



City Research Online

## City, University of London Institutional Repository

---

**Citation:** Hutchins, B. & Huntjens, B. (2020). Patients' attitudes and beliefs to presbyopia and its correction. *Journal of Optometry*, 14(2), pp. 127-132. doi: 10.1016/j.optom.2020.02.001

This is the published version of the paper.

This version of the publication may differ from the final published version.

---

**Permanent repository link:** <https://openaccess.city.ac.uk/id/eprint/23988/>

**Link to published version:** <https://doi.org/10.1016/j.optom.2020.02.001>

**Copyright:** City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

**Reuse:** Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

---

---

---

City Research Online:

<http://openaccess.city.ac.uk/>

[publications@city.ac.uk](mailto:publications@city.ac.uk)

---



# Journal of Optometry

[www.journalofoptometry.org](http://www.journalofoptometry.org)



## ORIGINAL ARTICLE

# Patients' attitudes and beliefs to presbyopia and its correction

Brooke Hutchins, Byki Huntjens\*

Centre for Applied Vision Research, City, University of London, London, UK

Received 2 December 2019; accepted 24 February 2020

### KEYWORDS

Presbyopia;  
Attitudes;  
Beliefs;  
Contact lenses;  
Near vision;  
Patient education

### Abstract

**Objective:** Presbyopia is the gradual inability to focus near objects with age. This study explores patients' attitudes and beliefs towards presbyopia including preferred modes of near refractive correction.

**Methods:** In the United Kingdom, twenty-four volunteers completed an online questionnaire and attended a structured, recorded focus group. Participants' age ranged between 36 and 48 years, representing a pre-presbyopic and a presbyopic population. Attitudes and beliefs about presbyopia, its significance, and opinions about current refractive correction including multifocal contact lenses were transcribed and coded using content analysis for overarching themes and patterns.

**Results:** Six participants (25%) were already wearing a near visual correction while 18 (75%) were not. Five key primary themes with clear inter-participant similarities were identified as 'age-related' (75%), 'acceptance' (50%), clear lack of 'familiarity with the word presbyopia' (65%), a mixed/reluctant attitude 'towards (multifocal) contact lenses' (62.5%), and 'comfort and convenience' of a presbyopic correction (79%) whereby cost is of less importance.

**Conclusion:** The need for a reading correction was perceived as a sign of age. Spectacles were the most preferred mode of near vision correction, while comfort and convenience were seen as more important than cost. Patient education about presbyopia is lacking. Multifocal contact lenses are not necessarily the preferred visual correction even if the patient already wears contact lenses for distance.

© 2020 Spanish General Council of Optometry. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

\* Corresponding author at: Division of Optometry and Visual Sciences, City, University of London, Northampton Square, London EC1V 0HB, UK.

E-mail address: [Byki.Huntjens.1@city.ac.uk](mailto:Byki.Huntjens.1@city.ac.uk) (B. Huntjens).

<https://doi.org/10.1016/j.optom.2020.02.001>

1888-4296/© 2020 Spanish General Council of Optometry. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: Hutchins B, Huntjens B. Patients' attitudes and beliefs to presbyopia and its correction. *J Optom.* (2020), <https://doi.org/10.1016/j.optom.2020.02.001>

## PALABRAS CLAVE

Presbicia;  
Actitudes;  
Creencias;  
Lentes de contacto;  
Visión de cerca;  
Educación del  
paciente

## Actitudes y creencias de los pacientes acerca de la presbicia y su corrección

### Resumen

**Objetivo:** La presbicia es la incapacidad gradual de enfocar los objetos cercanos con la edad. Este estudio explora las actitudes y creencias de los pacientes acerca de la presbicia, incluyendo los modos preferidos de corrección refractiva de la visión de cerca.

