A programme to improve quality of care for patients with chronic diseases, Kazakhstan

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Objective To evaluate the effect of a disease management programme in Kazakhstan on quality indicators for patients with hypertension, diabetes and chronic heart failure.

Methods A supportive, interdisciplinary, quality improvement programme was implemented between November 2014 and November 2015 at seven polyclinics in Pavlodar and Petropavlovsk. Quality improvement teams were established at each clinic and quality improvement tools were introduced, including patient flowsheets, decision support tools, patient registries, a patient recall process, support for patient self-management and patient follow-up with intensity adjusted for level of disease control. Clinic teams met for four 3-day interactive learning sessions within 1 year, with additional coaching visits. Implementation was managed by five local coordinators and consultants trained by international consultants. National and regional steering committees monitored progress.

Findings Between July and October 2015, the proportion of hypertensive patients with the recommended blood pressure increased from 24% (101/424) to 56% (228/409). Among patients with diabetes, the proportion who recently underwent eye examinations increased from 26% (101/391) to 71% (308/433); the proportion who had their low-density lipoprotein cholesterol measured increased from 57% (221/391) to 85% (369/433); and the proportion who had their albumin : creatinine ratio measured increased from 11% (44/391) to 49% (212/433). The proportion of chronic heart failure patients who underwent echocardiography rose from 91% (128/140) to 99% (157/158). All patients set themselves self-management goals.

Conclusion This intensive, supportive, multifaceted programme was associated with significant improvements in quality of care for patients with chronic disease. Further investment in coaching capacity is needed to extend the programme nationally.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

Introduction

Kazakhstan has a high rate of premature death from noncommunicable diseases; in 2012, it was 648 deaths per 100 000 adults compared with an average of 395 per 100 000 in the World Health Organization’s (WHO’s) European Region.1,2 Many deaths could be prevented by applying evidence-based practices for treatment, monitoring and promoting healthy behaviour. Previously, no system for routinely monitoring adherence to best practice existed in the country and surveys have identified major gaps in treatment. For example, in 2010, only 27% of 1799 hypertensive patients surveyed were taking prescribed medications daily.3 Moreover, in one city, only 34% (119/350) of hypertensive patients had their blood pressure controlled4 and only 28% (33/119) of patients with diabetes had adequate fasting plasma glucose levels.5

Combating noncommunicable diseases depends on improving the quality of care. A 2018 report by the Lancet Global Health Commission estimated that 8 million lives are lost globally each year because of poor care quality. As in Kazakhstan, health-care providers in many low- and middle-income countries follow guidelines on common medical conditions less than half the time.6 Another 2018 report notes the proportion of hypertensive patients treated adequately varied from 7 to 61% globally.7

Better quality depends on a strong primary care system, where most treatment, monitoring and counselling takes place. Historically, primary care has been weak in countries of the former Soviet Union, where care was strongly specialist-based.8 In Kazakhstan, change began in 2004 when the State Health Care Reform and Development Program prioritized primary care and decentralized health services.9 Between 2008 and 2015, the country embarked on the ambitious Health Sector Technology Transfer and Institutional Reform Project, financed by the World Bank.10 The project expanded universal health insurance, accreditation programmes, information systems and clinical practice guidelines.

The aim of this paper was to describe the results of a disease management programme established in the last year of the 8-year project. The programme set out to improve process and outcome measures for diabetes, hypertension and chronic heart failure in primary care by using quality improvement techniques to maximize the adoption of clinical practice guidelines. Previously, such techniques have been...
Decision support tools are intended to remind clinicians of the actions to be taken in different situations. They address the problem that guidelines are often complex and easy to forget and that some health-care providers may not be aware of their contents. The main tool was a flowsheet—a one-page document included in each patient’s chart to remind staff which tasks should be performed and documented at each clinic visit. The document also recorded clinical data, such as blood pressure, laboratory measurements and health-related behaviours. A flowsheet was developed for each targeted condition based on international examples. Other tools included simple, one-page algorithms for diagnosis or selecting treatment and checklists for the tests required. These tools were user-friendly alternatives to clinical protocols, which can be lengthy, legalistic and dense. All tools were approved by a clinical advisory group.

