

Impact of cataract surgery on vision-related quality of life



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Background: Blindness and visual impairment have been shown to reduce vision-related quality of life (VRQoL), general health and social status and increase mortality. Understanding the influence of different cataract surgery techniques on VRQoL can enhance the understanding of which technique may be most suitable to achieve the best outcomes from a patient's perspective. Previous studies have focused exclusively on the phacoemulsification technique, with limited attention on other techniques that are common in developing countries, such as the extracapsular cataract extraction (ECCE) and manual small-incision cataract surgery (MSICS) techniques.

Aim: To evaluate the impact of cataract surgery on VRQoL for the ECCE and MSICS techniques.

Setting: The study was conducted at the Themba Hospital in the Mpumalanga province.

Methods: A case study research design was used at the Themba Hospital. Participants underwent either the ECCE or the MSICS technique and were followed for a period of 6-weeks post-surgery. The VRQoL was assessed using the 33-item Indian Vision Functioning Questionnaire (IND-VFQ-33). Data were presented using frequencies, percentages and means \pm standard deviations.

Results: The sample included 101 participants, with a mean age of ~66 years. Following cataract surgery, there was an increase in the frequency of the 'not at all' response for the majority of the questions in the IND-VFQ-33 questionnaire in all three domains. There were statistically significant differences ($p < 0.05$) between the pre-surgery and post-surgery mean scores for all the questions, with the exceptions being those related to problems experienced when seeing outside in bright sunlight, bright light hurting the eyes and closing the eyes because of light from vehicles.

Conclusion: Individuals who underwent both the ECCE and MSICS techniques showed improvement in VRQoL in terms of general functioning, psychosocial impact and vision symptoms domains.

Keywords: cataract surgery; extracapsular cataract surgery; manual small-incision cataract surgery; vision-related quality of life; daily living activities; visual function; visual impairment.

Introduction

Cataract is the leading cause of treatable blindness throughout the world.^{1,2,3,4} Globally, cataract is the main cause of visual impairment, with the majority of individuals affected by cataracts living in developing countries.^{5,6} Blindness is closely associated with poverty as it worsens the latter as a result of reduced economic productivity.^{7,8,9,10,11,12} Furthermore, blindness and visual impairment have been shown to reduce vision-related quality of life (VRQoL), general health and social status and increase mortality.^{13,14}

Surgery is an effective treatment for cataracts as it removes the cloudy crystalline lens and replaces it with an artificial intraocular lens.^{15,16} The use of surgery as a means for the treatment of cataracts has been reported in previous studies.^{1,17,18,19} Even though cataract surgery is cost-effective, the outcomes associated with surgery are not always optimal as individuals may still remain visually impaired post-surgery, particularly in developing countries.^{7,20,21} Common surgical techniques used to remove cataracts in developing countries include the extracapsular cataract extraction (ECCE) and the manual small-incision cataract surgery (MSICS) techniques.^{5,22,23,24}

The aim of cataract surgery is to improve the affected individuals' visual function (VF), with the assumption that it will also improve their VRQoL.²⁵ The extent of improvement in the VRQoL

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owing to cataract surgery may also be influenced by other conditions wherein an increase in ocular comorbidity (other than cataracts) increases the risk of poor VRQoL following cataract surgery.^{25,26} In clinical practice, visual acuity (VA) is commonly used to quantitatively measure the gains in VF after cataract surgery.^{25,27} The impact of cataract surgery on everyday VRQoL in terms of vision-dependent activities has attracted limited attention.^{25,27} However, this is an important consideration as evaluation of the gains in only the VA aspect of VF may not adequately describe the outcomes associated with cataract surgery particularly from a patient's perspective. To this end, Sharma et al.¹¹ proposed that it may be less optimal to measure the changes in VA alone without its effect on improvement in vision-dependent activities after cataract surgery. In a recent study, Bandhu et al.¹⁷ noted that even though patients may benefit from an increase in VA after cataract surgery, their satisfaction may be limited. Therefore, assessment of patient satisfaction may provide additional information on the outcomes of the cataract surgery.²⁸ This is important as it helps to gain insight into the changes (if any), from the patient's perspective, of their participation in daily life activities and/or household economic status.⁹ This may provide further support to advocate for the allocation of more resources towards cataract surgery.²⁹

Methods for evaluating the impact of cataract surgery on VRQoL include the administration of pre-surgery and post-surgery VRQoL questionnaires.^{25,29} Some studies have evaluated and reported on pre-surgery and post-surgery VRQoL using the 33-item Indian Vision Functioning Questionnaire (IND-VFQ-33).^{17,29,30} Understanding the influence of different cataract surgery techniques on VRQoL can enhance the understanding of which technique may be most suitable to achieve the best outcomes from a patient's perspective.

No studies have been conducted to assess the impact of cataract surgery on VRQoL using the ECCE and MSICS techniques in the Mpumalanga province, South Africa (Segodi A, personal communication, July 17, 2017). Most of the studies have been conducted in developed countries and therefore there is a need for local studies to assess the functional gains after cataract surgery.¹¹ Consequently, the aim of this study was to evaluate the impact of two cataract surgery techniques – namely, ECCE and MSICS – on VRQoL at a hospital in the Mpumalanga province of South Africa.

Methodology

Site approval for this study was obtained from the Mpumalanga Department of Health and the Themba Hospital Chief Executive Officer. All ethical guidelines were adhered to during the study and written informed consent was obtained from all participants after a discussion of the nature and procedures involved in the study. The study employed a case study research design and was conducted at the Themba Hospital. The study population consisted of black and mixed race participants attending the Themba Hospital Ophthalmology Unit. A non-probability sampling

method that selects participants because of their accessibility and proximity to the researcher, also known as convenience sampling, was used to recruit 101 cataract surgery patients.