**Métodos:** En el Reino Unido, veinticuatro voluntarios completaron un cuestionario online y asistieron a un grupo de discusión estructurado y grabado. La edad de los participantes osciló entre 36 y 48 años, lo cual representa a una población pre-presbicia y con presbicia. Se transcribieron y codificaron las actitudes y creencias acerca de la presbicia, su significado, así como opiniones sobre la corrección refractiva actual incluyendo lentes de contacto multifocales, utilizando un análisis de contenido para temas y patrones fundamentales.

**Resultados:** Seis participantes (25%) ya utilizaban corrección visual de cerca y 18 (75%) no. Se identificaron cinco temas primarios principales con similitudes claras entre los participantes: 'relacionado con la edad' (75%), 'aceptación' (50%), clara falta de 'familiaridad con la palabra presbicia' (65%), actitud mixta/reticente 'hacia las lentillas (multifocales)' (62,5%), y 'comodidad y conveniencia' de una corrección de la presbicia (79%), en la cual el coste tiene una importancia menor.

**Conclusión:** La necesidad de corrección lectora fue percibida como un signo de la edad. Las gafas fueron el modo mayormente preferido de corrección de la visión de cerca, mientras que la comodidad y la conveniencia fueron percibidas como más importantes que el coste.

© 2020 Spanish General Council of Optometry. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Presbyopia is defined as the gradual inability to focus near objects on the retina due to insufficient accommodative ability following increasing age and the loss of elasticity in the crystalline lens.<sup>1-3</sup> A variety of factors are involved including hardening of the lens, changes in the elasticity of the lens capsule, lens dimension, geometry of zonular attachments and ciliary muscle contraction. However, it is still unknown how much each factor is responsible for this loss of accommodative ability.<sup>4</sup> In 2015, the number of people with presbyopia was estimated to be 1.8 billion (prevalence 25%, 95% confidence interval 23 %-27%) worldwide.<sup>5</sup> Due to the growing ageing population, most of our population will spend roughly half their lives as presbyopes.<sup>3</sup> The onset of presbyopia is therefore a common finding for eye care practitioners (ECPs), which is generally considered to take place somewhere between 38-45 years of age<sup>6</sup> depending on factors such as a patient's distance refractive error and amount of near work, while trauma, systemic disease, and drug side effects are other common modifiable risk factors for premature presbyopia.<sup>7</sup>

There are currently a number of corrective mechanisms for presbyopia, including spectacles (multifocal, bifocal), single vision contact lenses (CLs) alongside reading glasses, monovision contact lenses (one eye corrected optimally for distance and the other for near tasks), as well as multifocal and bifocal CLs.<sup>8</sup> Studies have explored the effectiveness and visual benefits of these different modalities of correction for presbyopic patients.<sup>3,9</sup> However, there are currently no up-to-date population-based studies investigating the use of multifocal contact lenses, a corrective mechanism that is associated with high dropout rates compared with other

types of contact lenses, often due to an imbalance between distance and near vision.<sup>10</sup>

A survey amongst ECPs found that 50% would only recommended CLs very occasionally to their presbyopic patients.<sup>11</sup> In addition, McDonnell et al. showed that presbyopia is associated with negative effects on vision targeted health related quality of life.<sup>12</sup> Those 45 years of age or older (classified as presbyopes) reported significantly reduced clarity of vision, symptoms, dependence on correction, and satisfaction with their correction when compared to younger participants (non-presbyopes), after adjustment for sex, race, and socio-economic status.

This exploratory, cross-sectional study aimed to investigate pre-presbyopic and presbyopic patients' attitudes and opinions on presbyopia and the methods in which it can be visually corrected, with a particular focus on (multifocal) contact lenses. Patients' current knowledge on the process of presbyopia itself was explored, including their current and preferred future methods of refractive correction (single vision or varifocal spectacles, laser surgery, contact lenses including multifocal and monovision, or a combination), establishing the factors which influence these preferences.

