ELSEVIER

Patients' Perspective of Functional Outcome After Elective Abdominal Aortic Aneurysm Repair: A Questionnaire Survey

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Background: To evaluate patients' awareness, functional outcome, and satisfaction after abdominal aortic aneurysm (AAA) repair.

Methods: A study-specific questionnaire was developed with collaboration of a multidisciplinary team. Lists of patients who underwent elective open AAA repair and endovascular aneurysm repair (EVAR) between January 2006 and December 2008 were obtained from the departmental database and cross-checked against hospital database for survival status. Emergency AAA repairs were excluded. Study questionnaires were posted to 138 patients (113 open, 25 EVAR) with self-addressed stamped return envelopes. Statistical analysis was performed using SPSS v16.0.

Results: Response rate was 89% ($n = 123$; 102 open, 21 EVAR). Seventy-one percent ($n = 88$) were unaware of this condition before diagnosis. Ninety-seven percent ($n = 120$) indicated their understanding of the need for surgery. Ninety-two percent ($n = 113$) stated that the operation was adequately explained to them. Ninety percent ($n = 111$) reported full recovery after surgery, with 60% ($n = 74$) recovering within 6 months. Eighty-seven percent ($n = 108$) were satisfied with the overall experience, and 85% ($n = 105$) stated that they would recommend the operation to family and/or friends if required.

Conclusions: There is a lack of awareness regarding AAA in elderly population. However, after being diagnosed, patients understand the implications and are satisfied with the overall results and would recommend AAA repair to family and/or friends if required.

INTRODUCTION

Abdominal aortic aneurysm (AAA) affects 2-9% of the population aged >65 years and is more common in men.[1,2] AAA rupture is the 10th leading cause of death in white men aged >65 years in developed countries.[3] Intervention for AAA is designed to prevent rupture, which is associated with an overall mortality rate of between 65% and 85%.[4-8] The main therapeutic strategies are conventional open surgical repair and endovascular aneurysm repair (EVAR). Traditionally, the quality of health care is determined by technical and physiologic outcome measures such as mortality and morbidity.[9] However, over the past two decades, there has been an increasing emphasis on patients' opinions, choices, and assessments for evaluation of health care to achieve a more comprehensive and patient-centered reflection of the quality of care.[10]

Patient satisfaction is a subjective and composite concept, involving physical, emotional, intellectual, cultural, and social factors.[11,12] It is determined by the quality of care provided and patients' anticipation of that care. Dissatisfaction arises when the patient suffers a discrepancy between anticipated and provided care.[13] Patients' satisfaction is considered to be an important outcome measure for health services. Patient-reported outcome measures, which are based on feedback from the patients, have recently been introduced in the National Health

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Service, United Kingdom. Functional outcome after major vascular surgery has become an increasingly important area of interest in recent years, especially with the appreciation that limited objective data are available.[14]

Questionnaire studies are useful in evaluating patients' satisfaction. The following three methods are commonly used to administer questionnaires: face-to-face interview, postal questionnaires, and telephonic surveys. Postal questionnaires are more commonly used to collect data for health research.[15] They provide an efficient means of collecting large quantities of exposure or outcome information.[16] The major drawback has been a relatively low response rate, which can jeopardize the generalizability of the results. Over the years, various techniques have been introduced to increase response rates and number of reports with successful outcome.[15]

The aim of this study was to objectively evaluate patients' awareness, functional outcome, and satisfaction after AAA repair using a postal survey.

METHODS

This was a prospective, questionnaire-based study performed as part of quality and service improvement. Ethical opinion was obtained from the Ethics committee. Hospital quality assurance and clinical audit approval were obtained. It was performed at the Academic Vascular Surgical Unit of a University hospital. Lists of patients who underwent open repair of AAA and EVAR between January 2006 and December 2008 were obtained from the departmental database and cross-checked against the hospital database for survival status. Emergency AAA repairs were excluded. Data were stored and analyzed with SPSS version 16.0 (SPSS Inc, Chicago, IL). Responses were coded numerically for statistical analysis. Because of the nature of responses, resulting categorical variables were expressed as proportions and analyzed using χ^2 test or Fisher exact test for nominal variance and χ^2 test for trend for ordinal variables. Response categories were combined where there was a lack of response. Yates continuity correction was applied where appropriate.