The VRQoL was evaluated using the IND-VFQ-33 questionnaire, which consists of 33 questions in three domains including general functioning, psychosocial impact and vision symptoms. The IND-VFQ-33 questionnaire is designed in English and therefore when administering the questionnaire, the questions were read out in English and the local language (Siswati) of the participants. Family members accompanying the participants were not allowed to contribute to the participant's responses. The responses of the participants were recorded on a five-point rating scale used in the IND-VFQ-33 questionnaire. This quantitative five-point rating scale of possible responses includes 1 ('not at all') through to 5 ('cannot do this'), with responses 2–4 representing the intermediate responses ('a little', 'quite a bit' and 'a lot'). The IND-VFQ-33 questionnaire was developed and validated using traditional validation techniques, such as classical test theory (CTT).³¹ Previous studies have shown the CTT to possess satisfactory psychometric properties.^{32,33,34} Prior to data collection, a pilot study was undertaken on five participants who had undergone cataract surgery for validity and reliability assessment. To ensure standardisation, administration of the IND-VFQ-33 questionnaire pre-surgery and post-surgery was undertaken by only one researcher who was familiar with both English and Siswati.

Data were captured and analysed using the Statistical Package for Social Sciences (SPSS) software, version 25. Overall, the VRQoL data were summarised using frequencies, percentages and mean \pm standard deviations (SDs). The independent sample *t*-test was used to assess the differences in mean age between participants in the ECCE and MSICS groups. The dependent sample *t*-test was used to assess differences between the pre-surgery and post-surgery scores in the two cataract surgery groups. The study adopted a 95% significance level, with a *p*-value of ≤ 0.05 being considered as statistically significant.

Ethical considerations

Ethical approval for this study (reference number BE592/16) was obtained from the Biomedical Research and Ethics Committee of the University of KwaZulu-Natal (ethical clearance number: BE592/16).

Results

Demographic characteristics

The study sample included 101 participants, with slightly more women ($n = 52$) than men ($n = 49$). In the sample, there was an almost equal distribution of participants who had undergone the ECCE ($n = 50$) and MSICS ($n = 51$) techniques. Of the 49 male participants, 27 and 22 had undergone the ECCE and MSICS techniques, respectively. Of the 52 female participants, 23 had undergone the ECCE technique and 29 had undergone the MSICS technique. Almost all participants

were black people ($n = 100$), with the exception of only one mixed race participant. A few more participants had their left eye operated compared with the right eye (56 vs. 45). The participants' ages ranged between 9 and 94 years, with a mean age of 66.32 ± 15.99 years. Approximately two-thirds of the study participants ($n = 65$) were aged between 61 and 80 years. The mean ages of participants who had undergone the ECCE and MSICS techniques were 69.66 and 63.04 years, respectively ($p = 0.04$). Even though the participants who had undergone the MSICS technique were significantly younger, this difference was only 6 years and may not be clinically significant.

Vision-related quality of life characteristics

In this study, the pre-surgery and post-surgery VRQoL, which was evaluated at a 6-week follow-up, was recorded using the IND-VFQ-33 questionnaire. The pre-surgery and post-surgery VRQoL domains included general functioning (questions 1–21), psychosocial impact (questions 22–26) and vision symptoms (questions 27–33). The post-surgery VRQoL was evaluated with reference to participants using their best spectacle correction and none of the participants wore any low vision aids.

Table 1 shows the frequency of responses to questions in the IND-VFQ-33 questionnaire from study participants who underwent the ECCE cataract surgery technique. The questionnaire was administered to participants ($n = 50$) at two different times, that is, pre-surgery and post-surgery. For all of the questions in the general functioning domain, with the exception of only one related to problems experienced when seeing outside in bright sunlight, there was an increase in the frequency of responses in the no difficulties option ('not at all' response) when the questionnaire was administered post-surgery. Prior to cataract surgery, more than 50% of the study participants reported that they were unable to go out at night ($n = 29$) and recognise the face of a person from a distance ($n = 27$) because of their poor vision. However, after cataract surgery, only one participant for each of the above questions reported that they were unable to do these tasks because of their vision problem (Table 1). Furthermore, the majority of participants reported no difficulty in going out at night ($n = 32$) or recognising faces of persons at a distance ($n = 37$) post-surgery, which implies that after cataract surgery these tasks were easier to accomplish. Regarding problems experienced when doing their work to the usual standard, only a few participants ($n = 7$) reported no difficulty, whilst the majority ($n = 24$) reported that they were unable to do this before surgery. However, the opposite trend was observed post-surgery, where 80% of the study participants reported no difficulty and only one participant reported difficulty to do this (Table 1).

In the psychosocial impact domain, the positive impact of cataract surgery was evident, as almost all study participants ($n = 49$) were scared ('a lot' response) to lose their remaining vision pre-surgery, whilst the post-surgery results showed

that only three of the study participants were scared to lose their remaining vision and the majority ($n = 39$) reported that they were not scared. Approximately two-thirds ($n = 35$) of the study participants felt that they had become a burden to other people because of their vision pre-surgery. However, after the cataract surgery this frequency reduced to only three participants. Overall, the majority of participants reported 'not at all' for all of the five questions in the psychosocial impact domain post-surgery, which is similar to the trend noted in the general functioning domain. In the vision symptoms domain, all study participants ($n = 50$) reported having reduced vision pre-surgery, but only three participants reported the same trend post-surgery. In the same way, approximately all of the study participants ($n = 49$) reported blurred vision pre-surgery, with only two participants reporting the same trend post-surgery. Overall, the majority of participants reported 'not at all' for most of the questions in the vision symptoms domain post-surgery. The only exceptions were the two questions related to problems experienced when seeing light from vehicles and bright light (Table 1). This implies that across the three domains the same trend of an increase in the frequency of responses in the 'not at all' response was common post-surgery.

