



## Cochrane Nursing Care Field—Cochrane Review Summary Interventions to increase attendance for diabetic retinopathy screening: A Cochrane review summary



Lisa Whitehead<sup>1</sup>

School of Nursing and Midwifery, Edith Cowan University, Western Australia, Australia

### 1. Background

Diabetic retinopathy occurs when the tiny blood vessels inside the retina at the back of the eye are damaged as a result of diabetes. This can seriously affect vision and in some cases cause blindness. The early stages of diabetic retinopathy are often asymptomatic and when the condition does become symptomatic, the most common symptoms are blurred or distorted vision that makes it difficult to read standard print, watch television or see people's faces. Increased sensitivity to glare and difficulty seeing at night are also reported.

Globally, approximately 93 million individuals may have some form of diabetic retinopathy, with 28 million suffering from the sight-threatening end points of the disease (Yau et al., 2012).

Key to preventing both micro and macro vascular changes is self-management and maintaining blood glucose levels within the recommended range through diet, medication and exercise (Whitehead et al., 2017a) with regular screening to detect clinical change. Early detection of diabetic retinopathy via retinal screening, followed by timely treatment, are crucial factors in preventing vision loss (Ferris, 1993). Some countries have recommended timelines for regular screening including Australia (Mitchell and Foran, 2008), United States (ADA, 2017) and the United Kingdom (NICE, 2015). However, despite national guidelines, wide geographical variation in screening coverage are still reported, with associated inequalities in outcomes (Lake et al., 2018). Several factors have been shown to affect access and attendance for diabetic retinopathy screening (DRS), including ethnicity, younger age (less than 40 years), a longer duration of diabetes, and living in areas of high social deprivation (Byun et al., 2013; Gulliford et al., 2010; Hwang et al., 2015; Kliner et al., 2012). Evidence to support improved and/or targeted uptake of screening are needed to help inform the discussion around costs (resource use) and benefits (effects) associated with interventions to improve attendance for DRS.

### 2. Objective/s

The primary objective of the review was to assess the effectiveness of quality improvement (QI) interventions that seek

to increase attendance for DRS in people with type 1 and type 2 diabetes.

### 3. Intervention/methods

A search of the Cochrane Library, major bibliographic databases, OpenGrey, the ISRCTN, ClinicalTrials.gov, and the WHO ICTRP was completed in February 2017. Inclusion criteria were randomized controlled trials (RCTs) designed to improve attendance for DRS or general quality improvement (QI) strategies for diabetes care and reported the effect of the intervention on DRS attendance.

The QI strategy was coded using a modification of the taxonomy developed by Cochrane Effective Practice and Organisation of Care (EPOC) and Behaviour Change Techniques (BCTs) using the BCT Taxonomy version 1 (BCTTv1). The authors used Place of residence, Race/ethnicity/culture/language, Occupation, Gender/sex, Religion, Education, Socioeconomic status, and Social capital (PROGRESS) elements to describe the characteristics of participants in the included studies that could have an impact on equity of access to health services. Two authors independently worked to select trials, extract data, and assess for risk of bias; all confirmed by a third author. The certainty of the evidence was also assessed using the GRADE framework.

### 4. Results

The review (Lawrenson et al., 2018) included 66 RCTs and the overall risk of bias was assessed as being low or unclear. The QI strategies employed were multifaceted and targeted patients, healthcare professionals or healthcare systems. Examples of patient-focused interventions included educational programmes to increase awareness of diabetic retinopathy and promote self-management, and the use of prompts/reminders. Provider-focused interventions included clinician education and audit and performance feedback. System interventions included team changes, establishing electronic registration and recall, and the use of telemedicine. Fifty-six studies (329,164 participants) compared intervention versus usual care (median duration of follow-up 12 months). Overall, DRS attendance increased by 12% (risk difference (RD) 0.12, 95% confidence interval (CI) 0.10 to 0.14; low-certainty evidence) compared with usual care, with substantial heterogeneity in effect size. Both DRS-targeted (RD 0.17, 95% CI 0.11 to 0.22)

<sup>1</sup> A member of the Cochrane Nursing Care (CNC).

