

Profile of the Australian College of Optometry low vision clinic

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Background: The number of Australians living with vision impairment or blindness is expected to increase substantially due to the ageing population and prevalence of age-related eye disease. In response, the Australian College of Optometry (ACO) commenced a low vision clinic in 2013. The ACO is a not-for-profit organisation providing eye-care services to more than 60,000 Victorians per year experiencing economic or social disadvantage. Consultation fees are bulk-billed to the Australian national health care scheme – Medicare – while spectacles and visual aids are subsidised through the state government-funded Victorian Eyecare Service. The aim of this study was to determine the profile and prescribing patterns of the new optometry-led low vision clinic, and report the findings of a short-term loan magnifier pilot study.

Methods: A retrospective audit of 270 patient records was conducted. Additionally, a short-term loan magnifier program was pilot tested to ascertain the demand for, and benefits of, such a program among this cohort.

Results: The median age was 77 years (interquartile range 64 to 85 years), with 52 per cent being female. The main cause of vision impairment was age-related macular degeneration (40 per cent). At least one-third primarily spoke a language other than English. The majority (75 per cent) were referred by the optometrist to the onsite consultant occupational therapist for immediate assistance with activities of daily living and onward referral for additional comprehensive services, as required. Of the 49 participants who completed the loan magnifier study, only nine exchanged the magnifier/s initially prescribed.

Conclusions: The ACO has established a low vision service within a large optometry clinic for people experiencing social and economic disadvantage. Where a program of subsidised low-cost magnifiers is available, there is little benefit to short-term loans of magnifiers. Providing basic affordable low vision aids and rehabilitation within a large primary care optometry setting can facilitate acceptability and uptake of low vision services that increase quality of life.

Key words: blindness, demographics, low vision, magnifiers, vision impairment

Estimates from the recent National Eye Health Survey indicate that more than 400,000 Australians are living with vision impairment or blindness – a number expected to increase substantially due to the growth and ageing of the population.¹ The majority of those affected have eye conditions that are treatable or preventable. For those with permanent vision impairment or blindness, the majority retain some vision, and rehabilitation services are available to help maximise its use and to develop compensatory techniques, enabling better function and improved quality of life. Although the effectiveness of low vision rehabilitation has been demonstrated,^{2,3} utilisation rates are alarmingly low. Just 20 per

cent of Australian patients with low vision receive low vision rehabilitation services,⁴⁻⁶ even though more than 90 per cent could potentially benefit.⁷

The reasons for poor utilisation have been investigated in a number of Australian surveys.^{5,6,8-14} Findings suggest patient, health professional and service-related barriers are all major contributors to the problem.⁵ Clinicians tend to focus on the medical aspects of eye disease and do not always discuss rehabilitation options with patients.⁵ When informed that 'nothing more can be done' from a medical perspective, the patient often misinterprets this information from clinicians to mean that no services can help them. In addition, eye health

professionals confronted with an occasional vision-impaired patient, often lack confidence in their ability to prescribe low vision devices and provide advice, due to their relatively infrequent opportunity to maintain skills in this discipline.⁸⁻¹⁰

Furthermore, provision of services requires outlay for stock and extra consultation time, so that the cost of practice is perceived as outweighing the benefits.^{9,15} The introduction of a low vision Medicare item for optometrists, 10942, has made little difference.^{9,16} Many also lack awareness of available low vision services and benefits.⁸⁻¹⁰ Thus, health professionals often fail to either provide or refer for services. When they do refer, it tends to be late,

when patients have more advanced low vision.⁸⁻¹⁰ Finally, without a referral from a health professional, many patients will not consider using low vision services.⁵ A number of patient barriers to low vision care have been postulated, including lack of awareness and difficulties in accessing services, the lack of understanding in the general community of the benefits of low vision care and the lack of co-located services.¹⁵

In Australia, low vision services have been predominantly provided through tertiary models operated by large non-government organisations within the disability sector – an expert interdisciplinary team offering diagnosis, treatment, comprehensive assessment and a full range of devices and rehabilitation options. The funding landscape in this sector is now changing. More complex individualised schemes with a focus on patient choice and control have been introduced – the National Disability Insurance Scheme (entry before age 65 years for non-Indigenous Australians and before age 50 years for Indigenous Australians) and My Aged Care (for non-Indigenous Australians age 65 years or over and Indigenous Australians age 50 years or over).

