

Diabetic retinopathy screening: Study to determine risk factors for non-attendance

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Article points

1. In this study the authors sought to determine the factors that influenced uptake rates for diabetic retinopathy (DR) screening using data from a large GP practice.
2. Half of those at highest risk of DR, linked to poorer control of diabetes and blood pressure and an earlier age, did not attend DR screening.
3. Improved education and more flexible screening solutions may improve attendance for DR screening.

Key words

- Attendance
- Better education
- Diabetic retinopathy (DR)
- Risk factors
- Routine DR screening
- Screening solutions

Author's details can be found at the end of the article.

The study objective was to determine the factors that influenced attendance for routine diabetic retinopathy (DR) screening using data from a large GP practice. In total, 611 people with diabetes were invited to attend DR screening in 2008; attendance rates were higher in older individuals ($P<0.001$) and were inversely associated with HbA_{1c} ($P<0.0001$) and systolic and diastolic blood pressure ($P=0.014$ and 0.005 , respectively). A telephone survey was conducted on individuals who had failed to attend DR screening. Of the 198 individuals contacted, reasons for non-attendance included: thinking that attending a hospital eye department or optometrist was adequate ($n=44$; 22%); not receiving the invitation ($n=36$; 18%); being unwell ($n=24$; 12%); being too busy ($n=16$; 8%); and being on holiday ($n=12$; 6%). Half of those at highest risk of DR did not attend for screening; the reasons given for non-attendance may be amenable to change with better education and more flexible screening solutions.

Diabetes is an increasing public health concern worldwide and affects more than 4% of the UK population (Diabetes UK, 2012). In order to detect sight-threatening diabetic retinopathy (DR) early, a national screening programme was implemented in England between 2003 and 2006 (Scanlon, 2008); this programme offers annual retinal digital photographic screening to all people aged 12 years and

older diagnosed with diabetes.

The Gloucestershire Diabetic Eye Screening Service (GDESS) is a mobile digital photographic screening programme that attends 85 GP practices annually (Scanlon et al, 2003). In this study the authors sought to determine the factors that influenced uptake rates for DR screening using data from two surgeries within one large GP practice in Gloucester that are covered by the GDESS.

Method

This study was conducted in two surgeries, Rosebank and Severn Vale, within one large GP practice in Gloucester during June 2009; DR screening services for both of these two surgeries is covered by the GDESS. In total, 611 individuals with diabetes were identified as being eligible for DR screening across the two surgeries, all of whom had been invited to make appointments for DR screening during 2008. These 611 people were separated into “attende” (*n*=382) and “non-attende” (*n*=229) groups according to whether or not they had attended their DR screening appointment in 2008; GP practice data were provided for individuals in both groups. Sociodemographic information included age, gender and the surgery within the GP practice that the individual attended; clinical data included HbA_{1c}, systolic blood pressure, diastolic blood pressure, type of diabetes

(type 1 or 2) and duration of diabetes. Student’s *t*-tests were performed to compare continuous variables, and chi-squared tests were performed to compare categorical data between attendee and non-attende groups (Table 1).

In addition to these statistical analyses, a telephone survey of the 229 individuals who had not attended a DR screening visit was undertaken by a trainee GP in June 2009 to collect qualitative information relating to reasons for non-attendance; of these non-attende, 21 had no telephone number or had moved away. Up to five attempts were made to contact the remaining 208 people, and a total of 198 were successfully contacted. These individuals were asked to cite the primary reason for their non-attendance at DR screening; statistical analyses were performed on their responses using *SAS version 9.1*.

Table 1. Sociodemographic and clinical data for individuals attending and failing to attend diabetic retinopathy screening.

