

Subjective outcome and quality of life following external dacryocystorhinostomy

Koshal Dani, Dayakar Yadalla¹, Anupama Joy¹, Annie M Wu², Jayagayathri R¹

Purpose: To assess the patient reported outcome and quality of life in post external dacryocystorhinostomy operated patients. **Methods:** A prospective questionnaire based study was carried out on 112 patients diagnosed with chronic dacryocystitis who underwent external dacryocystorhinostomy in the department of Orbit and Oculoplasty at a tertiary eye hospital in South India. **Results:** We included 112 cases in our study. Mean (SD) of the age of patients was 48.03 (12.79) years and ranged from 7 to 72 years of age. 44 (39.3%) patients were males and 68 (60.7%) were females. All cases had subjective symptoms of tearing, pain and swelling at baseline which were relieved by post-operative 3 in all cases. The mean (SD) best corrected visual acuity was 0.28 (0.39) at baseline and 0.25 (0.37) at postoperative 3 ($p < 0.001$). All four parameters studied in the GBI questionnaire - total mean GBI (32.22 vs 48.86, $P < 0.001$), general subscale (31.21 vs 44.08, $P < 0.001$), social health (46.28 vs 61.01, $P < 0.001$), physical outcome (22.17 vs 55.80, $P = 0.0001$) scores showed significant improvement from 1 vs 3 months post DCR. **Conclusion:** The GBI questionnaire is an effective tool for assessing patients' quality of life following DCR. External DCR can not only produce a successful anatomical outcome but also bring about a measurable improvement in subjective symptoms and quality of life among patients with symptomatic NLDO.

Key words: Chronic dacryocystitis, external dacryocystorhinostomy, Glasgow benefit inventory (GBI), quality of life, subjective outcome

Nasolacrimal duct obstruction (NLDO) is one of the commonly encountered problems in ophthalmic clinical visits.^[1] NLDO leads to stasis and secondary infection which can present as acute and chronic dacryocystitis with epiphora and purulent discharge. Complete obstruction of nasolacrimal duct is usually treated by dacryocystorhinostomy (DCR) surgery.^[2] NLDO and chronic dacryocystitis are also risk factors for endophthalmitis after intraocular surgery.^[3,4] And so any intraocular surgery should be delayed until obstruction is removed by DCR surgery. However, no disease-specific tools to assess the symptoms and the subjective outcome after DCR have been established. The purpose of this study is to assess the patient reported outcome and quality of life in post external dacryocystorhinostomy operated patients.

Methods

This prospective study included 112 patients who had undergone external dacryocystorhinostomy over a period of 1 year in our tertiary eye centre. A pre validated questionnaire – the Glasgow benefit inventory (GBI) questionnaire [Supplementary Fig. 1] was given to the patients who volunteered for the study, all the patients included in the study consented for the study. The questions are specifically tailored to measure a change in health status, defined as the general perception of well-being (12 questions). Social and physical health

parameters are also assessed, with three questions each. The total GBI scores from – 100 (maximal negative benefit), through zero (no change) to + 100 (maximal positive benefit in health status). Dacryocystorhinostomy surgery was performed for all cases with nasolacrimal duct obstruction by one of the two surgeons in Orbit and Oculoplasty clinic in our hospital.

The inclusion criteria included 1. Patient diagnosed with Chronic dacryocystitis. 2. All those patients who are successfully operated with external dacryocystorhinostomy. The exclusion criteria were: 1. Patients with congenital nasolacrimal duct obstruction. 2. All failed operated cases of chronic dacryocystitis. 3. Patients with primary hyper lacrimation- like tear film and ocular surface disorders, lacrimal gland tumours and cyst, effect of strong parasympathomimetic drugs are excluded. 4. Patients with other causes of reflex hyper lacrimation and central lacrimation are also excluded.

All the subjects who underwent successful dacryocystorhinostomy surgery were called for postoperative follow-up examination on postoperative month 1 and 3 and were asked to answer the questionnaire as per their response to the surgery. Vision, intraocular pressure, slit lamp biomicroscopy to

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examine tear film and swelling around the sac was done on both the visits and they were asked about any symptoms of pain and swelling around the sac area both the times. The study adhered to the tenets of the Declaration of Helsinki and was approved by the institutional Review Board and the Ethics committee of the institute. No waivers were granted.