## Methods

Participants were recruited between September 2018 and February 2019 from the School of Health at City, University of London and Moorfields Eye Hospital, London. The participants represented a variety of backgrounds in healthcare, academia, and engineering, and these were a combination of managerial, professional, as well as support staff. Inclu-

sion criteria for the study were adults aged between 36–48 years. There were no exclusion criteria other than age, clinical optometric or ophthalmic background, and willingness to verbally share ideas and opinions in a focus group. This study received approval from the Optometry Research & Ethics Review panel at City, University of London (United Kingdom). Prior to completing the study, all volunteers provided written informed consent conforming to the tenets of the Declaration of Helsinki.

### Data collection

Participants completed an online pre-questionnaire relating to their current distance and near visual correction, wearing time, and whether they had considered alternative near corrective options. This was followed with a focus group, which included 3–7 participants and lasting approximately 30–45 min. Each session was recorded for transcription and analyses purposes while preserving confidentiality and anonymity. Topic guides were provided to each volunteer prior to the session. The participants within each group were mixed in terms of their current visual corrections and visual needs, e.g. some wore a correction while some did not, and both presbyopes and pre-presbyopes were represented at each focus group. The format of the focus groups was centred around the questions on the topic guides which each individual participant was encouraged to answer/ discuss until opinions on all of the questions were gained. This often led to further discussions of interest. The focus groups were repeated until saturation was reached whereby no new themes were arising or expected to arise in any further subsequent discussions.

### Analysis

All the focus group discussions were transcribed manually after the sessions; this provided the basis for coding and analysis of the transcripts and establishing themes between the groups that were similar, recurring, or any new or unexpected themes (qualitative analysis). Attitudes and beliefs were subcategorised in 'primary themes' based on their similarities, which were used to determine the overarching ideas and attitudes within the discussions. Quantitative analysis included the percentages of participants who identified with these themes.

### Results

Demographic and responses to the electronic pre-questionnaire are summarized in Table 1. A total of 24 participants (19 females, 5 males), age range between 36 and 48 years, were divided in two groups: group A *pre-presbyopes* without near correction ( $n = 18$ ) and group B *presbyopes* with a near correction ( $n = 6$ ).

#### Primary themes following the focus groups

##### Lack of familiarity with the word 'presbyopia'

There was a clear lack of familiarity with the word presbyopia. This was in reference to either not having heard of

the word at all, or having heard it but being unaware of what it meant. In total, 83% ( $n = 20$ ) of all participants did not have a professional background in eye care and out of these individuals, 65% were not familiar with the term presbyopia and/or not aware what it means. A small number of participants ( $n = 2$ ) however, either knew or could predict the meaning of the word due to its etymology and resemblance to other words. Several non-eye care professionals who held a greater understanding of biological sciences and optics (10% of participants) mentioned key phrases such as '*loss of elasticity*'.

##### Presbyopia is age-related

The majority of comments strongly suggested that presbyopia is perceived as age-related and aspects related to presbyopic correction, such as reading glasses, are a sign of age. Seventy-five percent of all participants mentioned terms relating to and including '*getting older*' and a '*decline*' with '*age*' or '*elasticity*'. With regards to the age that participants assumed presbyopia to occur, the general consensus was '*between 40–45 years*' or '*mid 40s*'. Without prompting, 29% ( $n = 7$ ) of participants stated this age or age range when they spoke about their prior knowledge on presbyopia or when any information about presbyopia should be mentioned to the patient by an ECP.

##### Expectation and acceptance of presbyopia

There seemed to be a general consensus (mentioned in some form by 50% of all participants) that the onset of presbyopia is expected or there is an acceptance that it will occur or is occurring. Among those who did not wear a reading correction at the time of the focus group, there seemed to be more of a reluctant outlook on this prospect (44%), with one participant even referring to '*dreading*' it. There were a variety of other levels of severity in which this sense of reluctance was expressed by participants, including being '*worried*' about handling more than one type of visual correction and the impending realisation that '*it's my time [to deal with presbyopia]*'.