Questionnaire Development

The study questionnaire was developed after an extensive literature review and with the help a focus group, which comprised five vascular consultants, four vascular research fellows, a vascular nurse, a vascular technologist, and five patients. The questionnaire was designed in simple English language. Questions were focused to gather information on three key areas, namely, awareness, functional outcome, and overall satisfaction. Initially the questionnaire included 27 questions; however, at a later stage, three questions were considered repetitive and/or less useful and were therefore dropped. The final questionnaire was composed of 24 questions, distributed in three sections: operation and recovery, information, and lifestyle changes. Readability statistics were applied to the questionnaire so that it is easy to read and understand. Initially, the questionnaire was sent to 25 patients as a pilot survey. This was to assess the response rate, completion rate of questionnaire, and also to see the reproducibility. A response rate of 84% was obtained for this pilot survey, and among these patients, 82% completed the questionnaire. Reproducibility/ test–retest reliability, which means that the instrument yields the same results on the same population under different conditions,[17] was checked in the pilot study using agreement analysis (Kappa statistics). Questionnaires were sent twice, with a 2-week interval in between. High test–retest reliability was observed in all domains. Face validity was also tested for this questionnaire, which indicates whether, on the face of it, the instrument seems to be assessing the desired qualities.[11] The questionnaire was sent to all the vascular surgeons in the Yorkshire region. A total of 38 consultants were approached, of which, 23 replied (response rate 60%). Each question was scored for being an important measure of patient-reported outcome measure, on a 10-point rating scale (0-10); 0 being not relevant and 10 being extremely relevant. All questions, except one, scored an average of >7. The results of the responses from the vascular surgeons were discussed within the focus group, some minor changes were made, and all questions were retained in the final questionnaire. The question regarding the use of Internet was the only one scoring <7 because of the age group (older patients). It was decided by the focus group to keep that question because of the anticipated common use of Internet in the coming days (see Appendix).

Survey Methodology

The methodology took the form of a standard National Health Service postal survey; however, numerical identifiers were used to anonymize all participants. The questionnaire was posted to patients, along with a covering letter clearly mentioning that the survey was voluntary and that patients could decline to participate without their medical care being affected. Some of the methods described in the literature which we opted to use were personalizing the letter, using handwritten

