GOOD PRACTICE BRIEF

STRENGTHENING THE PRIMARY CARE RESPONSE TO DIABETES:
A comprehensive early detection programme of vision impairment among people with diabetes in Andalusia, Spain

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Summary

In 2004, a programme for early detection of diabetic retinopathy was introduced within the comprehensive plan for diabetes in Andalusia. The region has 8.4 million inhabitants and an estimated rate of diabetes mellitus of about 12%.

Currently, 424 648 patients have participated in the programme, with 753 523 retinographies performed, reaching 95% of the target population.

The programme enhances the participation of primary health care professionals and the use of digital solutions.

Motivation

Diabetes mellitus is one of the most prevalent noncommunicable diseases worldwide. It affects an estimated 1 million people in Andalusia.

Diabetic retinopathy (DR) is a major complication and one of the leading causes of blindness among people of working age in developed countries and affects most people with diabetes *(1)*. Early detection and treatment are essential for preventing loss of vision. In this programme, digital retinography was made available in primary health care, ensuring access and reducing waiting times.

The early detection programme

A comprehensive health care plan for diabetes was set up in 2003 in Andalusia, not only to improve the care provided but also to reduce the incidence and impact in the region. The plan was designed to better coordinate the available resources, services and health actions for diabetes. It focuses on preventive activities, including early detection of major complications and health education, and promotes changes for a healthy lifestyle (balanced diet, frequent physical activity and tobacco cessation), organization of health care delivery, training of professionals and research *(2, 3)*.

Key Messages

- Coordinating patient-centred care at primary and secondary levels facilitates continuity for all patients.

- Active involvement of primary care physicians and nurses ensured the success of this population-based programme on early detection of diabetic retinopathy.

- Comprehensive health care plans such as that for diabetes are strategic initiatives for matching population health needs and expectations with policies, services and resource distribution.

- Andalusia implemented this massive screening programme in a digital environment, sharing electronic health care records at all levels of care.

- The programme for early detection of diabetic retinopathy links organizational changes to innovative digital solutions.

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DR is the most frequent microvascular complication in people with diabetes, and its prevalence increases with the duration of the disease (overall rate, ≤ 30%), with a high risk of severe visual impairment (10% of patients). Early detection and treatment of DR is the best strategy for preventing (or delaying) loss of vision *(1, 4)*. Digital retinography is widely recommended in screening protocols for early detection of retinal lesions prior to the onset of visual impairment *(5, 6, 7)*. Therefore, a systematic, population-based programme for early detection of DR was incorporated into the Andalusian public health care system and within the comprehensive health care plan for diabetes one year later (2004) *(4)*. It is a clear example of priority-setting by the Regional Ministry of Health as well as of coordination among different levels of health care (primary and secondary care and hospitals), putting the patient at the centre of the system.
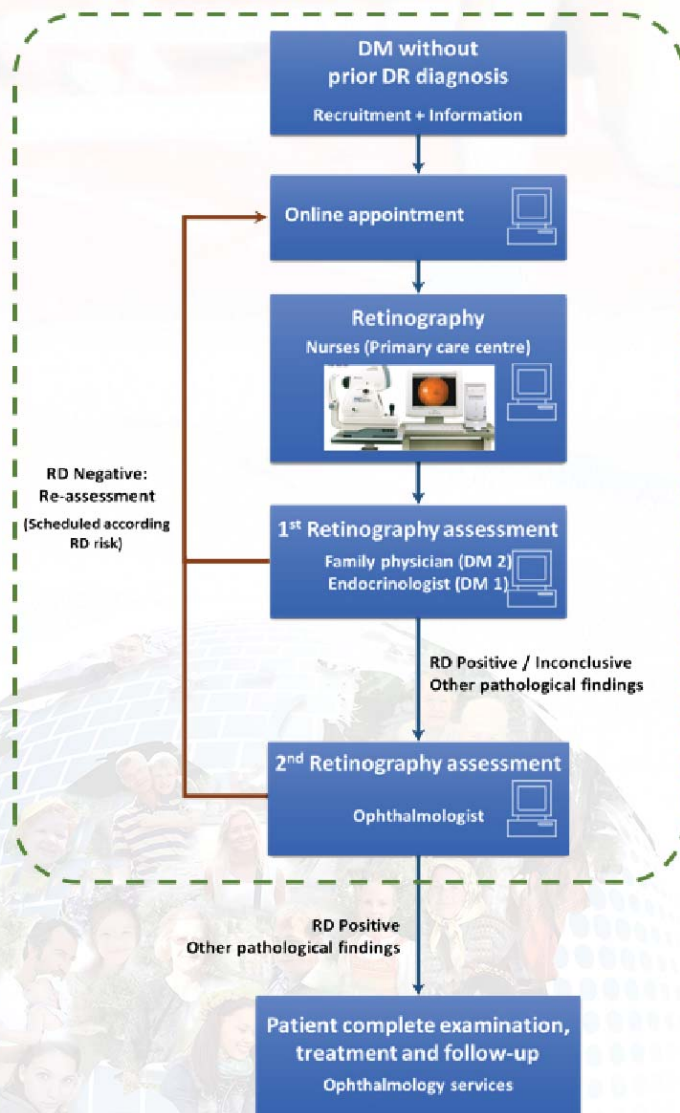
The early detection programme is based on:

- shared primary and specialized or hospital care for patients with diabetes, ensuring patient-centred care;
- active involvement of primary care professionals; and
- shared electronic health records available throughout the Andalusian public health care system.