##### Contact lens correction including multifocal contact lenses

There was a notable negative stance towards contact lenses for the correction of distance and near vision from both presbyopic and pre-presbyopic participants who were not contact lens wearers for distance vision ( $n = 17$ ; 71% of all participants). However, the majority of pre-presbyopes (those not wearing a near correction) who were wearing contact lenses for distance (29% of pre-presbyopes,  $n = 7$ ) seemed more open to the idea of contact lens correction when discussing their (future) near prescription. Interestingly, of these 7 participants, 2 (28%) shared relatively negative comments about multifocal contact lenses, which were related to a) the feeling of '*being lazy*' which increased with age (and therefore preferring spectacles instead), or b) contact lens wear being '*awkward, moderately [uncomfortable], in general a bit of a disappointing experience that I would avoid if I had other options*'.

None of the 6 participants requiring a near correction (26%) were currently multifocal contact lens wearers. Two main reasons were noted, these being 1) previous unsuccessful

**Table 1 Demographics and online pre-questionnaire results.** Parameters are shown in total amount of participants (percentage within the group) and mean  $\pm$  standard deviation (SD) for age. *Abbreviations:* SD standard deviation; Rx refractive prescription.

	All participants	Pre-presbyopes (without near correction)	Presbyopes (with near correction)
Participants n (%)	24 (100%)	18 (74%)	6 (26%)
Age (mean $\pm$ SD)	41.5 $\pm$ 3.8	41.2 $\pm$ 3.8	42.5 $\pm$ 4.0
Gender			
Male	5 (22%)	4 (24%)	1 (17%)
Female	19 (78%)	14 (76%)	5 (83%)
Correction(s) worn for distance? (Multiple answers possible)			
Single vision spectacles	8 (33%)	8 (44%)	0 (0%)
Varifocal spectacles	1 (4%)	0 (0%)	1 (17%)
Contact lenses	7 (29%)	7 (39%)	0 (0%)
Laser surgery	1 (4%)	1 (6%)	0 (0%)
None	13 (54%)	8 (44%)	5 (83%)
Length of time using a distance correction? (Only based on those wearing distance Rx)			
<1 years	1 (10%)	1 (10%)	0 (0%)
1–3 years	0 (0%)	0 (0%)	0 (0%)
3–5 years	0 (0%)	0 (0%)	0 (0%)
>5 years	10 (90%)	9 (90%)	1 (100%)
Length of time using a reading correction (if worn)? (Presbyopes only)			
<1 year	0 (0%)		0 (0%)
1–3 years	2 (33.3%)		2 (33.3%)
3–5 years	2 (33.3%)		2 (33.3%)
>5 years	2 (33.3%)		2 (33.3%)
Did your optometrist ever recommended a correction for reading/ near?			
Yes	9 (37%)	3 (17%)	6 (100%)
No	15 (63%)	15 (83%)	0 (0%)
Option/s participants would consider if near visual correction became necessary? (Pre-presbyopes only)			
Spectacles (reading only)	10 (56%)	10 (56%)	
Spectacles (varifocal)	9 (50%)	9 (50%)	
Spectacles (bifocal)	4 (22%)	4 (22%)	
Contact lenses (distance) and spectacles for reading	6 (33.3%)	6 (33.3%)	
Contact lenses (monovision)	1 (6%)	1 (6%)	
Contact lenses (multifocal)	6 (33.3%)	6 (33.3%)	
Laser surgery	4 (22%)	4 (22%)	
Has optometrist ever discussed/ recommended multifocal contact lenses?			
Yes	1 (4%)	0 (0%)	1 (17%)
No	23 (96%)	18 (100%)	5 (83%)

ful multifocal lens wear including a poor visual experience, and 2) never heard of the existence of these type of contact lenses. In comparison, the remainder of the current contact lens wearers were generally enthusiastic about the idea of contact lens wear for presbyopia including multifocal contact lenses and monovision. However, they had not received any information about these options by their ECP.