Table 2 shows the frequency of responses to questions in the IND-VFQ-33 questionnaire from study participants ($n = 51$) who underwent the MSICS technique. For all of the questions in the general functioning domain, with the exception of the question related to problems experienced when seeing outside in bright sunlight, there was an increase in the frequency of responses in the 'not at all' response when the questionnaire was administered post-surgery. Prior to cataract surgery, approximately 25% of the study participants reported that they were unable to go out at night ($n = 13$) and recognise the face of a person from a distance ($n = 12$) because of their vision. However, after cataract surgery, none of the study participants reported that they were unable to do these tasks because of their vision (Table 2). Furthermore, the majority of participants reported no difficulty in going out at night ($n = 44$) or recognising faces of persons at a distance ($n = 47$) post-surgery, which implies that after cataract surgery there were less symptoms for general functioning domain. One-third of the study participants ($n = 16$) reported no difficulty when doing their usual work. However, post-surgery more than 85% of the study participants ($n = 44$) reported no difficulty and only one participant reported inability to do this. This observation suggests that after cataract surgery there were fewer activity limitations from the participants' perspective (Table 2).

For all of the questions in the psychosocial impact domain, the majority of the participants reported having no difficulty ('not at all' response) when the questionnaire was administered post-surgery, which is similar to the trend noted in the general functioning domain. Prior to cataract surgery, all of the participants ($n = 51$) were scared to lose their remaining vision, whilst there was only three participants who were scared to lose their remaining vision

TABLE 1: Frequency and percentages of vision-related quality of life responses pre-surgery and post-surgery for participants undergoing the extracapsular cataract extraction surgery technique using the 33-item Indian Vision Functioning Questionnaire.

Questions	Pre-surgery (n = 50)								Post-surgery (n = 50)											
	Not at all		A little		Quite a bit		A lot		Cannot do this		Not at all		A little		Quite a bit		A lot		Cannot do this	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Domain: General functioning																				
1. Because of your vision how much problem do you have in climbing stairs?	12	24.0	5	10.0	7	14.0	26	52.0	-	-	43	86.0	3	6.0	1	2.0	3	6.0	-	-
2. Because of your vision how much problem do you have in making out the bumps and holes in the road when walking?	12	24.0	7	14.0	7	14.0	16	32.0	8	16.0	44	88.0	3	6.0	2	4.0	1	2.0	-	-
3. Because of your vision how much problem do you have in seeing if there are animals or vehicles when walking?	17	34.0	11	22.0	4	8.0	7	14.0	11	22.0	46	92.0	2	4.0	1	2.0	1	2.0	-	-
4. Because of your vision how much problem do you have in finding your way in new places?	10	20.0	6	12.0	5	10.0	7	14.0	22	44.0	43	86.0	2	4.0	4	8.0	-	-	-	-
5. Because of your vision how much problem do you have in going to social functions such as weddings?	11	22.0	5	10.0	3	6.0	11	22.0	20	40.0	43	86.0	3	6.0	3	6.0	-	-	1	2.0
6. Because of your vision how much problem do you have in going out at night?	8	16.0	6	12.0	2	4.0	5	10.0	29	58.0	32	64.0	14	28.0	2	4.0	1	2.0	1	2.0
7. Because of your vision how much problem do you have in finding your way indoors?	19	38.0	8	16.0	4	8.0	19	38.0	-	-	47	94.0	2	4.0	-	-	1	2.0	-	-
8. Because of your vision how much problem do you have in seeing the steps of the bus when getting in or getting down?	17	34.0	5	10.0	6	12.0	22	44.0	-	-	45	90.0	3	6.0	2	4.0	-	-	-	-
9. Because of your vision how much problem do you have in recognising people from a distance?	4	8.0	6	12.0	7	14.0	6	12.0	27	54.0	37	74.0	8	16.0	3	6.0	1	2.0	1	2.0
10. Because of your vision how much problem do you have in recognising the face of a person standing near you?	20	40.0	5	10.0	7	14.0	4	8.0	14	28.0	47	94.0	-	-	2	4.0	-	-	1	2.0
11. Because of your vision how much problem do you have in locking or unlocking the door?	28	56.0	9	18.0	5	10.0	8	16.0	-	-	48	96.0	1	2.0	-	-	1	2.0	-	-
12. Because of your vision how much problem do you have in doing your usual work either in the house or outside?	10	20.0	15	30.0	5	10.0	9	18.0	11	22.0	46	92.0	2	4.0	1	2.0	1	2.0	-	-
13. Because of your vision how much problem do you have in doing your work up to your usual standard?	7	14.0	3	6.0	9	18.0	7	14.0	24	48.0	40	80.0	5	10.0	2	4.0	2	4.0	1	2.0
14. Because of your vision how much problem do you have in searching for things at home?	14	28.0	16	32.0	7	14.0	13	26.0	-	-	44	88.0	4	8.0	1	2.0	1	2.0	-	-
15. Because of your vision how much problem do you have in seeing outside in bright sunlight?	30	60.0	12	24.0	6	12.0	2	4.0	-	-	13	26.0	32	64.0	5	10.0	-	-	-	-

Table 1 continues on the next page →

TABLE 1 (Continues...): Frequency and percentages of vision-related quality of life responses pre-surgery and post-surgery for participants undergoing the extracapsular cataract extraction surgery technique using the 33-item Indian Vision Functioning Questionnaire.