The early detection programme started with a pilot project in 2004 of 360 patients with diabetes, 11 primary care centres and 6 hospitals (for training, device provision and outcomes analysis) *(4)*. After an initial assessment, the programme was extended progressively throughout the territory, improving professional competence and patient care. No economic incentives were used at the outset of the programme.

Fig.1. Work flow of the programme for early detection of diabetic retinopathy.

DM, diabetes mellitus; DR, diabetic retinopathy

The current early detection programme works as follows (Fig. 1):

- In primary care centres, trained nurses perform retinography, and the results are stored in the patient's electronic health record within the corporate system.
- DR screening is performed by assessment of the first retinography by a trained family physician in a primary care centre (for patients with type 2 diabetes) or an endocrinologist in a hospital (usually for patients with type 1 diabetes).
- Patients for whom the results are negative are scheduled for the next examination cycle according to their risk for DR.
- Retinographies that show positive or inconclusive results are reviewed by an ophthalmologist for re-assessment.
- Patients with DR (or any other pathological finding) are referred to an ophthalmologist for a thorough, complete examination, treatment and follow-up (when necessary).

There are currently 155 retinographers (143 in primary care centres and 12 in hospitals) in the region and 44 mobile retinography units covering certain rural areas. Therefore, the vast majority of patients are screened at primary care level, ensuring their access to the programme at the closest point of care. Patients with DR symptoms are referred to ophthalmology services through the digital platform for diagnosis of DR.

Several quality indicators, including target population coverage and response time, in the comprehensive plan for diabetes are used to assess professional performance, linked to incentives.

Impact

To date, 426 648 patients have benefited from the programme, with 753 523 retinographies performed (Fig.2). Asymptomatic DR has been detected and treated in 46 957 cases, preventing vision impairment. Of these, 44 196 were classified as "mild to moderate non-proliferative DR". Most (84%) retinographies (632 959) were classified as "non-pathological", minimizing the proportion of patients to be referred to ophthalmology services and therefore preventing unnecessary travel and reducing ophthalmologists' workload and health care costs, with an estimated 30 million euros saved.

Since 2006, programme coverage has increased, to reach 95% of the target population (patients with diabetes without previously known DR) by the end of 2017. Severe visual impairment due to DR in Andalusia has decreased in absolute and relative terms, with an estimated 15.2% fewer cases of blindness registered between 2000 and 2014. Ad-hoc, innovative solutions have been found within the digital platform to assist in diagnosis of DR, including an algorithm for automated analysis of retinographies and one for optimizing follow-up frequency. Both are being evaluated. Benchmarking and use of indicators in the early detection programme allow assessment of outcomes, monitoring and quality control, ensuring continuous improvement.

Fig.2. Cumulative number of patients with diabetes included in the programme for early detection of diabetic retinopathy (2005–2017).

Implications for policy

The early detection programme is a systematic, population-based programme that covers almost the entire target population in Andalusia, with outstanding outcomes. It is embedded into current health care for diabetes, which was designed by a team of professionals at all levels of care, who took into account citizens' expectations, and includes a method for assessment. Its results have helped to reduce the burden of a common noncommunicable disease in the region. It is the only programme with these characteristics in our environment.

The role and involvement of primary health care in the system facilitated the implantation and outcomes of the early detection programme, supported by corporate digital solutions. The success of the programme reinforces the comprehensive approach to population health care of the Regional Ministry of Health of Andalusia, implemented by the public health care system, which is a wide network of universal coverage with high-quality, patient-centred, accessible care.

Lessons learned

- **Coordinating patient-centred care at primary and secondary levels facilitates continuity for all patients.** This is particularly relevant in the case of patients with noncommunicable diseases such as diabetes and for those included in the early detection programme.
- **Active involvement of primary care professionals (physicians and nurses) is key for the success of a population-based early detection programme on diabetic retinopathy.** Screening at primary care level ensures access, reduces urban–rural inequality and helps to achieve the highest coverage (95% of the target population). Mobile units are useful for reaching dispersed population in the region.
- **Comprehensive health care plans such as that for diabetes are corporate strategic initiatives for matching population health needs and expectations with policies, services and resource distribution.** Such plans foster activities in prevention, health education and promotion, health care delivery organization, training and research, including follow-up and assessment. The early detection programme is part of this corporate strategy, ensuring better results and outcomes.
- **Andalusia implemented this massive screening programme in a digital environment, sharing electronic health care records at all levels of care.** In the corporate system, the necessary information is accessible at all points of care and provides the data required for quality control and assessment.
- **The early detection programme includes organizational changes linked to innovative digital solutions,** whereby data and information travel instead of patients and efficiency is improved. Automated algorithms for reading retinographies and optimizing work flows are being evaluated. Continuous training of health care professionals is essential for adoption of such innovations.

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