However, much of the need for low vision care could be addressed by optometry, and a number of successful optometry-led secondary models (offering diagnosis, treatment, low vision assessment, refraction, prescription of a limited range of low vision devices and rehabilitation, with referral for comprehensive rehabilitation where required) have been developed in other countries.¹⁷ In Australia, optometry consultations remain funded through Medicare.

The Australian College of Optometry (ACO) is a not-for-profit organisation providing eye-care services across the state of Victoria to more than 60,000 patients per year who are experiencing economic or social disadvantage. Higher rates of blindness and vision impairment have been associated with older age and socio-economic disadvantage.¹⁸ In response to the increasing need for low vision services and to address some of the barriers to access by providing continuity, convenience and acceptability to patients, the ACO commenced an optometry-led low vision clinic at its main location (Carlton, Victoria, Australia) in late 2013.

The ACO administers the Victorian Eyecare Service, a spectacle and visual aids

subsidy scheme, on behalf of the state government. Consultation fees are bulk-billed to Medicare, while spectacles and visual aids are subsidised and provided at low cost. However, the need for even a small financial contribution can be a barrier for some patients experiencing disadvantage. As part of the new low vision service, a short-term loan magnifier program was pilot tested to ascertain the demand for and benefits of such a scheme among this cohort of patients.

The aim of this study was to determine the profile and prescribing patterns of a new optometry-led low vision clinic targeting patients experiencing disadvantage. A secondary aim was to determine the effectiveness of a short-term loan magnifier program among this cohort.

Methods

Audit

A retrospective audit of all patient records from the first two years (October 2013 to September 2015) of the optometry-led low vision clinic at the ACO was conducted.

The ACO low vision clinic operates two half-days per week, in partnership with Vision Australia, who provide an occupational therapist to support patients and introduce them to other rehabilitation services. All patients attending the low vision clinic underwent a full optometry low vision consultation (including full ocular and low vision history, visual acuity measurement refractive and magnifier assessment, contrast sensitivity [Melbourne Edge Test], visual field assessment and ocular health care) and were offered occupational therapy assessment, comprising determination of goals, review of activities of daily living and advice on lighting, adaptive techniques and technology, as well as referral for interdisciplinary care as required.

Optical magnifiers available at the ACO low vision clinic include: hand magnifiers (high plus lenses held by hand above the object to be magnified); stand magnifiers (as with hand magnifiers, with the lens-to-object distance fixed by a built-in stand that rests against the object/page); visulettes (a class of stand magnifier of low magnification, consisting of a solid dome of optical material that rests against the object); clip-on loupes and high addition spectacles; and distance telescopes. The majority (approximately 90 per cent in sales data) of hand

and stand magnifiers prescribed at the ACO were internally illuminated. In addition, desk-based and small portable electronic vision enhancement systems were also available, although without subsidy from the Victorian Eyecare Service. These systems consist of a device which captures images with a camera and displays a digitally magnified image on an inbuilt screen.

Low-income patients who were found to benefit from an optical magnifier and were interested in obtaining such a device were able to purchase the magnifier at Victorian Eyecare Service subsidised rates. Most devices were priced at AUD\$38.00, with the exception of electronic magnifiers. Patients were informed that the devices could be exchanged or returned, within one month of prescription. Routine clinical recall was established for these patients; no standard recall or follow-up was advised for the purpose of magnifier review, although optometrists were able to exercise clinical judgement to review patients as necessary.

Short-term loan magnifier pilot study

During the audit period, adult patients were given the option of participating in a short-term loan magnifier study. Participants were able to take up to three devices on loan for a period of three months. A nominal deposit of AUD\$10.00 was taken for each device and refunded at the conclusion of the study. A review consultation was offered at one month, with participants encouraged to attend if they were experiencing difficulties with their magnification device/s and were able to return or exchange devices if desired. All participants returned for review at three months; at this point, participants were able to return, retain or exchange magnifiers, with the selected magnifiers provided at no cost.