The clinical information system comprised a patient registry, which addressed the problem that health-care providers may be unaware of gaps in care that need attention. At each patient encounter, clinic staff entered data required by the flowsheet into an Excel database (Microsoft Corporation, Redmond, USA), which automatically calculated values for quality indicators. Staff could then review areas of weakness monthly and target them for improvement. The registry also reported changes in indicators over time, which helped in monitoring the programme’s impact.

A care delivery system was designed to ensure key processes were performed consistently. The system addressed the problem that the steps involved in delivering care are often poorly coordinated or implemented, or inefficient. There were three process improvements: (i) a recall process was created to ensure patients overdue for follow-up or a test returned to the clinic; (ii) patient segmentation was introduced to group patients by level of disease control. For example, diabetes patients with a blood pressure and Hba1c and LDL cholesterol levels within desired limits were deemed optimal. Those with an Hba1c level above 7% were suboptimal and an Hba1c level over 9% indicated poor control. Each clinic developed standard processes for determining how frequently and intensely each patient group should be followed up. For example, a patient with well-controlled hypertension could be seen every 6 months, whereas one with a systolic and diastolic blood pressure above 160 and 100 mmHg, respectively, could be seen monthly until control was achieved. Previously in Kazakhstan, all patients were seen monthly. The aim of segmentation was to improve efficiency by reducing unnecessary visits for healthier patients and reallocate staff time to those who needed more attention.

**Methods**

In Kazakhstan, primary care is provided through polyclinics by specialists, therapists (i.e. internists), general practitioners, nurses, psychologists, social workers and health educators. Laboratory and diagnostic imaging services are also available on site. Polyclinics are publicly funded and provide essential services for free within their catchment areas. Urban polyclinics report to the health department of the oblast (i.e. subnational region), which in turn reports to the national health ministry.

We investigated the effect of the initial design and testing phase of the disease management programme, from November 2014 to November 2015. The programme was implemented in seven large urban polyclinics in Pavlodar and Petropavlovsk (population 308 000 and 195 000, respectively). Three clinic teams worked on diabetes, three worked on hypertension and two worked on chronic heart failure. In one clinic, two disease types were tackled simultaneously. This phase did not include private clinics or public clinics in rural areas, which offer a limited range of services.

**Programme design**

To assess quality, countries of the former Soviet Union traditionally relied on clinical protocols, which specified standards for medical practice against which physicians were audited and sanctioned if found noncompliant. This approach assumed that poor care quality was due to a lack of effort that could be remedied by punishment and ignored the fact that poor quality was often due to systemic obstacles. In contrast, the disease management programme adopted a supportive, team-based, multifaceted approach to quality improvement that aimed to help clinic teams address the root causes of poor care in an environment that emphasized learning, analysis and improving work processes. The programme used the Chronic Care Model as a blueprint for designing a primary health-care system to manage chronic diseases and included the following components: (i) decision support tools for clinicians; (ii) an information system; (iii) care delivery system design; and (iv) patient self-management.12

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**Box 1. Improvements to optimize quality of care of chronic diseases, Kazakhstan, 2015**

**A recall process**

This process helped to ensure that patients overdue for follow-up or a test returned to the clinic. Practice guidelines recommend patients with diabetes undergo measurement of Hba1c every 6 months and LDL cholesterol measurement every 12 months. The patient registry was designed to generate recall lists of patients overdue for follow-up or a test. Each polyclinic was required to refine its recall process. Typically, polyclinics assigned one individual to review recall lists weekly and ensure patients were phoned or otherwise encouraged to return to the clinic.

**Patient segmentation**

This process aimed to group patients by level of disease control. For example, diabetes patients with a blood pressure and Hba1c and LDL cholesterol levels within desired limits were deemed optimal. Those with an Hba1c level above 7% were suboptimal and an Hba1c level over 9% indicated poor control. Each clinic developed standard processes for determining how frequently and intensely each patient group should be followed up. For example, a patient with well-controlled hypertension could be seen every 6 months, whereas one with a systolic and diastolic blood pressure above 160 and 100 mmHg, respectively, could be seen monthly until control was achieved. Previously in Kazakhstan, all patients were seen monthly. The aim of segmentation was to improve efficiency by reducing unnecessary visits for healthier patients and reallocate staff time to those who needed more attention.