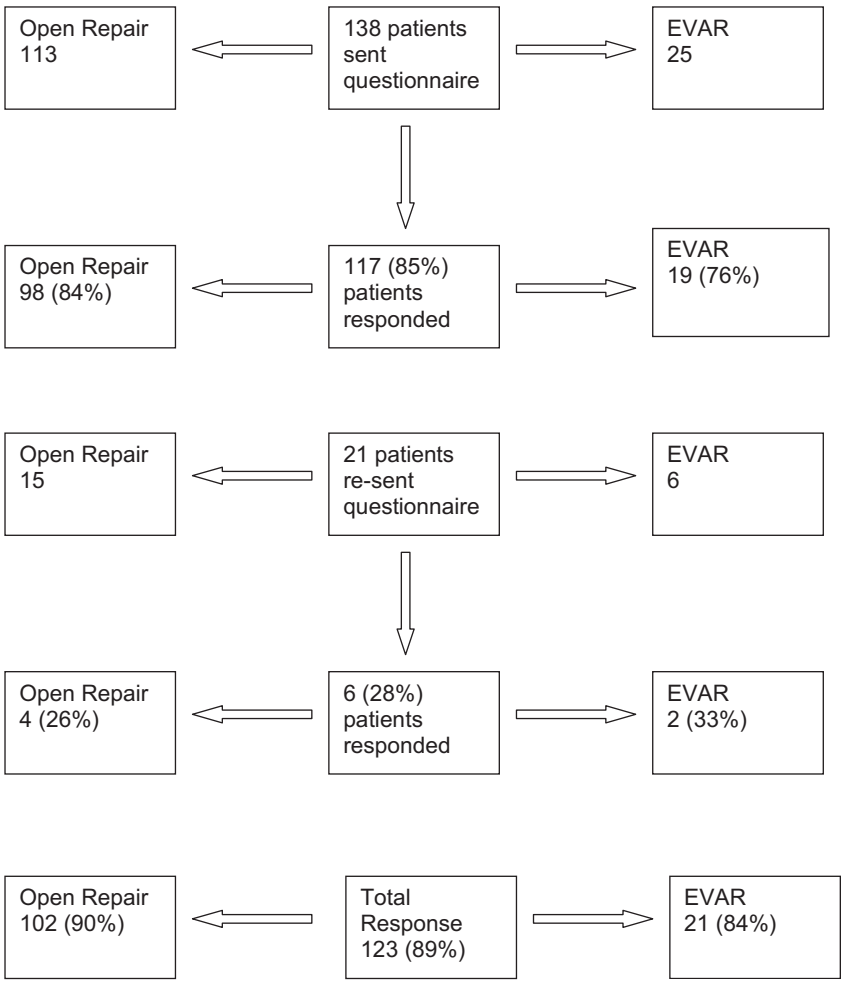

Fig. 1. A flowchart illustrating the response of the participants.

signatures, providing prepaid envelopes for return of questionnaires, and sending reminders to nonresponders.[15,16,18,19] Postal addresses were rechecked from the hospital database for all the nonresponders before sending them the second letter along with the questionnaire.

RESULTS

Response Rate

Study questionnaires were posted to 138 patients (113 open, 25 EVAR). One hundred seventeen (85%) patients responded initially. Questionnaires were sent to nonresponders, and a total of 123 (89%) patients (102 open, 21 EVAR) responded. The time interval from sending a questionnaire to receiving a response was a median of 9 days (range: 6-38). The time interval between surgery and responses was a variable median of 23 months (range: 6-40) (Fig. 1).

Demographics and Comorbidities

Among the responders, 103 (83.7%) patients were males. The mean age was 74 years (SD: 7.25). Seventy-one (57.7%) patients were hypertensive and 86 (69%) were either ex- or current smokers. The median length of hospital stay was 8 days (range: 7-12). Details of demographics and comorbidities are given in Table I.

Questions Focusing on Awareness

Seventy-one percent ($n = 88$) were unaware of AAA as a medical condition before diagnosis. Ninety-seven percent ($n = 120$) indicated their understanding of the need for surgery. Ninety-two percent ($n = 113$) stated that the operation was adequately explained to them. Fifty-four percent ($n = 67$) were provided with written information, whereas only 12% ($n = 15$) used the Internet for further information (Table II).

Table I. Demographics and comorbidities

	Total $n = 123$ (%)	Open repair $n = 102$ (%)	EVAR $n = 21$ (%)	p value
Male gender	103 (83.7)	86 (84.3)	17 (81)	0.75[a]
Age, years	74 ± 7.257	74 ± 7.108	78 ± 7.103	0.01[b]
Hypertension	71 (57.7)	62 (60.8)	9 (42.9)	0.13[c]
Renal failure	2 (1.6)	0	2 (9.5)	0.02[a]
Hypercholesterolemia	54 (43.9)	51 (50)	3 (14.3)	0.01[c]
Smoking				
Current and ex-smoker	86 (69)	71 (69)	15 (71)	0.86[c]
Nonsmoker	37 (30)	31 (30)	6 (28)	
COPD	11 (8.9)	9 (8.8)	2 (9.6)	0.91[a]
Diabetes	12 (9.7)	10 (9.8)	2 (9.6)	1.00[a]
Angina	30 (24.4)	23 (22.5)	7 (33.3)	0.29[c]
MI	20 (16.2)	14 (13.7)	6 (28.6)	0.10[a]
CABG/angioplasty	16 (13)	12 (11.8)	4 (19)	0.473[a]
Diuretics	30 (24.4)	27 (26.5)	3 (14.3)	0.23[c]
Antihypertensives	67 (54.5)	58 (56.9)	9 (42.9)	0.24[c]
Antianginal	24 (19.5)	18 (17.6)	6 (28.6)	0.24[a]
Statins	77 (62.6)	67 (65.7)	10 (47.6)	0.14[c]
Aspirin	61 (49.6)	54 (52.9)	7 (33.3)	0.10[c]
Length of hospital stay	8 (7-12)	9 (7-12)	6 (4-7)	0.01[d]

Results are displayed as number with percentages (%), mean ± SD or median (range). EVAR, endovascular aneurysm repair; COPD, chronic obstructive pulmonary disease; MI, myocardial infarction; CABG, coronary artery bypass graft. p value significant: <0.05, using [a]Fisher exact test, [b]t test, [c]χ^2 test, or [d]Mann–Whitney U test; comparing open repair with EVAR.