	Individuals eligible for DR screening	Individuals that attended DR screening	Individuals that did not attend DR screening	<i>P</i> value
• <i>n</i>	611	382	229	
• Age (years; range)	64 (53–76)	65 (56–77)	60 (49–73)	0.0002
• Gender (male/female)	324/287 (53.0%/47.0%)	195/187 (51.1%/48.9%)	129/100 (56.3%/43.7%)	0.21
• Type of diabetes (type 1/type 2)	67/544 (11.0%/89.0%)	38/344 (10.0%/90.0%)	29/200 (12.7%/87.3%)	0.30
• Duration of diabetes (years; range)	5 (2–10)	5 (2–10)	5 (2–9)	0.20
• Ethnicity				
– White	501 (90.7%)	311 (92.0%)	190 (88.8%)	0.042
– Asian	11 (2.0%)	4 (1.2%)	7 (3.3%)	
– Afro Caribbean	34 (6.2%)	22 (6.5%)	12 (5.6%)	
– Other	6 (1.1%)	1 (0.3%)	5 (2.3%)	
• HbA _{1c} (mmol/mol)	57 (17)*	54 (14)*	61 (19)*	<0.0001
• HbA _{1c} (%)	7.4 (1.6)*	7.1 (1.3)*	7.8 (1.9)*	<0.0001
• Systolic blood pressure (mmHg)	134 (16)*	132 (16)*	136 (15)*	0.014
• Diastolic blood pressure (mmHg)	77 (9)*	77 (9)*	79 (9)*	0.005

*Mean (standard deviation).

Results

Attendance rates for DR screening were higher in older people (49% attendance for those aged <55, 65% for those aged 55–64, 68% for those aged 65–74 and 71% for those aged ≥75; $P<0.001$) and

in those who attended the Severn Vale surgery rather than the Rosebank surgery ($P=0.035$) (Figure 1); attendance rates were not related to gender ($P=0.21$). Attendance rates were inversely associated with HbA_{1c} (72% attendance for those