Questions	Pre-surgery (n = 50)						Post-surgery (n = 50)					
	Not at all		A little		Quite a bit		A lot		Cannot do this		Not at all	
	N	%	N	%	N	%	N	%	N	%	N	%
16. Because of your vision how much problem do you have in seeing when coming into the house after being in the sunlight?	30	60.0	11	22.0	6	12.0	3	6.0	-	-	30	60.0
17. Because of your vision how much problem do you have in seeing differences in colours?	18	36.0	8	16.0	7	14.0	2	4.0	15	30.0	47	94.0
18. Because of your vision how much problem do you have in making out differences in coins or notes?	28	56.0	7	14.0	7	14.0	7	14.0	1	2.0	47	94.0
19. Because of your vision how much problem do you have in going to the toilet?	26	52.0	9	18.0	4	8.0	11	22.0	-	-	48	96.0
20. Because of your vision how much problem do you have in seeing objects that may have fallen in the food?	23	46.0	9	18.0	2	4.0	3	6.0	13	26.0	47	94.0
21. Because of your vision how much problem do you have in seeing the level in the container when pouring?	12	24.0	13	26.0	8	16.0	2	4.0	15	30.0	44	88.0
Domain: Psychosocial impact												
22. Because of your eye problem do you feel frightened to go out at night?	1	2.0	2	4.0	11	22.0	36	72.0	-	-	33	66.0
23. Because of your eye problem do you enjoy social functions less?	6	12.0	8	16.0	5	10.0	31	62.0	-	-	42	84.0
24. Because of your eye problem do you feel ashamed that you can't see?	19	38.0	14	28.0	8	16.0	9	18.0	-	-	47	94.0
25. Because of your eye problem do you feel you have become a burden on others?	2	4.0	5	10.0	8	16.0	35	70.0	-	-	44	88.0
26. Because of your eye problem do you feel frightened that you may lose your remaining vision?	-	-	1	2.0	-	-	49	98.0	-	-	39	78.0
Domain: Vision symptoms												
27. Do you have reduced vision?	-	-	-	-	-	-	50	100.0	-	-	43	86.0
28. Are you dazzled in bright light?	31	62.0	9	18.0	5	10.0	5	10.0	-	-	44	88.0
29. Is your vision blurred in sunlight?	34	68.0	7	14.0	5	10.0	4	8.0	-	-	39	78.0
30. Does bright light hurt your eyes?	28	56.0	11	22.0	9	18.0	2	4.0	-	-	91	80.0
31. Do you close your eyes because of light from vehicles?	20	40.0	14	28.0	8	16.0	8	16.0	-	-	3	6.0
32. Does light seem like stars?	28	56.0	20	40.0	2	4.0	-	-	-	-	47	94.0
33. Do you have blurred vision?	-	-	-	-	1	2.0	49	98.0	-	-	43	86.0

TABLE 2: Frequency and percentages of vision-related quality of life responses pre-surgery and post-surgery for participants undergoing the manual small-incision cataract surgery technique using the 33-item Indian Vision Functioning Questionnaire.

Questions	Pre-surgery <i>n</i> = 51						Post-surgery <i>n</i> = 51					
	Not at all		A little		Quite a bit		A lot		Cannot do this		Not at all	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Domain: General functioning												
1. Because of your vision how much problem do you have in climbing stairs?	24	47.1	9	17.6	5	9.8	13	25.5	-	-	49	96.1
2. Because of your vision how much problem do you have in making out the bumps and holes in the road when walking?	28	54.9	7	13.7	4	7.8	10	19.6	2	3.9	50	98.0
3. Because of your vision how much problem do you have in seeing if there are animals or vehicles when walking?	32	62.7	2	3.9	11	21.6	3	5.9	3	5.9	50	98.0
4. Because of your vision how much problem do you have in finding your way in new places?	25	49.0	7	13.7	6	11.8	5	9.8	8	15.7	49	96.1
5. Because of your vision how much problem do you have in attending social functions such as weddings?	25	49.0	9	17.6	5	9.8	4	7.8	8	15.7	48	94.1
6. Because of your vision how much problem do you have in going out at night?	15	29.4	10	19.6	8	15.7	5	9.8	13	25.5	44	86.3
7. Because of your vision how much problem do you have in finding your way indoors?	35	68.6	7	13.7	3	5.9	6	11.8	-	-	49	96.1
8. Because of your vision how much problem do you have in seeing the steps of the bus when getting in or down?	31	60.8	6	11.8	4	7.8	10	19.6	-	-	49	96.1
9. Because of your vision how much problem do you have in recognising people from a distance?	8	15.7	20	39.2	4	7.8	7	13.7	12	23.5	47	92.2
10. Because of your vision how much problem do you have in recognising the face of a person standing near you?	35	68.6	7	13.7	3	5.9	3	5.9	3	5.9	51	100.0
11. Because of your vision how much problem do you have in locking or unlocking the door?	45	88.2	4	7.8	1	2.0	1	2.0	-	-	51	100.0
12. Because of your vision how much problem do you have in doing your usual work either in the house or outside?	22	43.1	19	37.3	3	5.9	4	7.8	3	5.9	50	98.0
13. Because of your vision how much problem do you have in doing your work up to the usual standard?	16	31.4	6	11.8	12	23.5	5	9.8	12	23.5	44	86.3
14. Because of your vision how much problem do you have in searching for things at home?	35	68.6	8	15.7	2	3.9	6	11.8	-	-	50	98.0
15. Because of your vision how much problem do you have in seeing outside in bright sunlight?	27	52.9	16	31.4	5	9.8	3	5.9	-	-	17	33.3

Table 2 continues on the next page →

TABLE 2 (Continues...): Frequency and percentages of vision-related quality of life responses pre-surgery and post-surgery for participants undergoing the manual small-incision cataract surgery technique using the 33-item Indian Vision Functioning Questionnaire.