Results

Our study included 112 eyes of cases of Nasolacrimal duct obstruction who fulfilled the inclusion criteria. Various demographic factors were studied, such as age, sex, and laterality. All baseline clinical evaluation for nasolacrimal duct obstruction were done as described previously. All cases underwent DCR surgery and the surgical outcome was studied. Cases were followed up for 1 and 3 months respectively and subjective outcome along with questionnaire to assess the quality of life outcome was assessed. The clinical examination of the patient included the presence or absence of tearing and the presence of pain and swelling around sac area at baseline and at postoperative 1 and 3 months. Mean (SD) of the age was 48.03 (12.79) years and it ranged from 7 to 72 years as compared to Speillmann PM *et al.*^[5] where mean age is 59 years. Among the total 112 study cases, 44 (39.3%) patients were males and 68 (60.7%) patients were females [Table 1]. In our study, the incidence of nasolacrimal duct obstruction was found to be almost same on right (52.7%) and left side (47.3%), there was no side predilection. Wilcoxon sign rank test was used to find out the significant difference in BCVA at baseline and post-operatively. *P* value less than 0.05 was considered as statistically significant. The *P* value shows that there was a significant difference at baseline and month1 (*p*-value = 0.025), month3 (*p*-value < 0.001) BCVA [Table 2]. Paired t-test was used to find out the significant difference between baseline and post-operative IOP. The *P* value (>0.05) showed there was no significant difference at baseline and month1 (*p*-value = 0.702), month3 (*p*-value = 0.400) IOP. Paired t-test was used for assessment of patient quality of life outcome for all the questions and was found clinically significant (*p* value < 0.05) for most of the answers as described in the table. [Table 3] Wilcoxon sign rank test was used to find out the significant difference between month1 and month3 GBI

Table 1: Best corrected visual acuity in cases of study group at baseline and post operatively

BCVA	<i>n</i>	Mean (SD)	logMAR Median	IQR	<i>P</i>
Baseline	112	0.28 (0.39)	0.18 (6/9)	0-6/12	-
Month1	112	0.27 (0.38)	0.18 (6/9)	0-6/12	0.025
Month3	112	0.25 (0.37)	0.18 (6/9)	0-6/12	<0.001

*BCVA: Best corrected visual acuity, SD: Standard deviation

Table 2: Intraocular pressure at baseline and post operatively in cases of study group

IOP	<i>n</i>	Mean (SD)	Min-Max	<i>P</i>
Baseline	112	14.48 (1.93)	10-18	-
Month1	112	14.59 (2.31)	10-20	0.702
Month3	112	14.71 (2.02)	11-20	0.400

IOP: Intraocular pressure, SD: Standard deviation, Min: Minimum, Max: Maximum

score (Total, General, Social and Physical). The *P* value showed a significant difference in the total score (*p*-value < 0.001), general score (*p*-value < 0.001), social support score (*p*-value = 0.0001) and physical health (*p*-value < 0.001) at month1 and 3 [Table 4].

Discussion

Epiphora, defined as overflow of tears from the eye, can have a significant impact on QoL, causing discomfort, embarrassment, and blurring of vision. Kafil-Hussain *et al.*^[6] found that patients with epiphora suffer greater visual handicap in multiple areas of activities of daily living compared with the patients awaiting a second cataract surgery. Therefore, improving patient's QoL and symptoms are key objectives for surgery to treat epiphora. The incidence of nasolacrimal pathway obstruction increases with age, and dacryocystorhinostomy (DCR) is a commonly applied surgical technique to treat such cases. However, no disease-specific tools to assess the symptoms and the subjective outcome after DCR have been established. The Glasgow Benefit Inventory (GBI) which is a validated, generic patient-recorded outcome measure widely used in otolaryngology to report change in quality of life post-intervention, in a prospective clinical trial.^[7] Currently, questionnaire-based patient-reported outcome measures for procedures for epiphora are limited to DCR surgery. Several studies have assessed patient benefit following DCR surgery using the generic GBI questionnaire, which has been validated for DCR surgery and shown to be sensitive to change following an intervention.^[8] GBI is not procedure-specific and therefore also permits comparison across different interventions, and can differentiate between successful and unsuccessful procedures.^[9] Other methods of measuring QOL are Single-item symptom scores, single-item reports of improvement, Lacrimal Symptom Questionnaire (0.5%), Nasolacrimal Duct Obstruction Symptom Score, Ocular Surface Disease Index, Visual Function Questionnaire, the Short Form-36 Health Survey^[10] and Lac-Q questionnaire^[11]

