

Content Validity and Cognitive Debriefing of a Patient-Reported Outcome Instrument Evaluating Symptoms and Disease Impact in Patients with Geographic Atrophy

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Supplementary Information

Table S1. Summary of items in the VISSA-10 instrument and mapping to the GA secondary to dry AMD conceptual disease model

Item number	Topic addressed by item	Salient symptom(s) mapped to item
1	Extent of blurred vision	Blurred vision
2	Negative impact of blurred vision	Blurred vision
3	Low-light vision	Poor light adaptation
4	Depth perception	Did not map to specific salient symptom
5	Vision distortion	Did not map to specific salient symptom
6	Color contrast	Poor contrast vision
7	Bright light adaptation	Sensitivity to brighter light Poor light adaptation
8	Dark adaptation	Poor light adaptation
9	Blind spots	Progressive visual loss Restricted visual fields
10	Color perception	Defective color vision

AMD age-related macular degeneration, GA Geographic atrophy, VISSA-10 10-item Visual Impairment Symptom Severity Assessment (VISSA-10)

Table S2. Summary of symptoms reported by patients with GA secondary to dry AMD

Concept	Mentions (N=19)		Total mentions (%)	Average disturbance rating, (0–10)
	Spontaneous	Probed		
Poor light adaptation	11	7	18 (95)	6.6
Blurred vision	15	2	17 (89)	6.9
Defective color vision	9	6	15 (79)	6.5
Sensitivity to brighter light	2	13	15 (79)	7.5
Progressive visual loss	3	10	13 (68)	7.5
Restricted visual fields	3	10	13 (68)	7.3
Poor contrast vision	3	8	11 (58)	6.0
Light flashes	4	4	8 (42)	6.7
Night blindness	0	6	6 (31)	9.0
Fatigue ^a	2	4	6 (32)	8.8
Ocular pain	1	4	5 (26)	6.2
Sensitivity to reduced light	1	3	4 (21)	6.7
Black spots	3	0	3 (16)	4.5
Dry eyes	3	0	3 (16)	8.0
Line distortion ^b	3	0	3 (16)	10.0 (1 ^c)
Sleep disturbance	0	1	1 (5)	8.0
Items wavering or moving ^c	1	0	1 (5)	N/A

Eye irritation ^c	1	0	1 (5)	N/A
Sensation of an object moving past ^c	1	0	1 (5)	N/A
Loss of central focus ^c	1	0	1 (5)	N/A
Need to move eyes around to see ^c	1	0	1 (5)	N/A
Print becoming lighter ^c	1	0	1 (5)	N/A
Difficulty seeing at distance ^c	1	0	1 (5)	N/A
Seeing something in 3D that is only 2D ^c	1	0	1 (5)	N/A
Eye strain ^c	1	0	1 (5)	N/A

2D two dimensions, 3D three dimensions, AMD age-related macular degeneration, GA geographic atrophy, N/A not applicable

^aFatigue reported by patients as general fatigue not specific to eyesight

^bOnly one patient provided a disturbance rating

^cSymptom not included in the dry age-related macular degeneration population conceptual disease model [17]

Bold font indicates salient symptoms (mentioned by ≥50% of patients and average disturbance rating ≥5). Average disturbance ratings are means calculated based on the number of patients who provided a rating

Table S3. Summary of impacts reported by patients with GA secondary to dry AMD

Concept	Mentions (N=19)		Total mentions (%)	Average disturbance rating (0–10)
	Spontaneous	Probed		
Difficulty reading	17	1	18 (95)	8.1
Difficulty driving	17	1	18 (95)	8.6
Frustration	5	13	18 (95)	6.9
Need to wear glasses	7	11	18 (95)	5.7
Worry about disease and future	8	10	18 (95)	8.0
Dependency on others	11	6	17 (89)	7.6
Trouble with electronic screens	7	9	16 (84)	7.0
Stress and anxiety	6	7	13 (68)	7.1
Limited social and leisure activities	7	6	13 (68)	7.6
Lack of confidence	0	11	11 (58)	6.6
Depression	3	7	10 (53)	6.4
Inability to engage in physical activities	4	5	9 (47)	6.0
Difficulty at work, unemployment	4	4	8 (42)	7.2
Poor spatial perception and mobility	0	8	8 (42)	5.5
Embarrassment	0	8	8 (42)	6.1
Fear ^a	8	0	8 (42)	9.0
Lack of independence ^a	7	0	7 (37)	7.5