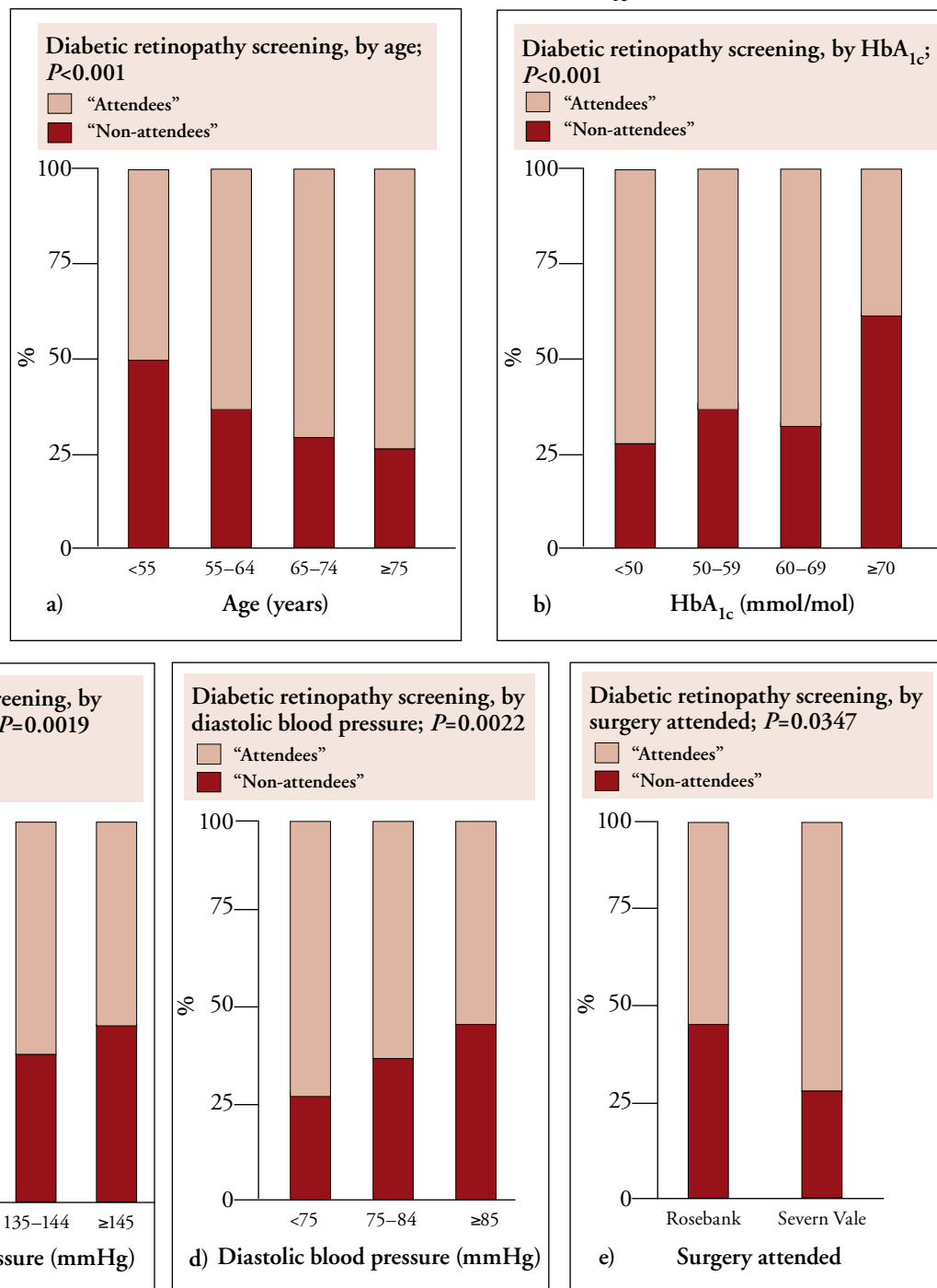


Figure 1. Risk factors for non-attendance at diabetic retinopathy screening: a) age; b) HbA_{1c} ; c) systolic blood pressure; d) diastolic blood pressure; e) surgery attended.