**Structured visits**

Clinic teams were encouraged to identify all tasks included in follow-up assessments, to assign tasks to different team members, to consider shifting tasks between team members (e.g. from a specialist to a primary care physician) to improve efficiency and to develop a routine to avoid omitting tasks by mistake.

Hba1c: glycosylated haemoglobin; LDL: low-density lipoprotein.
and know how to modify unhealthy behaviour benefit most from improved clinical care. Clinic staff learned how to shift from simply providing information to patients or using scare tactics to induce change to, instead, engaging in supportive dialogue. Staff also learned to coach patients to set small, but realistic and specific goals and to help them make several small changes that could gradually strengthen their self-confidence.

The programme was consistent with the three pillars of WHO’s framework on quality in primary health care: (i) empowered people and engaged communities; (ii) multisectoral policy and action for health; and (iii) health services that prioritize the delivery of high-quality primary care. The first pillar was addressed by the programme’s patient self-management component. The second was addressed by a concurrent project funded by the World Bank, which aimed to expand health insurance coverage, introduce accreditation and provide financial incentives for good performance. The third was addressed by the programme’s decision support tools, performance feedback and process improvements.

**Implementation**

We emphasized group learning over multiple encounters instead of traditional lecture-style teaching by using the Breakthrough Series Collaborative model developed for multisite quality improvement initiatives. Clinic teams attended four 3-day learning sessions in Pavlodar or Petropavlovsk to receive training from international consultants on implementing quality improvements. Each city had a regional coordinator (a physician with management experience) who worked with the polyclinics and was also trained by the international consultants. Skills, such as support for patient self-management, were taught by studying clinical cases and role-playing. Before each session, teams were assigned preparatory work and sessions were used to report progress, identify obstacles and brainstorm solutions with other participating teams. Between learning sessions, the international consultants conducted Plan–Do–Study–Act cycles to test and customize quality improvement tools from elsewhere and adapt them for local use (Fig. 1).

A formal leadership structure was established at different levels. Each polyclinic identified a clinical coordinator (i.e. team leader) and formed an interdisciplinary quality improvement team. The health ministry appointed a national coordinator and the two regional coordinators noted above. Progress across all sites was reviewed by a national steering committee and, at the regional level, by regional steering committees.

The core implementation team comprised five international consultants (two full-time equivalents) and two full-time local consultants and was active over 13 months. The programme’s costs included staff remuneration, the cost of office space, room rental, printed material and translations, and travel costs for meetings within the country and for six missions by international consultants. There were substantial indirect contributions of personnel time from health ministry staff and other key stakeholders, which included time for participating in steering committees and clinical advisory groups. One full-time staff member from the health ministry was designated the programme liaison officer.

**Evaluation**

Our investigation employed a quasi-experimental study design, where differences in quality indicators from before to after the intervention were examined for a single study group. Clinic teams submitted data monthly from July to October 2015. During this time, teams implemented programme components, such as recall processes, patient segmentation and support for patient self-management. Differences between the two periods were assessed using a two-tailed t-test for the difference between proportions. Quality indicators were selected for diabetes, hypertension and chronic heart failure.

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**Fig. 1. Breakthrough Series Collaborative model used in the Kazakhstan disease management programme, 2015**

- Select disease type
- Enrol members of quality improvement teams
- Establish clinical leadership structure
- Develop framework for quality improvements and identify changes required
- Preparatory work
- Learning session 1
  - Action period 1
  - Study
  - Act
  - Plan
- Learning session 2
  - Action period 2
  - Study
  - Act
  - Plan
- Learning session 3
  - Action period 3
  - Study
  - Act
  - Plan
- Learning session 4
  - Study
  - Act
  - Plan

Notes: The diagram was adapted from the Institute for Healthcare Improvement. Interdisciplinary quality improvement teams from each pilot site attended quarterly learning sessions and were supported in between sessions by email, visits from consultants and phone conferences. Teams also started reported data each month midway into the collaborative.
by reviewing indicators used in other countries or recommended by clinical guidelines (Table 1). All indicators were approved by a national clinical advisory group. Indicators included both process measures (e.g. adoption of guideline recommendations on the use of drugs and tests, and on follow-up) and outcome measures (e.g. blood pressure, blood sugar and cholesterol levels).

