limited resources. Moreover, although meetings were tailored to the project setting and educational in nature, incorporating cases would have been advantageous.

Discussion

GPs were generally positive towards DataSam, reporting population overview, treatment optimisation, workflow improvements and confidence in data-driven decisions. However, technical issues, time constraints, concerns about overtreatment and de-prioritisation of other diagnoses were encountered.

Comparison with previous findings

The interviewees expressed improved workflow through structured data usage. This aligns with a review by Tsang et al. [12], emphasising data-driven optimisation for clinical improvements and highlighting the role of real-time, actionable electronic feedback. Thereby, improving the perceived advantage by enabling goal-setting, problem-solving and ownership, making clinical improvements more likely [12]. Our findings, indicating that clinics that adjusted intra-organisational workflows were more motivated to act on population data, align with Tsang et al.'s emphasis on integrating action plans into quality development efforts rather than focusing solely on measuring performance [12].

General practices in DataSam experienced challenges in a data-driven quality development process, much like shown by previous reports [13]. The GPs noted a heightened awareness of discrepancies between their ideal and actual performance. They expressed concerns about challenges to systematically acting on their data, including a perceived misalignment between population-level quality targets, patient-centred care and competing priorities at individual and clinical levels. These concerns are not unique [12, 13]. However, most clinics were motivated to adopt a systematic approach and achieve population-level quality targets for diabetes (Table 4). This improved the patients' clinical outcomes related to systolic blood pressure, low-density lipoprotein and ischaemic heart disease [8].

In one interview, a clinic expressed concern that the intervention could lead to increased medication use, prompting reflections on the risk of overtreatment and overdiagnosis. The clinic questioned whether all patients required pharmacological intervention, asking: "Should an 80-year-old be prescribed SGLT2?" While the intervention was seen as supporting a greater focus on treatment targets, it also risked overshadowing other important clinical factors, such as patient age, polypharmacy and economic considerations. The clinic described how data-driven actions can steer clinical attention in a particular direction why the general practice must balance this with professional judgment, emphasising the importance of navigating between competing priorities and evolving guidelines.

Study strengths and limitations

This study provided insights into how increased use of population data can enhance T2D treatment and workflows. The longitudinal qualitative design allowed us to capture changes over time, yielding rich experiences and challenges. However, the study also had limitations. DataSam was a feasibility study that

involved voluntary participation from a specific area in the Capital Region. Participants may have had a prior interest in population data and a slightly lower T2D prevalence (4%) than the national average (6%). Our results may reflect a particular interest in data, potentially overlooking clinics with higher frustration levels, implementation challenges or limited outcomes. These factors may affect the generalisability of the results.

One interview revealed a potential barrier associated with the researcher's observational role and the audio recording. The clinic reported that being observed heightened their sense of pressure, making the visits feel more like an evaluation in a vulnerable position than a routine interaction. This illustrates how the presence of a researcher can unintentionally influence the dynamics of clinical encounters.

Perspectives

The findings of this study should encourage diabetes quality organisations to advance the implementation of a data-driven quality development process. The methods used in this study are likely adaptable to other general practice patient groups with chronic diseases. However, clinics without systems like the FLP might find implementing such changes challenging. Future research should prioritise identifying key challenges to effectively implement the FLP.

Conclusions

The study demonstrated that structured data use in general practices can enhance T2D treatment, workflows and staff confidence in data-driven decision-making. Even though all clinics experienced positive changes, challenges were evident in relation to technical issues, time constraints and concerns about overtreatment and data misuse. The study highlights the potential of using population data to optimise care, although further attention to implementation is needed.

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