Table II. Questionnaire response (questions focusing on awareness)

Questions	Response	Total $n = 123$ (%)	Open repair $n = 102$ (%)	EVAR $n = 21$ (%)	p value
Do you know what operation was performed?	Yes	111 (90.2)	92 (90.2)	19 (90.5)	0.58[a]
	No	6 (4.9)	6 (5.9)	0	
Do you know why operation was performed?	Yes	120 (97.6)	99 (97.1)	21 (100)	1.00[a]
	No	1 (0.8)	1 (1)	0	
Was the operation adequately explained to you?	Yes	113 (91.9)	93 (91.2)	20 (95.2)	1.00[a]
	No	6 (4.9)	5 (4.9)	1 (4.8)	
Were you provided any written information/leaflet regarding the operation?	Yes	67 (54.5)	57 (55.9)	10 (47.6)	0.05[b]
	No	36 (29.3)	32 (31.4)	4 (19)	
	Not sure	18 (14.6)	11 (10.8)	7 (33.3)	
Did you use the Internet to find out more about abdominal aortic aneurysm?	Yes	15 (12.2)	10 (9.8)	5 (23.8)	0.16[b]
	No	107 (87)	91 (89.2)	16 (76.2)	
Were you aware of this condition before your own diagnosis?	Yes	18 (14.6)	15 (14.7)	3 (14.3)	1.00[a]
	No	88 (71.5)	73 (71.6)	15 (71.4)	

Results are displayed as number with percentages (%). p value significant: <0.05 using [a]Fisher exact test or [b]χ^2 test comparing open repair with EVAR.

Questions Focusing on Functional Outcome

Only 16% ($n = 20$) were in active employment before surgery, which further reduced to 9% ($n = 11$) after surgery. Ninety percent ($n = 111$) reported full recovery after surgery, with 60% ($n = 74$) recovering within 6 months. Sixty-five percent ($n = 80$) were driving after the operation as compared with 70% ($n = 86$) before operation, and 79% ($n = 97$) of patients were doing their own shopping after the operation as compared with 87% ($n = 107$) before operation (Table III).

Table III. Questionnaire response (questions focusing on functional outcome)

Questions	Response	Total $n = 123$ (%)	Open repair $n = 102$ (%)	EVAR $n = 21$ (%)	p value
Have you completely recovered from your operation?	Yes	111 (90)	93 (91.2)	18 (85.7)	0.40[a]
	No	11 (9)	8 (7.8)	3 (14.3)	
If yes, when did you feel you had completely recovered from your operation?	Up to 6 months	74 (12.2)	59 (57.9)	15 (71.4)	0.01[b]
	>6 months	37 (30.1)	34 (33.3)	3 (14.3)	
How would you grade your general health before the operation?	Very poor	5 (4.1)	5 (4.9)	0	0.79[b]
	Poor	19 (15.4)	16 (15.7)	3 (14.3)	
	Good	85 (69.1)	67 (65.7)	18 (85.7)	
	Very good	12 (9.8)	12 (11.8)	0	
How would you grade your general health now?	Very poor	4 (3.3)	4 (3.9)	0	0.27[b]
	Poor	21 (17.1)	20 (19.6)	1 (4.8)	
	Good	86 (70)	67 (65.7)	19 (90.5)	
	Very good	12 (9.8)	11 (10.8)	1 (4.8)	
What type of accommodation did you live in before your operation?	Flat	7 (5.7)	6 (5.9)	1 (4.8)	0.94[c]
	House	74 (60.2)	62 (60.8)	12 (57.1)	
	Bungalow	38 (30.9)	32 (31.4)	6 (28.6)	
	Sheltered	3 (2.4)	2 (2)	1 (4.8)	
What type of accommodation are you living in now?	Flat	9 (7.3)	9 (8.8)	0	0.71[c]
	House	67 (54.5)	55 (53.9)	12 (57.7)	
	Bungalow	43 (35)	36 (35.3)	7 (33.3)	
	Sheltered	3 (2.4)	2 (2)	1 (4.8)	
Did you work before your operation?	Yes	20 (16.3)	19 (18.6)	1 (4.8)	0.19[a]
	No	102 (83)	83 (81.4)	19 (90.5)	
Do you work now?	Yes	11 (9)	10 (9.8)	1 (4.8)	0.69[a]
	No	111 (90)	92 (90.2)	19 (90.5)	
Did you drive before your operation?	Yes	86 (70)	73 (71.6)	13 (62)	0.55[c]
	No	36 (29.3)	29 (28.4)	7 (33.3)	
Have you driven since your operation?	Yes	80 (65)	69 (67.6)	11 (52.4)	0.25[c]
	No	41 (33.3)	32 (31.4)	9 (43)	
Did you do your own shopping before your operation?	Yes	107 (87)	88 (86.3)	19 (90.5)	0.21[a]
	No	13 (10.6)	13 (12.7)	0	
Do you do your own shopping now?	Yes	97 (78.9)	81 (79.4)	16 (76.2)	1.00[a]
	No	23 (18.7)	20 (19.6)	3 (14.3)	
Did you do any household chores before your operation?	Yes	106 (86.2)	88 (86.3)	18 (85.7)	1.00[a]
	No	14 (11.4)	12 (11.8)	2 (9.5)	
Do you do any household chores now?	Yes	101 (82.1)	84 (82.4)	17 (81)	1.00[a]
	No	19 (15.4)	16 (15.7)	3 (14.3)	