Difficulty with visual cues and gestures	0	7	7 (37)	6.0
Impact on school, learning activities	2	4	6 (32)	6.8
Difficulty completing activities of daily living	1	4	5 (26)	4.8
Dissatisfaction with doctor	0	4	4 (21)	5.0
Financial difficulties	0	4	4 (21)	6.5
Shame	0	2	2 (1)	8.0
Lack of private life ^a	1	0	1 (5)	N/A
Staying home	1	0	1 (5)	N/A
Needing to double-check everything ^a	1	0	1 (5)	N/A
Losing items around the house ^a	1	0	1 (5)	N/A
Sadness ^a	1	0	1 (5)	N/A
Worry about taking the wrong medications ^a	1	0	1 (5)	N/A
Inability to write in a straight line ^a	1	0	1 (5)	N/A
Inability to continue with visual hobbies like photography ^a	1	0	1 (5)	N/A
Inability to recognize friends' faces ^a	1	0	1 (5)	N/A
Inability to recognize family's faces ^a	1	0	1 (5)	N/A
Inability to recognize own face ^a	1	0	1 (5)	N/A
Concern about cutting themselves when preparing food ^a	1	0	1 (5)	N/A
Family having to learn to leave things in specific places ^a	1	0	1 (5)	N/A

AMD age-related macular degeneration, GA geographic atrophy, N/A not applicable

^aImpact not included in the dry age-related macular degeneration population conceptual disease model [17]

Bold font indicates salient impacts (mentioned by ≥50% of patients and average disturbance rating ≥5). Average disturbance ratings are means calculated based on the number of patients who provided a rating

Table S4. Qualitative descriptions of salient concepts mentioned by patients with GA secondary to dry AMD

	Concept	Patient number	Qualitative description
Symptom	Poor light adaptation	1	<i>“Now, actually, it takes me a while to adjust to the bright light and probably like 5 or 10 minutes I would have to sit down and relax and slowly adapt to the environment.”</i>
	Blurred vision	2	<i>“I was having really bad, blurry vision in my right eye and really badly blurry. I thought there was something wrong, so I went to a doctor, and he referred me to a specialist.”</i>
	Defective color vision	3	<i>“I couldn’t really discriminate between purple and black or brown and black. So I was having an issue with certain colors.”</i>
	Sensitivity to brighter light	4	<i>“Even infrared light in stores, it’d just be so bright, so painful. I just had to learn how to take care of all of that.”</i>
	Progressive visual loss	5	<i>“For about a week, my vision was stable. That was a pretty good week because I was able... What happens is when your vision takes a drop, you have to adjust. Now I can’t do this, and I have to find a way to do that. Okay, you make peace with it. Then when the vision drops again... There’s a constant adjusting and getting used to.”</i>
	Restricted visual fields	6	<i>“If I were looking at your face, I couldn’t see your face. It’s a grey blur and the outlines of your face. My peripheral vision would take in the top, the bottom, the sides of your face. To see your face I would have to look over you and then use my peripheral vision, the bottom part.”</i>
	Poor contrast vision	7	<i>“There was a card and she had me reading the letters on it, and all of a sudden about midway down the card I thought that the letters stopped. I commented to my husband later that I thought that was an odd way that it didn’t go all the way down to the bottom, but it</i>

did. The contrast just got...it lessened and lessened, and I got to the point where it wasn't great enough for me to distinguish."