Each year, 1.6-1.9 million cataract operations are performed throughout India, many in "camps" or rural peripheral centres where preoperative syringing of the nasolacrimal system is routinely performed prior to cataract surgery^[12]; the aim is to exclude NLDO, a major risk factor for postoperative endophthalmitis. Panophthalmitis can occur if any intraocular operation is undertaken due to unrecognized dacryocystitis. Knowledge about the subjective outcome including tearing, pain and swelling around sac area and whether there is overall quality of life improvement following external dacryocystorhinostomy can significantly influence the choice of surgery following nasolacrimal duct obstruction and patient quality of life in general.

Among the total 112 study cases, 44 (39.3%) patients were males and 68 (60.7%) patients were females. Females showed a higher incidence of 60.7% in our study as compared to males (39.3%). Hartikainen *et al.* also found a female to male ratio of 79%:21%.^[13] and Badhu *et al.* reported, incidence in females to be 67.6%^[14] as compared to males.

In our study, incidence of nasolacrimal duct obstruction was almost the same on right side with 59 eyes (52.7%) and left side with 53 eyes (47.3%). Ghose *et al.*^[15] and Brook *et al.*^[16] found that there was a relatively high incidence of the disease on the left side as compared with that on the right side. In general, the

Table 3: Assessment of GBI questionnaire post operatively at 1 and 3

Questions	1, Mean (SD)	3, Mean (SD)	P
Has the result of intervention/operation affected the things you do?	3.89 (0.95)	3.86 (0.80)	0.721
Have the result of the operation/intervention made your overall life better or worse?	4.14 (0.67)	3.97 (0.78)	0.076
Since your operation/intervention, have you felt more or less optimistic about the future?	4.27 (0.64)	4.13 (0.75)	0.124
Since your operation, intervention, do you feel more or less embarrassed when with a group of people?	3.80 (0.95)	3.82 (0.92)	0.893
Since your operation/intervention, do you have more or less self-confidence?	4.27 (0.76)	4.06 (0.75)	0.047
Since your operation/intervention, have you found it easier or harder to deal with company?	3.71 (0.96)	3.59 (0.70)	0.199
Since your operation/intervention, do you feel that you have more or less support from your friends?	3.57 (1.09)	3.93 (0.81)	0.009
Have you been to your family doctor, for any reason, more or less often after your operation/intervention?	3.29 (0.88)	3.79 (0.68)	<0.001
Since your operation/intervention, do you feel more or less confident about job opportunities?	3.85 (0.88)	3.99 (0.66)	0.103
Since your operation/intervention, do you feel more or less self-conscious?	2.37 (0.90)	3.41 (0.75)	<0.001
Since your operation/intervention, are there more or fewer people who really care about you?	4.06 (1.02)	4.29 (0.70)	0.043
Since you had the operation/intervention, do you catch colds or infections more or less often?	3.47 (0.87)	4.10 (0.90)	<0.001
Have you had to take more or less medicine for any reason, since your operation/intervention?	3.57 (0.87)	4.46 (0.68)	<0.001
Since your operation/intervention, do you feel better or worse about yourself?	3.90 (0.79)	4.26 (0.61)	<0.001
Since your operation/intervention, do you feel that you have had more or less support from your family?	4.14 (0.80)	4.45 (0.71)	0.0002
Since your operation/intervention, are you more or less inconvenienced by your health problem?	3.43 (0.78)	4.03 (0.82)	<0.001
Since your operation/intervention, have been able to participate in more or fewer social activities?	2.93 (1.02)	3.77 (0.81)	<0.001
Since your operation/intervention, have you been more or less inclined to withdraw from social situations?	2.93 (0.63)	3.69 (0.77)	<0.001