and general QI interventions (RD 0.12, 95% CI 0.09 to 0.15) were effective, particularly where baseline DRS attendance was low. All BCT combinations were associated with significant improvements, particularly in those with poor attendance. Higher effect estimates were reported in subgroup analyses for the BCTs 'goal setting (outcome)' (RD 0.26, 95% CI 0.16 to 0.36) and 'feedback on outcomes of behaviour' (RD 0.22, 95% CI 0.15 to 0.29) in interventions targeting patients, and 'restructuring the social environment' (RD 0.19, 95% CI 0.12 to 0.26) and 'credible source' (RD 0.16, 95% CI 0.08 to 0.24) in interventions targeting healthcare professionals. Ten studies (23,715 participants) compared a more intensive (stepped) intervention versus a less intensive intervention. In these studies DRS attendance increased by 5% (RD 0.05, 95% CI 0.02 to 0.09; moderate-certainty evidence). With the exception of gender and ethnicity, the characteristics of participants were poorly described in terms of PROGRESS elements. Seventeen studies (25.8%) were conducted in disadvantaged populations. No studies were carried out in low- or middle-income countries. Overall, the certainty of the evidence was judged to be low, using GRADE. The evidence was downgraded by two levels due to serious inconsistency of findings.

## 5. Conclusions

The results of this review provide evidence that QI interventions targeting patients, healthcare professionals or the healthcare system are associated with meaningful improvements in DRS attendance compared to usual care. There was no statistically significant difference between interventions specifically aimed at DRS and those that were part of a general QI strategy for improving diabetes care. This is a significant finding indicating that generic interventions that have the potential to improve glycaemic control, vascular risk management and screening for other microvascular complications also improve uptake of DRS. It is likely that further improvements in DRS attendance can also be achieved by increasing the intensity of a particular QI component or adding further components.

## 6. Implications for practice

Interventions targeted at screening for diabetic retinopathy or improving the quality of diabetes care more generally increased the number of people attending diabetic retinopathy screening across a 12-month follow-up period (on average, 580 vs 472 per 1000 people). Although the evidence relates primarily to adults with type 2 diabetes living in the USA or Europe, the data suggests that interventions, including self-management programs that include reference to the value of DRS, have almost the same impact on DRS as specific interventions that focus on DRS only. The longer term impact of any intervention on uptake of DRS or improvements in longer-term visual outcomes are unknown.

The most effective BCTs, those that were associated with an increase in uptake of DRS were goal setting with patients, and for healthcare professionals, interventions that involved environmental restructuring (e.g. introducing a new specialist diabetes nurse role responsible for monitoring screening rates and phoning people with diabetes to remind them to attend their DRS appointment). However, only 42% of the 93 possible BCTs were reported in the included interventions. Future work in this area could usefully explore further BCTs and their influence on screening attendance.

The review highlighted a number of gaps within the evidence base. There was limited evidence on the relative effectiveness of QI interventions in particular population subgroups according to demographic characteristics that could have an impact on health equity, e.g. ethnicity, level of education, or socioeconomic status and no studies were conducted in low- or middle-income

countries. The wider literature suggests that young adults (aged 18–39 years) are a priority population where they are the least likely to initiate retinal screening in accordance with national guidelines and have lower overall screening rates (Scanlon et al., 2016; Villarroel et al., 2018; Wang et al., 2017).

Patient and public involvement is essential in the development of high-quality, relevant health behaviour change interventions (Stewart et al., 2011) and is recommended specifically as a strategy for engaging groups at high risk of underutilisation of eye healthcare services (Elam and Lee, 2013). Individual's beliefs about diabetes influence their self-management practice (Whitehead et al., 2017b) and there is some evidence that beliefs about diabetes are formed soon after diagnosis and are predictive of later outcomes (Skinner et al., 2014), emphasizing the importance of targeting individuals recently diagnosed with type 2 diabetes to encourage retinal screening.