#### Comfort and convenience more important than cost

Of all participants, 79% (n = 19) indicated that cost, comfort and convenience factors, as well as vision were the most important when considering corrective options for near. Although financial consideration was an issue that was mentioned by just under half (46%) of all the participants in some form, the general attitude also indicated a preference towards comfort, convenience and standard of vision over cost of the correction. Cosmetic factors were only men-

tioned in relation to the use of bifocal spectacles. Without prompting, a total of 4 participants commented on this type of spectacles in a negative sense, with one individual referring to her grandmother's '*big glasses with the squares*', stating that she thought '*is what it's going to be like as I get older*'. Unexpectedly, none of the participants commented on reluctance to wear single distance or reading/varifocal spectacles due to poor cosmetics or other aspects relating to appearance.

#### Information for patients

A final prominent theme that was mentioned regularly throughout the discussions was the issue of where the information on presbyopia should originate from; the overall consensus was that the optometrist or other eye care practitioner are the professionals who should provide this information to their patients. However, there was also a

belief that there is scope for the general practitioner (GP) to play a role, possibly as part of the NHS Health Check for adults in England aged 40–74 ([www.nhs.uk/conditions/nhs-healthcheck/](http://www.nhs.uk/conditions/nhs-healthcheck/)).

## Discussion

This study describes the attitudes and beliefs towards presbyopia, and the forms in which this can be corrected with a secondary focus on contact lenses. Unique to this study was the use of focus groups instead of questionnaires only in a demographic that mainly consisted of pre-presbyopes. Generally, participants were aware of presbyopia as a '*natural ageing process*'; however, the term '*presbyopia*' itself was not considered common knowledge. It may be somewhat surprising that the majority of participants were not aware of the term presbyopia or what it meant, despite the epidemiology of presbyopia being 100%.<sup>13</sup> Our results are similar to previous work which indicated that there is a general lack of awareness of the topic, which is thought to be one of the main reasons for a 34% prevalence of unmanaged presbyopia even in developed countries.<sup>9</sup>

Any ECP (optometrist or other) is advised to focus on providing patients with sufficient information about presbyopia and to communicate all the available corrective options and their benefits. The principle belief throughout the group discussions was that information about presbyopia and its corrective means should come from an eye-care practitioner rather than a GP practice. Although most participants in our study shared this belief in discussion, some mentioned potential alternatives including the NHS or GP. Instead of waiting for the ECP to introduce the topic of presbyopia once patients notice changes to their near vision, it was suggested to include this possibly as part of the NHS Health Check for adults in England aged 40–74. The current research on this health initiative indicates much of the focus is on the reduction of cardiovascular morbidity<sup>14</sup>; however, with nearly all of adults displaying presbyopic symptoms from 40 years onwards and it being the most common physiologic ocular change after the age of 40<sup>15</sup>, it appears logical to have this mentioned as a prompt for check-up. In terms of when the topic of presbyopia and/or correction should be introduced, several patients mentioned they would like to be informed about presbyopia an adequate length of time prior to the associated changes in vision, with a '*forewarning 5 or 10 years before it's likely to happen*,' and '*a vague idea that you're expecting your vision to get worse and therefore you're going to need a check-up every now and again*'. In addition, Fylan and Grunfeld<sup>16</sup> reported that 70% of participants within their study wished for their ECP to inform them more about their eyesight in general, as well as difficulties with their vision.

Interestingly, a survey of nearly 800 presbyopic patients found that only 9 percent of current contact lens wearers reported being told about multifocal contact lenses when they complained to their practitioners about initial near vision problems.<sup>17</sup> Surprisingly, nearly 50% of 398 ECPs report that they would present the options for multifocal CLs to their patients, although often they do so to selected groups only.<sup>18</sup> Here, mentioning presbyopia early must be considered as well: avoid communicating this change in