Questions										Pre-surgery <i>n</i> = 51						Post-surgery <i>n</i> = 51					
Not at all		A little		Quite a bit		A lot		Cannot do this		Not at all		A little		Quite a bit		A lot		Cannot do this			
<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%		
24	47.1	19	37.3	4	7.8	4	7.8	-	-	36	70.6	15	29.4	-	-	-	-	-	-		
16. Because of your vision how much problem do you have in seeing when coming into the house after being in the sunlight?																					
39	76.5	2	3.9	4	7.8	2	3.9	4	7.8	51	100.0	-	-	-	-	-	-	-	-		
17. Because of your vision how much problem do you have in seeing differences in colours?																					
47	92.2	1	2.0	2	3.9	1	2.0	-	-	51	100.0	-	-	-	-	-	-	-	-		
18. Because of your vision how much problem do you have in making out differences in coins or notes?																					
40	78.4	7	13.7	1	2.0	3	5.9	-	-	51	100.0	-	-	-	-	-	-	-	-		
19. Because of your vision how much problem do you have in going to the toilet?																					
38	74.5	6	11.8	2	3.9	2	3.9	3	5.9	51	100.0	-	-	-	-	-	-	-	-		
20. Because of your vision how much problem do you have in seeing objects that may have fallen in the food?																					
28	54.9	13	25.5	3	5.9	4	7.8	3	5.9	51	100.0	-	-	-	-	-	-	-	-		
21. Because of your vision how much problem do you have in seeing the level in the container when pouring?																					
Domain: Psychosocial impact																					
2	3.9	12	23.5	14	27.5	23	45.1	-	-	40	78.4	9	17.6	1	2.0	1	2.0	-	-		
22. Because of your eye problem do you feel frightened to go out at night?																					
12	23.5	15	29.4	9	17.6	15	29.4	-	-	50	98.0	-	-	-	-	1	2.0	-	-		
23. Because of your eye problem do you enjoy social functions less?																					
28	54.9	16	31.4	6	11.8	1	2.0	-	-	50	98.0	1	2.0	-	-	-	-	-	-		
24. Because of your eye problem do you feel ashamed that you can't see?																					
4	7.8	15	29.4	11	21.6	21	41.2	-	-	48	94.1	-	-	2	3.9	1	2.0	-	-		
25. Because of your eye problem do you feel you have become a burden on others?																					
-	-	-	-	-	-	51	100.0	-	-	48	94.1	-	-	-	-	3	5.9	-	-		
26. Because of your eye problem do you feel frightened that you may lose your remaining vision?																					
Domain: Vision symptoms																					
-	-	-	-	-	-	51	100.0	-	-	48	94.1	-	-	1	2.0	2	3.9	-	-		
27. Do you have reduced vision?																					
24	47.1	11	21.6	12	23.5	4	7.8	-	-	47	92.2	3	5.9	-	-	1	2.0	-	-		
28. Are you dazzled in bright light?																					
27	52.9	10	19.6	8	15.7	6	11.8	-	-	46	90.2	3	5.9	-	-	2	3.9	-	-		
29. Is your vision blurred in sunlight?																					
20	39.2	15	29.4	12	23.5	4	7.8	-	-	18	35.3	27	52.9	6	11.8	-	-	-	-		
30. Does bright light hurt your eyes?																					
17	33.3	13	25.5	13	25.5	8	15.7	-	-	4	7.8	34	66.7	12	23.5	1	2.0	-	-		
31. Do you close your eyes because of light from vehicles?																					
32. Does light seem like stars?																					
35	68.6	13	25.5	3	5.9	-	-	-	-	46	90.2	5	9.8	-	-	-	-	-	-		
33. Do you have blurred vision?																					
-	-	-	-	2	3.9	49	96.1	-	-	48	94.1	-	-	1	2.0	2	3.9	-	-		

post-surgery, with more than 90% of the study participants ($n = 48$) reporting that they were not scared post-surgery (Table 2). More than 40% of the study participants ($n = 21$) felt that they had become a burden to other people because of their vision pre-surgery. However, after the cataract surgery this frequency reduced to only one participant. With regard to the vision symptoms domain, all the study participants ($n = 51$) reported having reduced vision pre-surgery, with only two participants reporting the same trend post-surgery. In the same way, approximately all the study participants ($n = 49$) reported blurred vision pre-surgery, with only two participants reporting the same trend post-surgery. Furthermore, more than 90% of the study participants ($n = 48$) reported no blurred vision after cataract surgery, which suggests that participants were able to perform vision-related activities more efficiently (Table 2). Overall, the majority of participants reported 'not at all' for almost all of the questions in the vision symptoms domain post-surgery, with the exception of two questions related to problems experienced when seeing bright lights and light from vehicles (Table 2). This finding is similar to the trend noted in the general functioning and psychosocial impact domains where an increase in the frequency of responses in the 'not at all' response was more common post-surgery.