Inclusion criteria for the study were: age ≥ 18 years, eligible for subsidy under the Victorian Eyecare Service (holder of a Pensioner Concession Card or Health Care Card), best-corrected binocular visual acuity worse than or equal to 0.20 logMAR and better than 1.30 logMAR (6/9.5 to 6/120), demonstrated clinical need for a magnifier, and ability to use a magnifier. As the study was integrated into the clinical service, to maintain efficiency with consent procedures and the additional questions required, the ability to speak English was also an inclusion criterion. English proficiency was judged

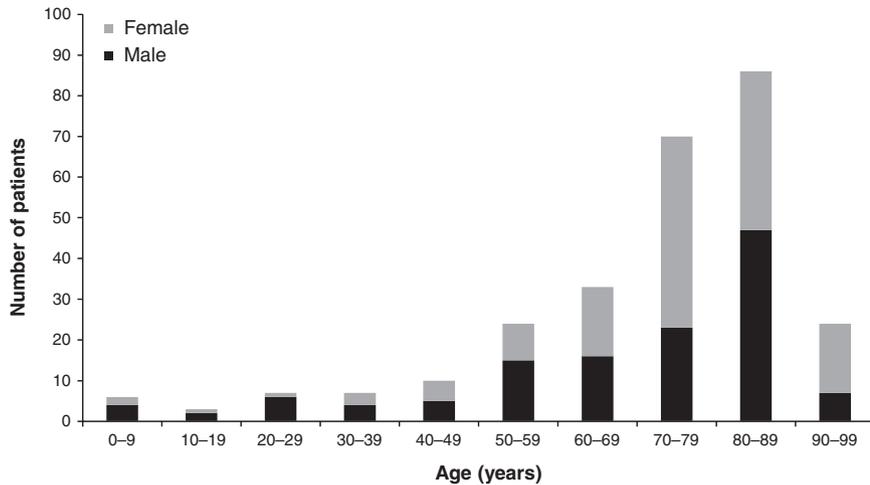


Figure 1. Age and gender distribution of patients attending the Australian College of Optometry (ACO) low vision clinic

	Age 0-29 years n (%)	Age 30-59 years n (%)	Age 60+ years n (%)	Total n (%)
Living situation				
Own home	5 (1.9)	10 (3.7)	114 (42.2)	129 (47.8)
Other [†]	9 (3.3)	16 (5.9)	67 (24.8)	92 (34.1)
Private rental	2 (0.7)	10 (3.7)	12 (4.4)	24 (8.9)
Public rental	0 (0.0)	5 (1.9)	18 (6.7)	23 (8.5)
Residential aged care	0 (0.0)	0 (0.0)	2 (0.7)	2 (0.7)
Referral source				
ACO/internal	3 (1.1)	20 (7.4)	117 (43.3)	140 (51.9)
Other [‡]	5 (1.9)	8 (3.0)	35 (13.0)	48 (17.8)
Public hospital	3 (1.1)	5 (1.9)	28 (10.4)	36 (13.3)
Private ophthalmologist	3 (1.1)	4 (1.5)	16 (5.9)	23 (8.5)
Private optometrist	1 (0.4)	2 (0.7)	15 (5.6)	18 (6.7)
Self	1 (0.4)	2 (0.7)	2 (0.7)	5 (1.9)
Primary language				
English	8 (3.0)	27 (10.0)	105 (38.9)	140 (51.9)
Unknown	2 (0.7)	4 (1.5)	39 (14.4)	45 (16.7)
Greek	1 (0.4)	3 (1.1)	21 (7.8)	25 (9.3)
Italian	0 (0.0)	1 (0.4)	24 (8.9)	25 (9.3)
European other	0 (0.0)	0 (0.0)	13 (4.8)	13 (4.8)
Arabic/Persian	3 (1.1)	3 (1.1)	3 (1.1)	9 (3.3)
Mandarin/Cantonese	2 (0.7)	0 (0.0)	5 (1.9)	7 (2.6)
Asian other	0 (0.0)	2 (0.7)	2 (0.7)	4 (1.5)
African other	0 (0.0)	1 (0.4)	1 (0.4)	2 (0.7)

[†]Other[†] living situations include supported residential services, no fixed address.
[‡]Other[‡] referral sources include general practitioners, community occupational therapists, blindness and low vision agencies.
 ACO: Australian College of Optometry.