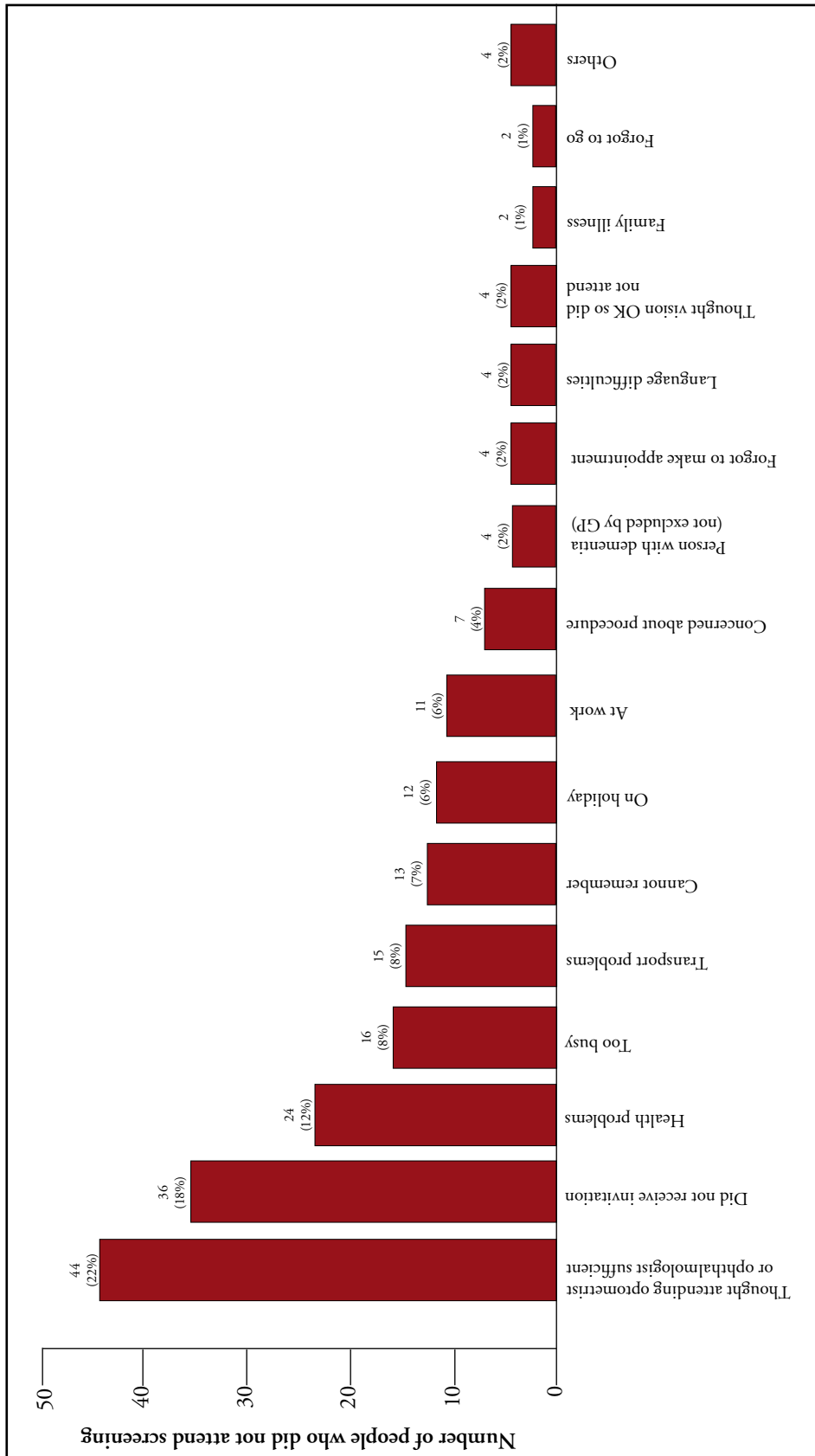


Figure 2. Reasons given for non-attendance at diabetic retinopathy screening (n=198); four people gave two reasons.

“The Gloucestershire Diabetic Eye Screening Service is a mobile digital photographic screening programme that attends 85 GP practices annually.”

Page points

1. The telephone survey of individuals who had not attended a diabetic retinopathy (DR) screening appointment in 2008 provided a variety of reasons for patient non-attendance; the most common reason given was that individuals thought that DR screening appointments were unnecessary if they were already attending appointments with an optometrist or ophthalmologist.
2. Research has suggested that the two main barriers to uptake of DR screening are the asymptomatic nature of DR and an individual not being told of the need to be regularly screened.
3. A priority for screening services may therefore be to promote education and understanding of the importance of DR screening in the primary healthcare setting.

with an HbA_{1c} <6.7% [<50 mmol/mol] and 40% for an HbA_{1c} \geq 8.6% [70 mmol/mol]; $P<0.0001$), and with systolic and diastolic blood pressure ($P=0.014$ and 0.005 , respectively). However, no significant relationship was identified between attendance rates for DR screening and type of diabetes (type 1 or 2; $P=0.30$) or duration of diabetes ($P=0.20$) (Table 1).

Of the 229 people who did not attend DR screening, 198 were successfully contacted to determine the primary reason for non-attendance. Reasons for non-attendance included: 44 (22%) thought attending a hospital eye department or optometrist was adequate; 36 (18%) said they did not receive the invitation; 24 (12%) were unwell at the time of the screening; 16 (8%) were too busy; 13 (7%) could not remember the reason for their non-attendance; 12 (6%) had been on holiday at the time of the screening clinic; 11 (6%) could not take time off work; 15 (8%) had transport problems; 7 (4%) had registered concerns about the procedure; and 4 (2%) said that they did not attend because of language difficulties (Figure 2). Of the 44 (22%) who said that they thought attending a hospital eye department or optometrist was adequate, only 16 had a record (on the patient administration system or the ophthalmology electronic record) of being seen for DR screening between 27 May 2007 and 26 May 2008. Those who said they were too busy or unable to take time off work were younger (median 49 years, interquartile range 39–54 years) than those who gave other reasons (median 62 years, interquartile range 51–75 years).

Discussion

This study has identified various risk factors associated with reduced attendance for DR screening, including clinical and sociodemographic features, poor glycaemic control, poor blood pressure control, age <55 years and GP surgery attended. These findings are of clinical significance as poor glycaemic and blood pressure

control are major risk factors for the development of DR (Diabetes Control and Complications Trial Research Group, 1993; UK Prospective Diabetes Study Group, 1998a; 1998b). Lower uptake rates for DR screening among younger people also represent lost opportunity in limiting the progression of DR. These results therefore support the assertion that those individuals who are least likely to attend DR screening appointments are those who are at highest risk of developing DR.

These findings are in accordance with the results of various studies that have identified risk factors for non-attendance at DR screening appointments. In a similar study conducted in Scotland, Leese et al (2008) also identified that younger individuals, those with poor HbA_{1c} values and those with higher systolic blood pressure had a higher propensity for non-attendance at DR screening. Other studies have similarly identified that attendance rates for DR screening are significantly lower in younger people (Millett and Dodhia, 2006; Khan, 2010) and that individuals with poor glycaemic control were proportionately more likely not to attend for DR screening (Khan, 2010). The authors have also noted in the past that in Gloucestershire there is a link between social deprivation and poor attendance at DR screening (Scanlon et al, 2008).