The mean response for each question in the IND-VFQ-33 questionnaire, which was administered pre-surgery and post-surgery to the ECCE and MSICS participants, was calculated using the five-point rating scale and is shown in Table 3. For the ECCE participants, statistically significant differences ($p < 0.05$) were noted between the pre-surgery and post-surgery mean scores for all the questions in the general functioning domain, with the exception of only two questions. These two questions, which showed no statistical differences in mean scores, were related to problems experienced when seeing outside in bright sunlight ($p = 0.08$) and when coming into the house after being in sunlight ($p = 0.12$). For all the questions in the psychosocial impact domain, the mean pre-surgery and post-surgery scores at 6-week follow-up were significantly different ($p < 0.05$) and were lower post-surgery (Table 3). The mean scores for all the questions in the vision symptoms domain were significantly different ($p < 0.05$), with the exception of two questions related to problems experienced when seeing light from vehicles ($p = 0.28$) and bright light ($p = 0.14$). The post-surgery scores for these two questions were higher than pre-surgery scores (Table 3).

Following cataract surgery, statistically significant differences ($p < 0.05$) were noted for all questions except two in the general functioning domain for the MSICS participants. These two questions in which no significant difference was observed related to problems experienced when seeing outside in bright sunlight ($p = 0.64$) and making out differences in coins and notes ($p = 0.06$) as shown in Table 3. All questions in the general functioning domain showed smaller mean scores post-surgery except the one which concerned seeing outside in bright light. Furthermore, for all the questions in the psychosocial

impact domain, the mean scores pre-surgery and post-surgery were statistically different, with lower values for the responses post-surgery. With the exception of one question, all questions in the vision symptoms domain showed the trend of lower scores post-surgery (Table 3). Only the question related to closing your eyes because of light from vehicles had a higher score post-surgery compared with pre-surgery. Furthermore, statistically significant differences were noted between the pre-surgery and post-surgery scores for almost all questions (Table 3). The two questions in which no significant differences were observed related to problems experienced when seeing light from vehicles ($p = 0.15$) and bright light ($p = 0.84$).

Discussion

Demographic characteristics

This study was conducted to evaluate the impact of cataract surgery on the VRQoL for individuals who had undergone two different cataract surgery techniques. The study participants ($n = 101$) had undergone either the ECCE or MSICS techniques. The majority of study sample consisted of older participants, with a mean age of ~66 years, which is consistent with reports of other studies where the mean age of participants was higher than 60 years.^{17,27,35,36,37} The finding is not surprising as age-related cataracts are the most common type of cataracts and often the affected individuals may present late for surgical intervention.^{11,16,38} In this study, there were slightly more women ($n = 52$) than men ($n = 49$), which is consistent with the results observed in previous studies.^{27,37}

Vision-related quality of life characteristics

In developing countries there are limited studies that have evaluated VRQoL after cataract surgery.¹¹ This study reported on the impact of cataract surgery at the 6-week follow-up period and is therefore consistent with the follow-up periods observed in previous studies.^{11,37,39} A 6-week follow-up period is considered as adequate to allow visual recovery and rehabilitation to stabilise.^{37,39,40} Vision-related quality of life questionnaires aim to measure the impact of vision loss on an individual's daily life.³⁶ Many questionnaires have been developed to evaluate pre-surgery and post-surgery VRQoL in individuals with cataract. These questionnaires include the Activities of Daily Vision Scale (ADVS), 14-item Vision Function (VF-14), IND-VFQ-33 and Visual Disability Assessment (VDA).^{37,41} These VRQoL questionnaires are important as they consist of questions related to perceived difficulties in performing daily living activities.⁴² However, some of these questionnaires have certain limitations. For example, the VF-14 is developed for use in developed countries, whilst the ADVS focuses on questions related to vision symptoms only.⁴³ The IND-VFQ-33 was chosen for this study as it assesses the individuals' experience in terms of vision-related challenges for daily living activities. The IND-VFQ-33 was developed and validated in a population similar to that which was included in this study.⁴⁴ Furthermore, the

TABLE 3: Mean \pm standard deviation of vision-related quality of life responses (pre-surgery and post-surgery) for participants undergoing the extracapsular cataract extraction surgery and manual small-incision cataract surgery cataract surgery techniques using the 33-item Indian Vision Functioning Questionnaire.