focussing ability when reading or close work becomes a problem for the emerging presbyopic patient, but consider sharing this information prior to the onset of presbyopia to encourage awareness. As recognised by Charman,<sup>3</sup> the multifocal contact lens market has seen only limited success when compared to contact lenses for distance vision, and these lens types are still 'preferred only by a minority of older patients, most of whom are early presbyopes'. It has been suggested that any new CL wearer with either emmetropia or low amounts of refractive error (also known as ametropia) for distance, and those unwilling to accept a visual compromise, would have a low probability for successful presbyopic contact lens wear.<sup>8</sup> This perhaps highlights an area of focus for ECPs: manage patients' expectations without being too cautious as well as emphasise the freedom of contact lenses over spectacles. The focus for primary eye care professionals seems to indicate that emphasis should be placed on provision of information about alternative means of correction to early and pre-presbyopes. It must be noted that lack of patient education is not the only reason for the smaller multifocal contact lens market; it has been recognised that dropping out of contact lens wear with age can be attributed to a lack of available suitable higher near prescriptions, as well as an increase in dry-eye related problems,<sup>19,20</sup> and the possibility that overall cosmetic concern reduces with age.<sup>21</sup>

Cost, convenience, and comfort were highlighted as a primary theme by all our participants. It has been noted that discomfort in contact lens wear is a major reason for subsequent discontinuation, alongside dryness, vision and handling,<sup>22</sup> with vision-related problems reported as the main issue for presbyopic wearers in particular.<sup>10</sup> To participants already wearing a habitual distance prescription, convenience and comfort were considered more important than the relative cost of (multifocal) contact lenses. It has been reported that although ECPs perceive cost as the number one aspect in the patient's choice of presbyopic correction, patients themselves do not always see it that way.<sup>16</sup> Similarly, cost was not seen as a barrier by our participants, nor previously reported to impact discontinuation of contact lens wear in (pre-) presbyopes.<sup>23,24</sup> Although expense has been shown to affect contact lens discontinuation,<sup>22</sup> this was mainly reported by younger contact lens wearers.

## Limitations

Participants' recall of receiving information about presbyopia may have affected the accuracy of our results, although efforts were made to reduce the recall period by only including those within the pre- and early presbyopic age range (36–48 years). In addition, the use of focus groups stimulated memories and thoughts through group dynamics, providing an opportunity to reduce recall bias and debate ideas and attitudes prompted either by the facilitator or other members of the focus group.<sup>25</sup> This was considered advantageous over self-administered surveys and/ or interviews.

The small sample size with limited demographic representation was also considered a limitation. Although focus groups are expected to be more accurate compared to individual questionnaires or interviews, they are very time-

consuming and expensive to run. The methodology described by Guest et al.<sup>26</sup> was adopted to identify the full range of primary themes around presbyopia and its preferred visual correction. No new themes were identified during the fourth focus group, which led to a sample of 24 participants. This sample included a wide range of professional backgrounds and choice of visual corrections, as well as a representation of genders, ethnicities, pre- and early presbyopes, and distance refractive errors, albeit too small for sub-analysis. For example, due to its relatively small sample size, this study was not able to conduct a comparison between sexes on the subject of presbyopic correction. Although it is believed that the attitude towards multifocal contact lenses could be similar,<sup>27</sup> it is possible that perceptions about presbyopia differ between men and women. This is based on reports of differences between men and women in the prevalence, age of onset, and severity of presbyopia,<sup>28</sup> as well in the working distance and arm length and the types of tasks for which men and women use near vision.<sup>29</sup>

## Conclusions

The need for a reading correction was generally perceived as a sign of age and responses suggested that deterioration in vision is expected with age. Spectacles were the preferred mode of near vision correction. Presbyopia was not a well-known condition overall, and the majority of participants were unaware of exactly what it meant. Most participants indicated that information about presbyopia should be provided by an optometrist in comparison to other health care professionals (e.g. General Practitioner). Furthermore, there were mixed opinions towards the idea of wearing multifocal contact lenses; a positive attitude was mostly driven by the participants' previously successful contact lens experience. Comfort and convenience were much more important than cost, as long as visually they were comfortable and suitable for their lifestyle.