## References

- American Diabetes Association, 2017. Standards of care: microvascular complications and foot care. *Diab. Care* 40 (Suppl 1), 88–98.
- Byun, S.H., Ma, S.H., Jun, J.K., Jung, K.W., Park, B., 2013. Screening for diabetic retinopathy and nephropathy in patients with diabetes: a nationwide survey in Korea. *PLoS One* 8 (5) e62991.
- Elam, A.R., Lee, P.P., 2013. High-risk populations for vision loss and eye care underutilization: a review of the literature and ideas on moving forward. *Surv. Ophthalmol.* 58 (4), 348–358.
- Ferris, F.L., 1993. How effective are treatments for diabetic retinopathy? *JAMA: J. Am. Med. Assoc.* 269 (10), 1290–1291.
- Gulliford, M.C., Dodhia, H., Chamley, M., McCormick, K., Mohamed, M., Naithani, S., et al., 2010. Socio-economic and ethnic inequalities in diabetes retinal screening. *Diab. Med.* 27 (3), 282–288.
- Hwang, J., Rudnisky, C., Bowen, S., Johnson, J.A., 2015. Socioeconomic factors associated with visual impairment and ophthalmic care utilization in patients with type II diabetes. *Can. J. Ophthalmol.* 50 (2), 119–126.
- Kliner, M., Fell, G., Gibbons, C., Dhothar, M., Mookhtiar, M., Cassels-Brown, A., 2012. Diabetic retinopathy equity profile in a multi-ethnic, deprived population in Northern England. *Eye* 26 (5), 671–677.
- Lake, A., Browne, J., Abraham, C., Tumino, D., Hines, C., Rees, G., Speight, J., 2018. A tailored intervention to promote uptake of retinal screening among young adults with type 2 diabetes - an intervention mapping approach. *BMC Health Serv. Res.* 18, 396. doi:<http://dx.doi.org/10.1186/s12913-018-3188-5>.
- Lawrenson, J.G., Graham-Rowe, E., Lorencatto, F., Burr, J., Bunce, C., Francis, J.J., Aluko, P., Rice, S., Vale, L., Peto, T., Presseau, J., Ivers, N., Grimshaw, J.M., 2018. Interventions to increase attendance for diabetic retinopathy screening. *Cochr. Database Syst. Rev.*(1) doi:<http://dx.doi.org/10.1002/14651858.CD012054.pub2> Art. No.: CD012054.
- Mitchell, P., Foran, S., 2008. Guidelines for the Management of Diabetic Retinopathy. . Accessed 21 August 2018 [https://www.nhmrc.gov.au/\\_files\\_nhmrc/publications/attachments/di15.pdf](https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/di15.pdf).
- National Institute for health and Care Excellence, 2015. Type 2 Diabetes in Adults: Management NICE Guideline [NG28]. . Accessed 13 May 2018 <https://www.nice.org.uk/guidance/ng28/chapter/1-Recommendations#managing-complications>.
- Scanlon, P.H., Stratton, I.M., Leese, G.P., Bachmann, M.O., Land, M., Jones, C., et al., 2016. Screening attendance, age group and diabetic retinopathy level at first screen. *Diab. Med.* 33 (7), 904–911.
- Skinner, T.C., Khunti, K., Carey, M.E., Dallosso, H., Heller, S., Davies, M.J., 2014. Stability and predictive utility, over 3 years, of the illness beliefs of individuals recently diagnosed with type 2 diabetes mellitus. *Diab. Med.* 31 (10), 1260–1263.
- Stewart, D., Wilson, R., Selby, P., Darbyshire, J., 2011. Patient and public involvement. *Ann. Oncol.* 22 (Suppl 7), 54–56.
- Villarroel, M.A., Vahratian, A., Ward, B.W., 2018. Health care utilization among U.S. Adults with diagnosed diabetes, 2013NCHS Data Brief, . . Accessed 21 August 2018 [www.cdc.gov/nchs/data/databriefs/db183.pdf](http://www.cdc.gov/nchs/data/databriefs/db183.pdf).
- Wang, S.Y., Andrews, C.A., Gardner, T.W., Wood, M., Singer, K., Stein, J.D., 2017. Ophthalmic screening patterns among youths with diabetes enrolled in a large US managed care network. *JAMA Ophthalmol.* 35 (5), 432–438.
- Whitehead, L.C., Crowe, M.T., Carter, J.D., et al., 2017a. A nurse-led education and cognitive behaviour therapy-based intervention among adults with uncontrolled type 2 diabetes: a randomised controlled trial. *J. Eval. Clin. Pract.* 23, 821–829. doi:<http://dx.doi.org/10.1111/jep.12725>.
- Whitehead, L., Crowe, M., Carter, J., Maskill, V., Carlyle, D., Bugge, C., Frampton, C., 2017b. A nurse-led interdisciplinary approach to promote self-management of type 2 diabetes: a process evaluation of post-intervention experiences. *J. Eval. Clin. Pract.* 23 (2), 264–271. doi:<http://dx.doi.org/10.1111/jep.12594> Blackwell Publishing Ltd.
- Yau, J.W., Rogers, S.L., Kawasaki, R., Lamoureux, E.L., Kowalski, J.W., Bek, T., et al., 2012. Global prevalence and major risk factors of diabetic retinopathy. *Diab. Care* 35 (3), 556–564.



The Mission of the Cochrane Nursing Care Field (CNCF) is to improve health outcomes through increasing the use of the Cochrane Library and supporting Cochrane's role by providing an evidence base for nurses and related healthcare professionals involved in delivering, leading or researching nursing care. The CNCF produces 'Cochrane Corner' columns (summaries of recent nursing-care-relevant Cochrane Reviews) that are regularly published in collaborating nursing-care-related journals. Information on the processes this Field has developed can be accessed at: <http://cncf.cochrane.org/evidence-transfer-program-review-summaries>.