Questions	Mean \pm SD					
	ECCE			MSICS		
	Pre-surgery (n = 50)	Post-surgery (n = 50)	p	Pre-surgery (n = 51)	Post-surgery (n = 51)	p
Domain: General functioning						
1. Because of your vision how much problem do you have in climbing stairs?	2.94 \pm 1.27	1.28 \pm 0.78	0.000	2.14 \pm 1.27	1.08 \pm 0.44	0.000
2. Because of your vision how much problem do you have in making out the bumps and holes in the road when walking?	3.02 \pm 1.45	1.20 \pm 0.61	0.000	2.04 \pm 1.34	1.06 \pm 0.42	0.000
3. Because of your vision how much problem do you have in seeing if there are animals or vehicles when walking?	2.68 \pm 1.60	1.14 \pm 0.53	0.000	1.88 \pm 1.28	1.04 \pm 0.28	0.000
4. Because of your vision how much problem do you have in finding your way in new places?	3.50 \pm 1.62	1.28 \pm 0.78	0.000	2.29 \pm 1.54	1.10 \pm 0.50	0.000
5. Because of your vision how much problem do you have in attending social functions such as weddings?	3.48 \pm 1.62	1.26 \pm 0.75	0.000	2.24 \pm 1.52	1.08 \pm 0.34	0.000
6. Because of your vision how much problem do you have in going out at night?	3.82 \pm 1.60	1.50 \pm 0.84	0.000	2.82 \pm 1.58	1.22 \pm 0.64	0.000
7. Because of your vision how much problem do you have in finding your way indoors?	2.46 \pm 1.34	1.10 \pm 0.46	0.000	1.61 \pm 1.04	1.04 \pm 0.20	0.000
8. Because of your vision how much problem do you have in seeing the steps of the bus when getting in or getting down?	2.66 \pm 1.35	1.18 \pm 0.63	0.000	1.86 \pm 1.22	1.04 \pm 0.20	0.000
9. Because of your vision how much problem do you have in recognising people from a distance?	3.92 \pm 1.38	1.42 \pm 0.86	0.000	2.90 \pm 1.46	1.14 \pm 0.53	0.000
10. Because of your vision how much problem do you have in recognising the face of a person standing near you?	2.74 \pm 1.70	1.16 \pm 0.68	0.000	1.67 \pm 1.19	1.00 \pm 0.00	0.000
11. Because of your vision how much problem do you have in locking or unlocking the door?	1.86 \pm 1.14	1.08 \pm 0.44	0.000	1.18 \pm 0.56	1.00 \pm 0.00	0.028
12. Because of your vision how much problem do you have in doing your usual work either in the house or outside?	2.92 \pm 1.48	1.14 \pm 0.53	0.000	1.96 \pm 1.17	1.06 \pm 0.42	0.000
13. Because of your vision how much problem do you have in doing your work up to the usual standard?	3.76 \pm 1.46	1.38 \pm 0.90	0.000	2.82 \pm 1.56	1.24 \pm 0.71	0.000
14. Because of your vision how much problem do you have in searching for things at home?	2.38 \pm 1.16	1.18 \pm 0.56	0.000	1.59 \pm 1.02	1.02 \pm 0.14	0.000
15. Because of your vision how much problem do you have in seeing outside in bright sunlight?	1.60 \pm 0.86	1.84 \pm 0.58	0.077	1.69 \pm 0.88	1.75 \pm 0.59	0.636
16. Because of your vision how much problem do you have in seeing when coming into the house after being in the sunlight?	1.64 \pm 0.92	1.40 \pm 0.49	0.116	1.76 \pm 0.91	1.29 \pm 0.46	0.001
17. Because of your vision how much problem do you have in seeing differences in colours?	2.76 \pm 1.68	1.08 \pm 0.34	0.000	1.63 \pm 1.26	1.00 \pm 0.00	0.001
18. Because of your vision how much problem do you have in making out differences in coins or notes?	1.92 \pm 1.21	1.10 \pm 0.46	0.000	1.16 \pm 0.58	1.00 \pm 0.00	0.059
19. Because of your vision how much problem do you have in going to the toilet?	2.00 \pm 1.23	1.08 \pm 0.44	0.000	1.35 \pm 0.80	1.00 \pm 0.00	0.003
20. Because of your vision how much problem do you have in seeing objects that may have fallen in the food?	2.48 \pm 1.71	1.12 \pm 0.59	0.000	1.55 \pm 1.14	1.00 \pm 0.00	0.001
21. Because of your vision how much problem do you have in seeing the level in the container when pouring?	2.90 \pm 1.58	1.20 \pm 0.67	0.000	1.84 \pm 1.21	1.00 \pm 0.00	0.000
Domain: Psychosocial impact						
22. Because of your eye problem do you feel frightened to go out at night?	3.64 \pm 0.66	1.52 \pm 0.86	0.000	3.14 \pm 0.92	1.27 \pm 0.60	0.000
23. Because of your eye problem do you enjoy social functions less?	3.44 \pm 1.33	1.34 \pm 0.85	0.000	2.67 \pm 1.37	1.06 \pm 0.42	0.000
24. Because of your eye problem do you feel ashamed that you can't see?	2.14 \pm 1.13	1.06 \pm 0.24	0.000	1.61 \pm 0.78	1.02 \pm 0.14	0.000
25. Because of your eye problem do you feel you have become a burden on others?	3.52 \pm 0.84	1.26 \pm 0.78	0.000	2.96 \pm 1.02	1.14 \pm 0.57	0.000
26. Because of your eye problem do you feel frightened that you may lose your remaining vision?	3.96 \pm 0.28	1.36 \pm 0.80	0.000	4.00 \pm 0.00	1.18 \pm 0.71	0.000
Domain: Vision symptoms						
27. Do you have reduced vision?	4.00 \pm 0.00	1.26 \pm 0.75	0.000	4.00 \pm 0.00	1.16 \pm 0.64	0.000
28. Are you dazzled in bright light?	1.68 \pm 1.02	1.14 \pm 0.40	0.001	1.92 \pm 1.02	1.12 \pm 0.48	0.000
29. Is your vision blurred in sunlight?	1.58 \pm 0.97	1.24 \pm 0.48	0.025	1.86 \pm 1.08	1.18 \pm 0.62	0.000
30. Does bright light hurt your eyes?	1.70 \pm 0.91	1.92 \pm 0.53	0.140	2.00 \pm 0.98	1.76 \pm 0.65	0.147
31. Do you close your eyes because of light from vehicles?	2.08 \pm 1.10	2.28 \pm 0.67	0.280	2.24 \pm 1.09	2.20 \pm 0.60	0.839
32. Does light seem like stars?	1.48 \pm 0.58	1.06 \pm 0.24	0.000	1.37 \pm 0.60	1.10 \pm 0.30	0.005
33. Do you have blurred vision?	3.98 \pm 0.14	1.22 \pm 0.65	0.000	3.96 \pm 0.20	1.16 \pm 0.64	0.000

ECCE, extracapsular cataract extraction; MSICS, manual small-incision cataract surgery; SD, standard deviation.