Impact	Difficulty reading	3	<i>"I'm having more and more problems reading fine print."</i>
	Difficulty driving	8	<i>"Driving, I don't do that any longer. I just can't. I'm afraid of what might happen."</i>
	Frustration	9	<i>"I think frustration. Just, I want there...the doctor to be capable to give me a prescription or to do surgery or to make this go away, not get worse."</i>
	Need to wear glasses	7	<i>"I have a pair of prescription glasses that I wear. I just recently got those. It does nothing to help me with what I would say is the reading or the faces. My prescription glasses only allow things in the distance to be a little bit clearer."</i>
	Worry about disease and future	10	<i>"I worry about it becoming worse and potentially either damaging the left eye, going blind, or having some of those other symptoms that you mentioned. For me, that's a big concern, so I do worry about that."</i>
	Dependency on others	11	<i>"You know, I always have my husband with me, a chaperone, so he's my eyes too now."</i>
	Trouble with electronic screens	5	<i>"I've had a laptop for many years and just this weekend I got a 27-inch monitor, with the hopes that I could see my computer much better. My Mac tech guy came over, set it up. And there was about a 15% improvement. Not much. He used all the accessibility tools that Apple provides and made everything big. So that was disappointing."</i>
	Stress and anxiety	10	<i>"The stress is only if I felt that I needed to do something I wasn't able to do, like go out to the store and pick up some milk in the evening and then a little stress for me. It's a matter of anxiety..."</i>

Limited social and leisure activities	12	<i>"Slow down or a lot of times I don't do activities that I used to enjoy anymore because of the AMD. Like driving, I try not to do it unless it's extremely necessary. Sitting behind a computer. Exercising outside on my own, things like that."</i>
Lack of confidence	13	<i>"Well, if I'm trying to read something, definitely, and I can't. There is a lack of confidence where I'll be like, 'What does that say?'"</i>
Depression	14	<i>"A bad day is I'm more depressed, I'm not so energetic, I'm having a harder time coping with my, I guess, vision. My day is a little bit more complicated, and things become more stressful, I become more depressed. I think that my worst days are like that."</i>

AMD age-related macular degeneration, GA geographic atrophy

Table S5. Saturation of concepts mentioned by patients with GA secondary to dry AMD: i) Saturation of symptoms, ii) Saturation of impacts

i) Saturation of symptoms

Concept	Data analysis wave		
	Wave 1 (n=5)	Wave 2 (n=5)	Wave 3 (n=5)
Night blindness	x		
Restricted visual fields	x		
Blurred vision	x		
Poor light adaptation	x		
Progressive visual loss	x		
Defective color vision	x		
Poor contrast vision	x		
Sleep disturbance			x
Fatigue		x	
Ocular pain	x		
Sensitivity to brighter light	x		
Sensitivity to reduced light	x		
Black spots	x		
Dry eyes	x		
Items wavering or moving	x		
Eye irritation	x		
Sensation of an object moving past	x		
Loss of central focus		x	
Need to move eyes around to see		x	
Print becoming lighter		x	
Difficulty seeing at distance		x	
Seeing something in 3D that is only 2D			x
Eye strain			

2D two dimensions, *3D* three dimensions, *AMD* age-related macular degeneration, *GA* geographic atrophy

“x” indicates first wave when concept is mentioned

Saturation of concept was defined as the point at which additional patient interviews did not contribute unique concepts or new information

ii) Saturation of impacts

Concept	Wave 1 (n=5)	Wave 2 (n=5)
Poor spatial perception and mobility	X	
Difficulty completing activities of daily living	X	
Difficulty reading	X	
Difficulty driving	X	
Dependency on others	X	
Stress and anxiety	X	
Inability to engage in physical activity	X	
Difficulty with visual cues and gestures	X	
Embarrassment	X	
Frustration	X	
Lack of confidence	X	
Dissatisfaction with doctor	X	
Need to wear glasses	X	
Worry about disease and future	X	
Shame	X	
Limited social and leisure activities	X	
Depression	X	
Difficulty at work, unemployment	X	
Impact on school, learning challenges	X	
Financial difficulties	X	
Lack of independence	X	
Fear	X	
Generalized emotional impact	X	
Trouble with electronic screens	X	
Lack of private life		X
Staying home		X
Needing to double-check everything		X
Losing items around the house		
Sadness	X	
Concern about taking the wrong medications		
Inability to write in a straight line		
Inability to continue with visual hobbies like photography		

Inability to recognize friends' faces

Inability to recognize family's faces

Inability to recognize own face

x

Concern about cutting themselves when preparing food

Family having to learn to leave things in specific places

AMD age-related macular degeneration, *GA* geographic atrophy

'x' indicates first wave when concept is mentioned

Saturation of concept was defined as the point at which additional patient interviews did not contribute unique concepts or new information