

OBSERVATIONS

Awareness of HbA_{1c} and Its Relationship With Diabetic Retinopathy Among Adult Diabetic Patients Attending a Tertiary Ophthalmic Center

A major contributing factor to poor compliance to maintain HbA_{1c} <7% has been found to be a lack of patient awareness (1). Wang et al. (1) showed only 17% of participants understood HbA_{1c}, and 49% of participants had heard of the HbA_{1c} test. Their study also concluded that there was greater awareness of HbA_{1c} among the younger age groups and those with higher education levels. Despite the high prevalence of patients with diabetes in Asia, data on the association between awareness of HbA_{1c} and diabetic retinopathy are not available in the Singapore population.

Our study was a hospital-based, cross-sectional study of 506 diabetic patients aged 23–88 years in Singapore with different racial groups, including Chinese, Malay, Indian, and others.

Of the 623 patients invited, 507 were recruited (81.2% response rate). One was excluded because of incomplete data. The majority of patients who declined to participate cited a lack of time or interest in the study.

There were 257 (50.8%) men and 249 (49.2%) women with median age of 62.1 years. Patients' education level ranged from no formal education to a postgraduate degree. Two hundred seventy-one (53.6%) patients had diabetic retinopathy, and 148 (29.2%) patients had previous laser treatment.

We found significant differences among patients with different occupations ($P < 0.001$). There was significantly greater awareness among patients with

younger age ($P < 0.001$), earlier onset of diabetes ($P < 0.001$), higher education ($P < 0.001$), those cared by endocrinologists ($P < 0.001$), and those aware that increased HbA_{1c} ($P = 0.007$) could cause blindness. More frequent visits to ophthalmologists ($P = 0.049$) or endocrinologists ($P = 0.035$) also increased the awareness of HbA_{1c}. However, those cared for by family physicians showed a negative association ($P < 0.001$). We hypothesize that this was because patients who see family physicians are less likely to have diabetic retinopathy, and thus were less aware of HbA_{1c} and diabetic retinopathy.

There were no significant differences between awareness of HbA_{1c} and sex or race. Having diabetic retinopathy or knowing diabetes could cause blindness was not associated with greater awareness of HbA_{1c}.

With multivariate logistic regression analysis, after adjusting for all other factors, higher education level, younger age, and longer duration of diabetes were still significantly associated with greater HbA_{1c} awareness. The odds of HbA_{1c} awareness decreased by 4% with every increase in age by 1 year ($P < 0.001$), and increased by 5% with every increase in the duration of diabetes by 1 year ($P < 0.001$). However, higher education level and being cared for by endocrinologists translates into more awareness ($P < 0.001$).

Studies by Colleran et al. (2) and Panja et al. (3) demonstrated that a better grading on the Michigan Diabetes Knowledge Test is associated with lower HbA_{1c} values. With each increase in the number of questions answered correctly, HbA_{1c} decreased by 0.239 ($r = -0.337$, $P < 0.003$). A meta-analysis by Norris et al. (4) showed that intervention via patient education reduced HbA_{1c} more than the control group by 0.76% (95% CI 0.34–1.18), 0.26% (0.21% increase–0.73% decrease), and 0.26% (0.05–0.48) at immediate, 1–3 months, and ≥ 4 months follow-up.

In summary, more resources should be channeled toward increasing the awareness levels to reduce the complication of diabetic retinopathy.

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S.S. designed, conceived, and executed the study and edited the manuscript. Y.C.C. wrote the manuscript. Y.S. analyzed statistics and wrote the results section. E.L.O. collected data. K.G.A.E. edited the manuscript. S.S. is the guarantor of this work and, as such, has full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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