**Table 1. Effect of a disease management programme on the quality of chronic disease care, Kazakhstan, 2015**

| Disease and quality criterion | No. of patients assessed | No. of patients who met criterion (%) | P* |
|------------------------------|--------------------------|--------------------------------------|----|
|                              | Julyb August September October | Julyb August September October |    |
| Hypertension                 |                          |                                      |    |
| Blood pressure checked at last polyclinic visitd | 315 423 415 409 | 256 (81) 365 (86) 388 (93) 391 (96) | <0.001 |
| Systolic/diastolic blood pressure < 140/90 mmHg* | 424 423 415 409 | 101 (24) 178 (42) 197 (47) 228 (56) | <0.001 |
| Diabetes                     |                          |                                      |    |
| Eye examination in past yeard | 391 317 445 433 | 101 (26) 76 (24) 181 (41) 308 (71) | <0.001 |
| LDL cholesterol measured in past yeard | 391 317 445 433 | 221 (57) 211 (67) 342 (77) 369 (85) | <0.001 |
| Albumin : creatinine ratio measured in past yeard | 391 317 445 433 | 44 (11) 107 (34) 131 (29) 212 (49) | <0.001 |
| HbA1c measured in past 6 monthsd | 391 317 445 433 | 282 (72) 188 (59) 327 (73) 326 (75) | 0.23 |
| Foot examination in past yeard | 391 317 445 433 | 261 (67) 192 (61) 320 (72) 305 (70) | 0.21 |
| HbA1c level < 7%e | 282 188 327 326 | 163 (58) 115 (61) 182 (56) 182 (56) | 0.37 |
| Systolic/diastolic blood pressure < 140/90 mmHg* | 391 317 445 433 | 225 (58) 179 (56) 246 (55) 246 (57) | 0.39 |
| LDL cholesterol level < 2.5 mmol/L* | 221 211 342 369 | 59 (27) 50 (24) 74 (22) 64 (17) | 0.01 |
| Chronic heart failure        |                          |                                      |    |
| Underwent echocardiographyd | 140 162 162 158 | 128 (91) 144 (89) 161 (99) 157 (99) | <0.001 |

HbA1c: glycosylated haemoglobin; LDL: low-density lipoprotein.

* Quality of care indicators were the percentage of patients who satisfied each criterion.

b The first time at which validated data were available from participating sites. The quality improvement programme was initiated between January and June 2015.

c We used two-tailed t-tests for differences in proportions to calculate if there was a statistical difference between patients meeting the criterion in July compared with October.

d Process indicator.

e Outcome indicator.

Fig. 2. Change in care quality outcome indicators, disease management programme, Kazakhstan, 2015

HbA1c: glycosylated haemoglobin; LDL: low-density lipoprotein.

Note: Validated data were first available from participating sites in July 2015.

Findings

Learning sessions began in January 2015, indicators and flowsheets were established by March 2015 and the patient registry became operational by June 2015. All learning sessions between January and October 2015 included training on patient self-management.

Between July and October 2015, the proportion of hypertensive patients whose blood pressure was under control...
increased significantly (Table 1 and Fig. 2), as did the proportion whose blood pressure was checked at the last clinic visit (Fig. 3). There were also significant increases in the proportion of patients with diabetes who underwent low-density lipoprotein (LDL) cholesterol and albumin: creatinine ratio assessment and had eye examinations in the past year. However, there was no significant change in foot examinations or regular glycosylated haemoglobin (HbA1c) measurement. The proportion of patients with good control of LDL cholesterol (i.e. under 2.5 mmol/L) decreased significantly from 27% (59/221) to 17% (64/369) but there was no significant change in the proportion with good glucose control (i.e. an HbA1c level under 7%) or with a systolic and diastolic blood pressure under 140 mmHg and 90 mmHg, respectively. The proportion of patients with chronic heart failure who underwent echocardiography increased significantly from 91% (128/140) to 99% (157/158). All patients had self-management goals documented and 223 health-care providers underwent basic training on patient self-management. All seven polyclinics achieved a significant improvement in at least one quality indicator.