GBI: Glasgow benefit inventory, SD: Standard deviation

Table 4: GBI score analysis for all four parameters of GBI questionnaire

GBI score	n	Mean (SD)	Median score	Min-Max	P
Total score					
1	112	32.22 (18.12)	27.78	0.00-75.00	<0.001
3	112	48.86 (18.40)	52.78	2.78-91.67	
General subscale					
1	112	31.21 (19.06)	29.17	-4.17-66.66	<0.001
3	112	44.08 (19.41)	45.83	0.00-95.83	
Social support					
1	112	46.28 (36.47)	50.00	-100-100	0.0001
3	112	61.01 (27.18)	66.66	0 to 100	
Physical health					
1	112	22.17 (32.22)	16.67	-33.33-100	<0.001
3	112	55.80 (25.97)	66.66	-16.67-100	

GBI: glasgow benefit inventory, SD: standard deviation, Min: minimum, Max: maximum

disease had a predilection to the left side as the nasolacrimal duct and the lacrimal fossa formed a greater angle on the right side than on the left side.^[17] No such side predilection was found in our study and is almost same on both the sides.

There is significant improvement in symptoms of the patients in our study with almost no patient complained of epiphora at 1 and 3 months postsurgery (only successful cases were selected for the study) and also very few patients -40 patients (45.9%) complained of mild (38 patients-95% patients had only mild pain and swelling) to moderate (2 patients -5%) pain and swelling at 1 postoperative visit as compared to 87 patients (87.7%) preoperatively who had mild to moderate pain and swelling at sac area and none of the patients had pain and swelling around the sac area at 3 months following external dacryocystorhinostomy, which suggests a better subjective outcome of the patients on long run after the surgery. There was significant improvement in mean BCVA post operatively (p

value of 0.025 and < 0.001 at 1 and 3 months respectively) similar to SHIN JH *et al.*^[18] Improvement in visual acuity in the setting of decreased epiphora may be attributed to less blurring of images, as has been previously observed.^[19] There was no significant difference in intraocular pressure post operatively; intraocular pressure would not have been expected to change after DCR.

Our study aimed at four parameters from the GBI questionnaire: total GBI score, general subscale, social and physical outcome of the patient at 1 and 3 respectively. The mean total score of 32.22 and 48.86 at 1 and 3 month [Fig. 1a] are clinically significant and suggests improvement in overall quality of life in patients postsurgery which are better as compared to other study groups as the total GBI scores were +42.67 (95% CI: 33.42-51.91) for DCR in study by Z Sipkova *et al.*^[20] and similar to Speillmann PM *et al.*^[5] where mean overall GBI was +32.7. The general subscale score (mean