IND-VFQ-33 is recommended for use in developing countries as it shows high test-retest reliability and has been used previously to evaluate VRQoL in patients undergoing cataract surgery.^{29,33,37}

In this study, almost all participants who had undergone the cataract surgery showed an increase in the frequency of responses in the no difficulty option ('not at all') and the mean scores for the majority of questions in all three domains were lower post-surgery. This difference between the mean pre-surgery and post-surgery scores for most questions was statistically significant ($p < 0.05$). However, the difference between the mean scores for questions related

to problems experienced when seeing outside in bright sunlight, when coming into the house after being in sunlight, making out differences in coins and notes, and seeing light from vehicles and bright light failed to reach statistical significance. Despite this finding, the relative changes in mean scores for the different questions pre-surgery and post-surgery should be interpreted with caution as a change in one score may not be directly comparable to changes in another score in the questionnaire.³⁷ This observation of improved post-surgery scores (i.e. being lower) and significant differences for most of the study participants is similar to the findings observed in previous studies using different questionnaires.^{11,29,37,45,46,47,48}

Prior to cataract surgery, the majority of the study participants were unable to go out at night, recognise the face of a person from a distance and do their work to the usual standard. Furthermore, most of the participants felt that they had become a burden to other people and were afraid of losing their remaining vision. The majority of participants reported having reduced ($n = 101$) and/or blurred ($n = 98$) vision. These observations are in agreement with the results reported in previous studies, where the majority of study participants presented with reduced VRQoL pre-surgery.^{1,17,35} For example, Bandhu et al.¹⁷ reported that 70% of their study participants presented with reduced VRQoL pre-surgery. Similarly, Dimple et al.³⁵ reported that all their study participants presented with reduced and/or poor VRQoL pre-surgery. As observed in this study, the presence of cataract was associated with a decrease in the quality of life for the questions in all three domains, which corroborates the finding that vision impairment is associated with decreased VRQoL pre-surgery.^{17,49} Furthermore, the participants' responses to the questionnaire pre-surgery suggest that activities of daily living were mostly affected as has been reported in the study by Bandhu et al.¹⁷

As expected, following cataract surgery, several participants had difficulties with regard to problems experienced when seeing light from vehicles and bright light. This is not surprising as it is normal to have a strong reaction to the change in brightness and light sensitivity after cataract surgery.^{50,51} This increase in light sensitivity is possibly because everything seems brighter to these individuals as the light that enters the eye is no longer filtered by the cataract.^{50,51} Furthermore, individuals who have undergone cataract surgery may see better in dim lighting and appear more sensitive to bright light that was better tolerated before undergoing surgery.⁵¹

Post-surgery, the majority of study participants were able to go out at night, recognise the face of a person from a distance and do their work to the usual standard. More than 90% of participants did not feel that they had become a burden to other people and 87 participants were not scared to lose their remaining vision, with the majority reporting improved and/or clear vision. This observation is in agreement with the results reported in previous studies, where the majority of study participants presented with improved VRQoL in most of the questions in all domains post-surgery.^{1,11,17,45,47,48} For example, Abdullahi et al.¹ reported that a few participants in their study were likely to have feelings of being a burden to others after cataract surgery. As expected, the VRQoL of participants who had undergone the two cataract surgery techniques at Themba Hospital was improved and/or better post-surgery as cataract surgery may lead to an improvement in VRQoL.⁵² As observed in this study, cataract surgery resulted in an increase in the ability of individuals to become independent, which was also reported in previous studies.^{11,48} This is not surprising as the purpose of cataract surgery is to improve and restore an individual's general, psychosocial and visual functioning.^{25,29,30} In addition, it was suggested

that the observation of better outcomes may be because of improvement in VA as decrease in VRQoL may be associated with visual impairment owing to reduced and/or poor VRQoL after cataract surgery.¹ Other studies in Indian, Nigerian and Mexican-American populations have also validated the claim of the impact of visual impairment on VRQoL.^{1,53,54}

Strengths and limitations

The strengths of this study include the use of a post-surgery 6-week follow-up period, which is in agreement with other studies, and standardised measurement protocols during the follow-up visits. A relevant and validated questionnaire was used to assess the VRQoL, and this questionnaire was originally designed for patients with cataract.⁴² The questions in the questionnaire were read out in English and the local language (Siswati) of the participants to minimise any errors because of misunderstanding. Possible limitations of the study include a sample consisting of mainly black ($n = 100$) participants, a relatively small sample size and a lack of non-operated control group, which make it difficult to generalise the results.

Conclusion

Cataract surgery techniques are performed to restore VF and may result in allowing previously visually impaired individuals to better perform their daily living activities. The improvement in VF may indirectly allow these individuals to improve their economic productivity and contribute to household income.^{22,24,29} Studies have reported that cataract surgery improves VF and VRQoL.^{17,44,52,55} For this reason, cataract surgery should be made available for affected individuals, particularly in developing countries.^{17,55} The results of this study show that individuals undergoing the ECCE and MSICS techniques showed improvement in VRQoL post-surgery. Consequently, there is a need for more targeted public health policy and patient care management for individuals affected with cataract.^{43,56} To this end, cataract surgery is effective and individuals affected with cataract are encouraged to have surgery as this will improve their daily living functional independence and overall VRQoL in terms of general, psychosocial and visual functioning.

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Competing interests

The authors declare that there is no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

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Data availability statement

Data sharing is not applicable to this article.

Disclaimer

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