Results are displayed as number with percentages (%). p value significant: <0.05 using [a]Fisher exact test, [b]Mann–Whitney U test, or [c]χ^2 test; comparing open repair with EVAR.

Questions Focusing on Satisfaction

Eighty-seven percent ($n = 108$) were satisfied with the overall experience, and 85% ($n = 105$) stated that they would recommend the operation to family and/or friends if required (Table IV).

DISCUSSION

The purpose of this study was to assess awareness, functional outcome, and satisfaction after elective AAA repair from patients' perspective through a postal questionnaire. Previously, no study has been undertaken where patient satisfaction was evaluated using a postal questionnaire for patients with AAA. This study showed that, if carefully conducted, the low-resource, low-cost postal survey can achieve high response rates. Furthermore, a good response rate may indicate that patients were generally satisfied with the operation, recovery, and the care provided to them.

The importance of assessing outcome after major operations has appropriately attracted attention of clinicians in the recent years by the realization that the success of an intervention is not just the technical success. The increasing interest in the functional outcome has been motivated partially by increased attention to healthcare costs, with

Table IV. Questionnaire response (questions focusing on satisfaction)

Questions	Response	Total $n = 123$ (%)	OR $n = 102$ (%)	EVAR $n = 21$ (%)	p value
Overall was the operation more major to what you had anticipated?	Yes	52 (42.3)	44 (43.1)	8 (38.1)	0.56[a]
	No	24 (19.5)	21 (20.6)	3 (14.3)	
	Same	46 (37.4)	36 (35.3)	10 (47.6)	
Experience of operation and recovery as a whole?	Good	108 (87.8)	88 (86.2)	20 (95.3)	0.91[b]
	Poor	15 (12.2)	14 (13.7)	1 (4.8)	
Would you do it all over again if required?	Yes	104 (84.6)	84 (82.4)	20 (95.2)	0.04[‡]
	No	4 (3.3)	4 (3.9)	0	
	May be	14 (11.4)	14 (13.7)	0	
If required would you recommend this operation to one of your family/close friends?	Yes	105 (85.4)	87 (85.3)	18 (85.7)	1.00[c]
	No	4 (3.3)	3 (2.9)	1 (4.8)	
	Not sure	12 (9.8)	11 (10.8)	1 (4.8)	

Results are displayed as number with percentages (%). p value significant: <0.05 using [a]χ^2 test, [b]Mann–Whitney U test, or [c]Fisher exact test; comparing open repair with EVAR.

the obvious intent of directing practice to those interventions that consume less resource.[20] The short form (36) health survey (SF-36) questionnaire contains most of the functional outcome data currently available. Mangione et al. have suggested that changes in health-related quality of life surrounding AAA repair may not be adequately described in the SF-36 questionnaire.[21] A small series in which SF-36 questionnaire was used to compare cognitive function and quality of life in patients undergoing open AAA repair versus EVAR has found little difference in health-related quality of life in the postoperative period.[22] This supports the finding of Mangione et al. in concluding that more than SF-36 will be required to assess health-related quality of life in patients with AAA repair.[21]

In this study, we have explored the multifactorial functional outcome of patients undergoing an intervention for AAA through a carefully designed study-specific questionnaire. Various parameters such as time to full recovery, return to day-to-day activities (e.g., driving and shopping), repeating the process of AAA repair, and recommendation of operation to family and/or close friends were included in the questionnaire.