Discussion

Our investigation showed that the quality improvement tools for chronic disease management developed in high-income settings could be deployed effectively in Kazakhstan. Improvements were achievable despite fewer national resources and the country’s history of limited primary care development. In 2009, only 17% (26 vs 156 per 100,000 population) of physicians in the country were general practitioners and their training programmes were relatively new and focused on knowledge rather than practical skills.17

Implementation of the disease management programme was associated with substantial improvements in care quality process measures, such as ensuring patients had recently undergone recommended tests. The recall lists generated by the patient registry were critical for success because they identified patients who needed to return for missed tests. Our observations are consistent with those of the United States’ Health Disparities Collaborative, which found that improvements were greatest for similar quality indicators.18

Although quality outcome measures improved for hypertensive patients, similar outcomes did not improve for patients with diabetes over the short-term. However, clinical algorithms were introduced relatively late in the programme and they might have had little impact during the observation period. Moreover, it may require more time to optimize decision-making for more complex treatment decisions. In the Health Disparities Collaborative, early results also showed no improvement in diabetes outcomes,19 but some sites demonstrated reductions in HbA1c levels after 4 years of follow-up.19

The unusual finding that the proportion of patients with diabetes and an LDL cholesterol level < 2.5 mmol/L decreased probably occurred because increased testing led to greater inclusion of people who were not compliant with the regular visit schedule and who were also probably less likely to comply with dietary recommendations. Members of the national steering committee noted that statins were not free under universal health insurance in Kazakhstan – drug policy may, therefore, need to change. Similarly, the proportion of patients with diabetes whose HbA1c level was measured did not change. Although HbA1c testing is free, some participants noted that budgetary constraints at clinics hindered access to the test. Better planning could improve access.

As the disease management programme had numerous complex components, frequent interactions between international consultants, local coordinators and participants were key to success. These interactions helped clinic teams adapt the quality improvement tools developed elsewhere for local use and assisted in problem-solving. During learning sessions and coaching visits, implementation problems were observed, such as the incomplete use of flowsheets, data entry errors, incorrect techniques in patient self-management discussions and confusion about interpreting guidelines, algorithms or indicators. The traditional learning model of attending a single lecture would probably not have resulted in similar improvements.

The programme’s formal leadership structure provided an accountability mechanism that probably contributed to its success. Progress was reviewed
The disease management programme in Kazakhstan included a holistic package of interventions, such as patient flowsheets, decision support tools for clinicians, process improvements, support for patient self-management, measurement of quality indicators and performance feedback through an electronic registry. Our pilot study found that significant improvements in care quality could be achieved without an increase in clinic staff. However, success depended critically on intensive coaching and regular support for local clinic teams. The priority for policy-makers who wish to apply this approach in their own countries is to invest in building capacity to provide external support for local clinic teams. Also important are strong leadership, an accountability structure, incentives and continued engagement with stakeholders within the framework of a national plan for improving health-care quality.

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Competing interests: None declared.

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This article is dedicated to the memory of co-author Arman Issina, who died in the crash of Bek Air flight 2100 on 27 December 2019, while travelling across Kazakhstan to extend the disease management programme.

Malzah
برنامج تحسين جودة الرعاية للمرضى الذين يعانون من الأمراض المزمنة - كازاخستان

إنشاء فرق تحسين الجودة في كل عيادة، كما تم إدخال أدوات تحسين الجودة في كل عيادة، بما في ذلك مستندات تدفق المرضى، وأدوات دعم القرارات والسجلات، وعملية استدعاء المرضى، ودعم الإدارة الذاتية للمريض، وضمانة المرضى، مع ضبط الكفاءة على مستوى السيطرة على الأمراض. اجتمعت فرق العيادات في أربع جلسات تعلم تفاعلية لمدة 3 أيام خلال عام واحد، مع زيارات تدريب.

