1   **Exploring correlations between change in visual acuity following routine**

2   **cataract surgery and improvement in quality of life assessed with the**

3   **Glasgow Benefit Inventory**

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15   **Running title:** Quality of life after cataract surgery

18   **Conflicts of interest:** The authors declare no conflicts of interest.

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20   Sir,

21   The Glasgow Benefit Inventory (GBI)[1] assesses patient-perceived changes in quality of life following

22   an intervention by means of 18 questions; the score ranges between a minimum of -100 (maximal

23   detriment) to +100 (maximal benefit). As it is not procedure-specific, it can potentially be used to

24   compare changes in quality of life following different interventions. Originally developed for use in

25   otolaryngology, it has also been used in a range of oculoplastic procedures,[2,3] and also, more

26   recently, we have deployed it after routine cataract surgery.[4] In the latter study, the questionnaire

27   was administered to 109 patients, and significant improvement in quality of life was demonstrated

28   with a positive GBI score.

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30   In the present study, we retrospectively retrieved visual acuity data for these patients (from the

31   patient record) to explore correlation between change in visual acuity (decimalised) and GBI score.

32   Patients for whom the pre-operative or post-operative was not available were excluded. 91 patients

33   (83.5%) were included: 48 were female; 53 were Caucasian, 30 Black, 3 Asian (5 had unrecorded

34   ethnicity). The mean (SD) age was 71 (11) years.

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36   Table 1 shows the main findings, and Figure 1 plots GBI scores against change in visual acuity. For

37   the whole cohort GBI score correlated positively with visual acuity with a Pearson correlation

38   coefficient of 0.35 ($p=7\times10^{-4}$). For first eyes, correlation was stronger than for second eyes. The visual

39   acuity improvement for first eyes was greater than that for second eyes as might be expected (given

40   the usual practice of operating on a worse seeing eye first). Importantly, an improvement in quality

41   of life (positive GBI score) was seen after both first and second eye surgery, with no significant

42   difference in scores, despite the difference in change in visual acuity. Mean pre and post-operative

43   visual acuity did not differ significantly by ethnicity.

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45 Our findings quantify the correlation between quality of life improvement, as measured by the GBI,

46 and change in visual acuity. A significant correlation was seen. However, the strength of the

47 correlation was moderate to low overall, which supports the notion that change in visual acuity

48 alone does not capture the full improvement in quality of life conferred by cataract surgery. This is

49 especially true for second eyes. The improvement in visual acuity was less than that for first eyes,

50 but the perceived improvement in quality of life appeared to be just as strong, suggesting that this is

51 driven by factors other than visual acuity (possibly improved stereopsis or reduced anisometropia as

52 well as other less quantifiable factors). Thus our findings confirm that the benefit of cataract surgery

53 is not assessable by visual acuity alone, particularly in the case of second eyes.

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67   **Tables**

	n	Change in VA (decimalised)		GBI score		Correlation coefficient	Significance (*p*)
		Mean (SD)	95% CI	Mean (SD)	95% CI		
1st eye	57	0.44 (0.37)	0.34-0.54	+23.6 (18.2)	18.8-28.5	0.53	2×10^{-5}
2nd eye	34	0.22 (0.32)	0.11-0.33	+22.4 (23.4)	14.2-30.6	0.10	0.57
All patients	91	0.36 (0.37)	0.28-0.44	+23.2 (20.2)	19.0-27.4	0.35	7×10^{-4}

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69   **Table 1. Change in visual acuity (VA) and Glasgow Benefit inventory (GBI) scores after first eye and**

70   **second eye surgery. Pearson coefficients are given for correlation between change in VA and GBI**

71   **score. 95% CI, 95% confidence interval for mean. The change in visual acuity was greater for first**

72   **eyes compared with second eyes (*p*=0.005, unpaired t test), but GBI scores for first eyes and**

73   **second eyes (*p*=0.68) indicating similar benefits in quality of life for first eyes and second eyes.**

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76   **Figure legend**

77   Figure 1. GBI score plotted against change in decimalised visual acuity. The dashed line provides a

78   simple linear fit. Correlation was found to be significant ($p=7 \times 10^{-4}$).