Our population demographics were comparable with other studies focusing on quality of life or functional outcome for patients with AAA.[23,24] A high proportion of patients in our study had complete recovery and positive experience of operation as compared with previously reported data. However, questions focusing on awareness and functional outcomes, including active employment and day-to-day activities, in our study are comparable with the available evidence.[14]

In one of the questions regarding use of Internet for information, we found that only 12% of our patients have used Internet for further information. This observation is in contrast to a questionnaire study for cholecystectomy and hernia repair, where 59% patients used the Internet.[25] This finding is probably a reflection of the fact that most of the patients with AAA were elderly people who were not using computers in day-to-day life. Majority of the patients were unaware of AAA condition before it was diagnosed, which reflects that the elderly population is unaware of this disease and also highlights the importance of ultrasound screening for AAA in elderly population.

This study had a few limitations. The patients were completing the questionnaires at different time intervals from their operation. Some of the elderly population may have found it difficult to recall the events, thus recall bias may have been introduced. The results would have been more robust if the time interval between the operation and completing the questionnaires was standardized for the patients.

In conclusion, despite a lack of awareness regarding AAA in the elderly population, after being diagnosed, patients understand the implications and are satisfied with the overall results of surgery. Postal questionnaire response rate can be improved using various strategies, as we have demonstrated. Further studies are required to develop

a questionnaire for evaluation of patient-reported outcome measures.

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APPENDIX QUESTIONNAIRE

Questionnaire.
Patient satisfaction & awareness following elective repair of abdominal aortic aneurysm

Section one: Operation & recovery

1. Do you know what operation was performed?
   ☐ Yes ☐ No ☐ Not Sure

   If yes please describe briefly what was performed?

2. Do you know why operation was performed?
   ☐ Yes ☐ No ☐ Not Sure

3. Overall was the operation more major to what you had anticipated?
   ☐ Yes ☐ No ☐ Same as my expectation

4. Have you completely recovered from your operation?
   ☐ Yes ☐ No

   If yes, when did you feel you had completely recovered from your operation?
   ☐ 3 Months ☐ 6 Months ☐ 12 Months ☐ More than 12 months

5. How would you grade your general health before the operation?
   ☐ Very poor ☐ Poor ☐ Good ☐ Very good

6. How would you grade your general health now?
   ☐ Very poor ☐ Poor ☐ Good ☐ Very good

7. How was your experience of the operation & recovery as a whole?
   ☐ Very poor ☐ Poor ☐ Good ☐ Very good

Section two: Information

8. Was the operation adequately explained to you?
   ☐ Yes ☐ No ☐ Not Sure

9. Were you provided any written information/leaflet regarding the operation?
   ☐ Yes ☐ No ☐ Not Sure

10. Did you use the internet to find out more about abdominal aortic aneurysm?
    ☐ Yes ☐ No ☐ Not Sure

    If yes, how would you rate the information you found on the internet?
    ☐ Very poor ☐ Poor ☐ Good ☐ Very good

11. Were you aware of this condition before your own diagnosis?
    ☐ Yes ☐ No

12. Please write any suggestions about improving the patient information.

Section three: Life Style Changes-General

13. What type of accommodation did you live in before your operation?
☐ Flat ☐ House ☐ Bungalow ☐ Sheltered Accommodation

14. What type of accommodation are you living now?
☐ Flat ☐ House ☐ Bungalow ☐ Sheltered Accommodation

15. Did you work before your operation?
☐ Yes ☐ No

If yes, what was your occupation?

16. Do you work now?
☐ Yes ☐ No

If yes, what is your occupation?

17. Did you drive before your operation?
☐ Yes ☐ No

18. Have you driven since your operation?
☐ Yes ☐ No

19. Did you do your own shopping before your operation?
☐ Yes ☐ No

20. Do you do your own shopping now?
☐ Yes ☐ No

21. Did you do any household chores before your operation?
☐ Yes ☐ No

22. Do you do any household chores now?
☐ Yes ☐ No

23. Would you do it all over again knowing what you know now regarding the operation & recovery?
☐ Yes ☐ No ☐ May be

24. If required would you recommend this operation to one of your family/ close friends?
☐ Yes ☐ No ☐ Not Sure