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improving health-care quality.
哈萨克斯坦改进慢性病患者护理质量的项目

目的 旨在评估哈萨克斯坦疾病管理项目对高血压、糖尿病和慢性心力衰竭患者护理质量指标的影响。

方法 2014 年 11 月至 2015 年 11 月期间，在巴甫洛达尔和彼得罗巴甫洛夫斯克的七家综合诊所实施了支持性、跨学科的质量改进项目。在每个诊所中都成立了质量改进团队，并引入了质量改进工具，包括患者流程图、决策支持工具、患者登记表、患者复诊提醒流程、对患者自我管理以及患者随诊的支持，并根据疾病控制程度来调整强度。诊所团队在一年内举行了四次为期 3 天的互动式学习会议，并进行了额外的指导考察。实施工作由五名当地协调员和经过国际顾问培训的顾问指导。国家和地区指导委员会监测进展。

结果 2015 年 7 月至 10 月期间，血压达到推荐标准的高血压患者的比例从 24% (101/424) 增至 56% (228/409)。在糖尿病患者中，近期接受眼科检查的患者比例从 26% (101/391) 增至 71% (308/433)；接受低密度脂蛋白胆固醇测定的患者比例从 57% (221/391) 增至 85% (369/433)；接受白蛋白/肌酐比值测定的患者比例从 11% (44/391) 增至 26% (101/391)。所有患者都为自己设定了自我管理目标。

结论 这个强化支持性多维项目促使慢性病患者的护理质量显著改进。需要进一步加大投资，提高指导能力，在全国范围内推广该项目。
Резюме

Программа по повышению качества медицинской помощи пациентам с хроническими заболеваниями в Казахстане

Цель Оценить влияние программы управления заболеваний, действующей в Казахстане, на показатели качества медицинской помощи, предлагаемой пациентам с гипертензией, диабетом и хронической сердечной недостаточностью.

Методы Комплексная междисциплинарная программа, направленная на улучшение качества медицинской помощи, проводилась в семи поликлиниках Павлодара и Петропавловска в период с ноября 2014 года по ноябрь 2015 года. В каждой поликлинике были созданы группы по повышению качества медицинского обслуживания, использовавшие соответствующие технические средства, включая графики приема пациентов, средства поддержки принятия решений, реестры пациентов, процесс повторного вызова пациентов, обучение пациентов методам самопомощи и последующее наблюдение за пациентами с частотой, зависящей от уровня контроля заболевания. В течение года группы специалистов поликлиники четырежды собирались для проведения 3-дневных курсов интерактивного обучения и получали дополнительное индивидуальное обучение. Внедрением программы занимались пять местных координаторов и консультантов, прошедших международное обучение. За ходом выполнения программы следили национальный и региональный руководящие комитеты.

Результаты В период между июлем и октябрем 2015 года доля пациентов, страдающих гипертензией, у которых отмечалось рекомендованное уровневое давление, выросла с 24% (101 из 424) до 56% (228 из 409). Среди пациентов с диабетом доля лиц, недавно прошедших обследование у окулиста, возросла с 26% (101 из 391) до 71% (308 из 433); доля тех, кому определяли уровень холестерина липопротеинов низкой плотности, увеличилась с 57% (221 из 391) до 85% (369 из 433); а доля тех, кому измеряли соотношение альбумина к креатинину, возросла с 11% (44 из 391) до 49% (212 из 433). Среди пациентов с хронической сердечной недостаточностью доля пациентов, прошедших эхокардиографию, увеличилась с 91% (128 из 140) до 99% (157 из 158). Все пациенты поставили себе цели по изучению методов самопомощи.

Вывод Интенсивная, комплексная, разноплановая программа была связана со значительным улучшением качества медицинской помощи пациентам с хроническими заболеваниями. Для распространения программы в национальном масштабе нужны дальнейшие инвестиции в обучающую деятельность.

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