## Funding

The undergraduate student (Brooke Hutchins) was awarded an educational grant from industry sponsor Johnson and Johnson Vision Care Institute, as part of the STEP® Educational Project 2018. The study was designed and undertaken independently from Johnson and Johnson.

## Conflicts of interest

The authors have no conflicts of interest to declare.

## Acknowledgements

Part of this work has been presented as a poster at the British Contact Lens Association conference in Manchester (UK) in May 2019.

## References

1. Glasser A, Campbell MC. Biometric, optical and physical changes in the isolated human crystalline lens with age in relation to presbyopia. *Vis Res.* 1999;39:1991–2015, [http://dx.doi.org/10.1016/S0042-6989\(98\)00283-1](http://dx.doi.org/10.1016/S0042-6989(98)00283-1).
2. Balgos MJ, Vargas V, Alió JL. Correction of presbyopia: an integrated update for the practical surgeon. *Taiwan J Ophthalmol.* 2018;8:121–140, [http://dx.doi.org/10.4103/tjo.tjo\\_53.18](http://dx.doi.org/10.4103/tjo.tjo_53.18).
3. Charman WN. Developments in the correction of presbyopia I: spectacle and contact lenses. *Ophthalmic Physiol Opt.* 2014;34:8–29, <http://dx.doi.org/10.1111/opo.12091>.
4. Renna A, Alió JL, Vejarano LF. Pharmacological treatments of presbyopia: a review of modern perspectives. *Eye Vis (Lond).* 2017;4:3, <http://dx.doi.org/10.1186/s40662-017-0068-8>.
5. Fricke TR, Tahhan N, Resnikoff S, et al. Global prevalence of presbyopia and vision impairment from uncorrected presbyopia: systematic review, meta-analysis, and modelling. *Ophthalmology.* 2018;125:1492–1499, <http://dx.doi.org/10.1016/j.ophtha.2018.04.013>.
6. Carnevali T, Southaphanh P. A retrospective study on presbyopia onset and progression in a Hispanic population. *Optometry.* 2005;76:37–46, [http://dx.doi.org/10.1016/S1529-1839\(05\)70253-0](http://dx.doi.org/10.1016/S1529-1839(05)70253-0).
7. Jain IS, Ram JA, Gupta AM. Early onset of presbyopia. *Am J Optom Physiol Opt.* 1982;59:1002–1004, <http://dx.doi.org/10.1097/00006324-198212000-00012>.
8. Bennett ES. Contact lens correction of presbyopia. *Clin Exp Optom.* 2008;91:265–278, <http://dx.doi.org/10.1111/j.1444-0938.2007.00242.x>.
9. Wolffsohn JS, Davies LN. Presbyopia: Effectiveness of correction strategies. *Prog Retin Eye Res.* 2019;68:124–143, <http://dx.doi.org/10.1016/j.preteyeres.2018.09.004>.
10. Sulley A, Young G, Hunt C. Factors in the success of new contact lens wearers. *Cont Lens Anterior Eye.* 2017;40:15–24.
11. Ewbank A. Who fits contact lenses? *Optician.* 2009;237:6204.
12. McDonnell Peter J, Lee Paul, Spritzer Karen, Lindblad Anne S, Hays Ron D. Associations of presbyopia with vision-targeted health-related quality of life. *Arch Ophthalmol.* 2003;121:1577–1581, <http://dx.doi.org/10.1001/archophth.121.11.1577>.
13. Weale RA. Epidemiology of refractive errors and presbyopia. *Surv Ophthalmol.* 2003;48:515–543, [http://dx.doi.org/10.1016/S0039-6257\(03\)00086-9](http://dx.doi.org/10.1016/S0039-6257(03)00086-9).
14. Robson J, Dostal I, Sheikh A, et al. The NHS Health Check in England: an evaluation of the first 4 years. *BMJ Open.* 2016;6:e008840, <http://dx.doi.org/10.1136/bmjopen-2015-008840>.
15. Muhammad Rilwan C, Jamba Mustapha A, Langnap Lokhur. Prevalence of presbyopia in rural Abuja, Nigeria. *Ann Niger Med.* 2015;9:56–60, <http://dx.doi.org/10.4103/0331-3131.177953>.
16. Fylan F, Grunfeld EA. Visual illusions? Beliefs and behaviours of presbyope clients in optometric practice. *Patient Educ Couns.* 2005;56:291–295, <http://dx.doi.org/10.1016/j.pec.2004.03.003>.
17. Multi-sponsor Surveys, Inc (MSI). *Gallup study of the U.S. consumer contact lens market.* Market research for Bausch + Lomb; 2015. From <https://www.bausch.com/Portals/77/-/m/BL/United%20States/Files/Downloads/ECP/Vision%20Care/BL-Multifocal-Supplement.pdf?ver=2016-07-28-103547-817>. [Accessed 18 October 2019].
18. Jobson Optical Research. *The soft multifocal contact Lens eye-care practitioner usage and attitude study.* Market research for Bausch + Lomb; 2015. From <https://www.bausch.com/Portals/77/-/m/BL/United%20States/Files/Downloads/ECP/Vision%20Care/articles/UFP0261USA16-Feature-Article-Gallup-survey-untapped-growth-opportunities.pdf>. [Accessed 18 October 2019].
19. Begley CG, Caffery B, Nichols KK, Chalmers R. Responses of contact lens wearers to a dry eye survey. *Optom*