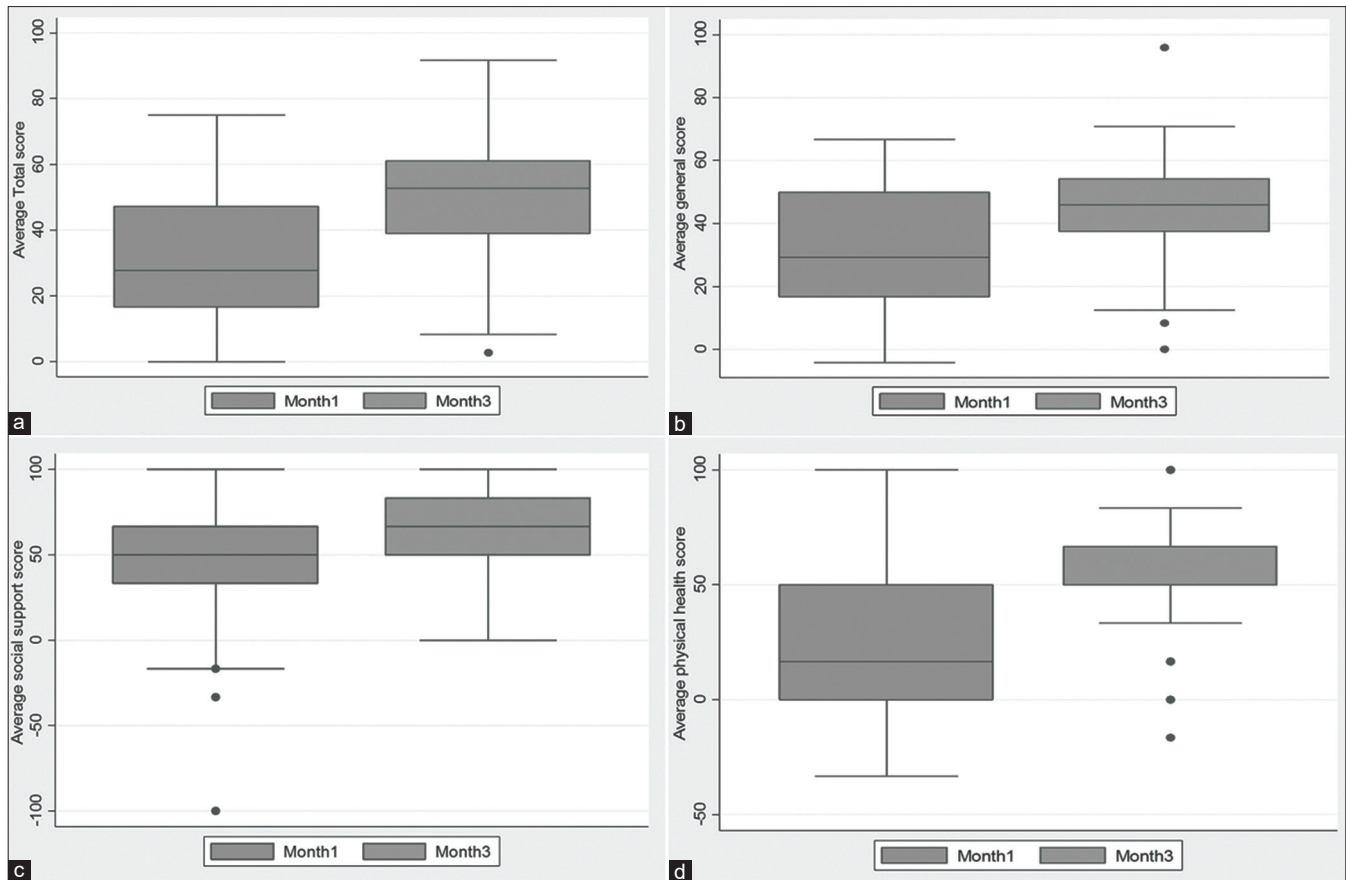


Figure 1: (a): Comparison of average total GBI score at month1 and 3. (b) Comparison of average general subscale score at 1 and 3. (c) Comparison of average social support score at 1 and 3. (d) Comparison of average physical health score at 1 and 3

of 31.21 and 44.08 at 1 and 3 months respectively) [Fig. 1b], with P value of $P < 0.001$ suggest the general subscale score is statistically significant, thus there is significant improvement in routine general overall life style where patient feels more optimistic about his future, is less embarrassed with group of people, more confident doing routine activities of the patient, finds more support from his friends, more confident about finding job opportunities and finds himself much comfortable in the society. The social health score (mean of 46.28 and 61.01 at 1 and 3 months respectively) [Fig. 1c] were also statistically significant with P value of $P < 0.001$ indicating improvement in social health of the patient postoperatively like getting more of support from family and friends. The physical health score (mean of 22.17 and 55.80 at 1 and 3 months respectively) [Fig. 1d] and P value of 0.0001 is statistically significant and suggest that there is considerable improvement in the physical health in terms of now patient has to less often visit his general physician for other reasons like colds, fever and other infectious diseases. All the four parameters under study: total GBI score, general subscale, social and physical outcome of the patient at 1 and 3 months showed statistical significance and hence the result can be drawn that the questionnaire very well highlights the improvement in quality of life of patients who underwent external dacryocystorhinostomy.

Strength

Strong inclusion and exclusion criteria to study the

subjective outcome and quality of life outcome post external dacryocystorhinostomy considered in the aim of the study. The sample size of 112 eyes with strict inclusion and exclusion criteria was modest compared to previous studies- M.Feretis *et al.*^[7]-64 patients. In literature there are limited studies about subjective outcome and quality of life assessment using a pre validated questionnaire in cases of chronic dacryocystitis operated by external dacryocystorhinostomy only. There are many studies comparing endonasal DCR and external DCR like Bakri SJ *et al.*^[21] with similar benefits and Javed Ali M *et al.*^[22] comparing external DCR and transcanalicular DCR, whereas Ali MJ *et al.*^[11] has studied outcomes of powered endoscopic DCR in adults using Lac-Q questionnaire. As there is paucity in Indian literature, regarding data on the subjective outcome and quality of life assessment after external-DCR in the South Indian population, this study contributes to it.