In this study, gender, type of diabetes and duration of diabetes were found not to be significant risk factors associated with non-attendance at DR screening events. While Leese et al (2008) also found that gender did not have a significant effect upon non-attendance, Millett and Dodhia (2006) found attendance rates at DR screening to be significantly lower in individuals with type 1 diabetes, and Leese et al (2008) found that individuals with a longer history of diabetes had a higher risk of non-attendance.

The telephone survey of individuals who had not attended a DR screening appointment in 2008 provided a variety

of reasons for patient non-attendance. The most common reason given was that individuals thought that DR screening appointments were unnecessary if they were already attending appointments with an optometrist or ophthalmologist (22%). While people under the care of an ophthalmologist may already be undergoing treatment for DR, those who have only attended optometrist appointments may be unaware of the need for DR screening as a separate process from other types of eye examination. Of the 44 (22%) who said they thought attending a hospital eye department or optometrist was adequate, 28 had no record of an appointment in ophthalmology, which suggests that this group felt that an appointment with an optometrist was sufficient. This result highlights the importance of education regarding the risks associated with DR and the importance of regular DR screening. It also highlights the need for ongoing dialogue and education of the local optometry practices to make sure that they follow the guidelines recommended by the Association of Optometrists (2007), which state that:

“Once formal screening schemes have been established nationally, the word ‘screening’ in connection with diabetic retinopathy will imply a process that is quality assured to specified standards. From 1 January 2007 it is inappropriate for any service that does not meet all the above standards to claim to be a screening service.”

Research by other authors has suggested that the two main barriers to uptake of DR screening are the asymptomatic nature of DR and an individual not being told of the need to be regularly screened for DR (Lee et al, 1999). A priority for the GDESS may therefore be to do further work to promote education and understanding of the importance of DR screening in the primary healthcare setting.

Another major reason for non-attendance cited by participants in the telephone survey was that they were unable to attend because of health complications (12%). Such complications may relate to other conditions experienced as a result of diabetes, including nephropathy, neuropathy or the consequences of heart attacks or strokes, for which diabetes increases risk (Kannel and McGee, 1979). The frequency of other health complications experienced by individuals with diabetes calls for collaboration between primary healthcare services; the GDESS may be able to offer more flexible DR screening solutions to those identified as being too unwell to attend regular screening appointments through communication with other diabetes service providers.

The results of the telephone survey may also indicate a need for greater choice in the times offered to individuals for DR screening. A significant number of people contacted during the telephone survey responded that they did not attend screening because they were too busy (7%), they had been away on holiday (6%) or they could not take the time off work (6%). These reasons for non-attendance may particularly apply to younger people who may be more likely to be engaged in full-time employment or are responsible for the care of dependents. At the time of undertaking this study, the GDESS service had limited availability to provide screening appointments at an alternative venue if the individual was away on holiday when the screening service attended the GP surgery. The GDESS has made attempts to provide flexible appointment times, which link in with what is possible at an individual surgery; although these results may represent a lack of awareness by individuals of the full choice of appointment times offered by the GDESS, there may be a need for the GDESS to promote an awareness of flexible appointment times.

In addition, 6% of participants in the telephone survey responded that they did

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“This study supports the view that screening services should be making extra efforts to target regular non-attendees for diabetic retinopathy screening, as these individuals have a proportionately higher risk of sight-threatening DR”

not attend a DR screening appointment in 2008 because of transport problems. While the GDESS is a mobile digital photographic screening programme that enables individuals to attend DR screening appointments at their own GP surgeries, the GDESS may need to liaise more effectively with GP surgeries to identify eligible individuals who may suffer comorbidities and are unable to travel, and to offer them more flexible DR screening solutions.

This study supports the view that screening services should be making extra efforts to target regular non-attendees for DR screening, as these individuals have a proportionately higher risk of sight-threatening DR. ■

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This project was accepted as an audit project in Gloucestershire Primary Care and thus did not require ethical approval.

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