- Vis Sci.* 2000;77:40–46, <http://dx.doi.org/10.1097/00006324-200001000-00012>.
20. Moss SE, Klein R, Klein BE. Prevalence of and risk factors for dry eye syndrome. *Arch Ophthalmol.* 2000;118:1264–1268, <http://dx.doi.org/10.1001/archophth.118.9.1264>.
  21. Charman WN. Non-surgical treatment options for presbyopia. *Expert Rev Ophthalmol.* 2018;13:219–231, <http://dx.doi.org/10.1080/17469899.2018.1506330>.
  22. Dumbleton K, Woods CA, Jones LW, Fonn D. The impact of contemporary contact lenses on contact lens discontinuation. *Eye Contact Lens.* 2013;39:93–99, <http://dx.doi.org/10.1097/ICL.0b013e318271caf4>.
  23. Richdale K, Sinnott LT, Skadahl E, Nichols JJ. Frequency of and factors associated with contact lens dissatisfaction and discontinuation. *Cornea.* 2007;26:168–174, <http://dx.doi.org/10.1097/01.icc.0000248382.32143.86>.
  24. Young G, Veys J, Pritchard N, Coleman S. A multi-centre study of lapsed contact lens wearers. *Ophthalmic Physiol Opt.* 2002;22:516–527.
  25. Brod Meryl, Tesler Laura E, Torsten Christensen L. Qualitative research and content validity: developing best practices based on science and experience. *Qual Life Res.* 2009;18:1263–1278, <http://dx.doi.org/10.1007/s11136-009-9540-9>.
  26. Guest G, Namey E, McKenna K. How many focus groups are enough? Building an evidence base for nonprobability sample sizes. *Field methods.* 2017;29:3–22, <http://dx.doi.org/10.1177/1525822X16639015>.
  27. Rueff EM, Varghese RJ, Brack TM, Downard DE, Bailey MD. A survey of presbyopic contact lens wearers in a university setting. *Optom Vis Sci.* 2016;93:848–854, <http://dx.doi.org/10.1097/OPX.0000000000000881>.
  28. Patel I, West S. Presbyopia: prevalence, impact, and interventions. *Community Eye Health.* 2007;20:40–41.
  29. Hickenbotham A, Roorda A, Steinmaus C, Glasser A. Meta-analysis of sex differences in presbyopia. *Invest Ophthalmol Vis Sci.* 2012;53:3215–3220, <http://dx.doi.org/10.1167/iovs.12-9791>.