Limitations

The type of study is a prospective questionnaire based non randomised study including only one questionnaire. Duration of follow up cases: 1 and 3 follow ups could have been extended to 6 and 12 months but was not possible due to time restraint. Age wise distribution of the patient to study the outcome in specific group of patients was not done in the study. Childhood NLDO was excluded as compared to study by Holmes JM *et al.*^[23] which studied childhood NLDO.

Conclusion

This study suggest that cases of chronic dacryocystitis operated by external dacryocystorhinostomy can significantly improve the subjective outcome of the patient in terms of decreased to nil tearing and relief from symptoms of pain and swelling around the sac area over a period of 1-3 months after the successful surgery in these patients. The assessment of quality of life outcome based on parameters of overall improvement in quality of life, physical and social health improvement by using the Glasgow benefit inventory- GBI questionnaire can be very well established from this study and is an effective tool in assessing the quality of life outcome following external dacryocystorhinostomy. Our study proves that external dacryocystorhinostomy - considered as the gold standard procedure is still an effective tool to bring a clinically significant change in subjective and quality of life outcome in a large number of patients in a tertiary eye care centre.

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Conflicts of interest

There are no conflicts of interest.

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1. Has the result of the operation/intervention* affected the things you do?				
Much worse 1	A little or somewhat worse 2	No change 3	A little or somewhat better 4	Much better 5
2. Have the results of the operation/intervention* made your overall life better or worse?				
Much better 5	A little or somewhat 4	No change better 3	A little or somewhat 2	Much worse 1
3. Since your operation/intervention*, have you felt more or less optimistic about the future?				
Much more optimistic 5	More optimistic 4	No change 3	Less optimistic 2	Much less optimistic 1
4. Since your operation/intervention*, do you feel more or less embarrassed when with a group of people?				
Much more embarrassed 1	More embarrassed 2	No change 3	Less embarrassed 4	Much less embarrassed 5
5. Since your operation/intervention*, do you have more or less self-confidence?				
Much more self-confidence 5	More self-confidence 4	No change 3	Less self-confidence 2	Much less self-confidence 1
6. Since your operation/intervention*, have you found it easier or harder to deal with company?				
Much easier 5	Easier 4	No change 3	Harder 2	Much harder 1
7. Since your operation/intervention*, do you feel that you have more or less support from your friends?				
Much more support 5	More support 4	No change 3	Less support 2	Much less support 1
8. Have you been to your family doctor, for any reason, more or less often, since your operation/intervention*?				
Much more often 1	More often 2	No change 3	Less often 4	Much less often 5
9. Since your operation/intervention*, do you feel more or less confident about job opportunities?				
Much more confident 5	More confident 4	No change 3	Less confident 2	Much less confident 1
10. Since your operation/intervention*, do you feel more or less self-conscious?				
Much more self-conscious 1	More self-conscious 2	No change 3	Less self-conscious 4	Much less self-conscious 5
11. Since your operation/intervention*, are there more or fewer people who really care about you?				
Many more people 5	More people 4	No change 3	Fewer people 2	Many fewer people 1
12. Since you had the operation/intervention*, do you catch colds or infections more or less often?				
Much more often 1	More often 2	No change 3	Less often 4	Much less often 5
13. Have you had to take more or less medicine for any reason, since your operation/intervention*?				
Much more medicine 1	More medicine 2	No change 3	Less medicine 4	Much less medicine 5
14. Since your operation/intervention*, do you feel better or worse about yourself?				
Much better 5	Better 4	No change 3	Worse 2	Much worse 1
15. Since your operation/intervention*, do you feel that you have had more or less support from your family?				
Much more support 5	More support 4	No change 3	Less support 2	Much less support 1
16. Since your operation/intervention*, are you more or less inconvenienced by your health* problem?				
Much more inconvenienced 1	More inconvenienced 2	No change 3	Less inconvenienced 4	Much less inconvenienced 5
17. Since your operation/intervention*, have you been able to participate in more or fewer social activities?				
Many more activities 5	More activities 4	No change 3	Fewer activities 2	Many fewer activities 1
18. Since your operation/intervention*, have you been more or less inclined to withdraw from social situations?				
Much more inclined 1	More inclined 2	No change 3	Less inclined 4	Much less inclined 5

Supplementary Figure 1: The GBI questionnaire