Table 1. Living situation, referral sources and primary language by age

clinically by ability to complete a clinical history and subjective refraction without an interpreter. Exclusion criteria were: Department of Veterans Affairs Gold Card holder (who are able to obtain fully subsidised magnifiers at no cost) and/or cognitive impairment.

The audit and pilot study adhered to the tenets of the Declaration of Helsinki and were approved by the Australian College of Optometry Human Research Ethics Committee (H16 003 and H12 006 respectively).

Data analysis

Data were analysed using Microsoft Excel version 14.7.4 (Microsoft Corporation, Redmond, Washington, USA) and SPSS version 24.0 (IBM, Armonk, New York, USA). Descriptive statistics were computed and change in visual acuity following refraction was investigated using the paired t-test (two-tailed and p-values less than 0.05 were considered statistically significant).

Results

Patient characteristics

Two hundred and seventy patients presented to the clinic for a comprehensive consultation. There was an almost equal gender distribution with 129 men (47.8 per cent) and 141 women (52.2 per cent). As expected, there was a skew toward older persons, with 79 per cent aged 60 years or older. Median age at time of presentation was 77 years (interquartile range 64 to 85 years; range one to 98 years) (Figure 1).

Analysis of basic demographic characteristics (Table 1) revealed that about half of the patients spoke English as their primary language (n = 140, 51.9 per cent), were internally referred from another ACO clinic (n = 140, 51.9 per cent) and lived in their own home (n = 129, 47.8 per cent). Predominant causes of vision impairment were age-related (Table 2).

Mean presenting better eye distance visual acuity was 0.69 logMAR (approximately 6/30) (SD 0.45 logMAR; range -0.06 logMAR to no perception of light) and mean best-corrected visual acuity in the better eye was 0.61 logMAR (approximately 6/24) (SD 0.45 logMAR; range -0.25 logMAR to no perception of light), representing a statistically significant refractive improvement (mean difference 0.08 logMAR; t = 8.34, p < 0.001). Thirty-eight patients (14 per cent) were

Diagnosis	n (%)
Age-related macular degeneration	107 (39.6)
Diabetic retinopathy	29 (10.7)
Macular disease – other	25 (9.3)
Optic nerve/visual pathway diseases – other	20 (7.4)
Glaucoma	19 (7.0)
Cataract	16 (5.9)
Retinal disease – other	12 (4.4)
Corneal disease	9 (3.3)
Myopic degeneration	8 (3.0)
Retinitis pigmentosa	8 (3.0)
Trauma	5 (1.9)
Amblyopia/nystagmus	5 (1.9)
Albinism	3 (1.1)
Other	3 (1.1)
Unknown/idiopathic	1 (0.4)

Table 2. Primary ocular diagnosis

found to improve by two lines (0.20 logMAR) or more with refractive correction alone. Thirty-three (12.2 per cent) were legally blind based on the visual acuity eligibility criterion for an Australian Disability Support Pension (best-corrected visual acuity worse

than 1.0 logMAR [6/60]). The median best spectacle corrected near visual acuity was N8 (range N2.5 to worse than N80). Mean binocular peak contrast sensitivity was 12.3 dB (SD 4.2 dB), representing a moderate reduction in contrast.

Clinical outcomes

During the audit period, 125 pairs of spectacles and 181 magnifiers were prescribed (Table 3). Hand magnifiers were the most frequently prescribed magnification device. Thirty-one patients were prescribed more than one magnifying device. One hundred and eighty-one patients (67.0 per cent of cohort) were prescribed spectacles and/or magnification devices.

Focal lighting evaluation was undertaken for 164 patients (60.7 per cent), with increased and focused illumination found to benefit 128 (78.0 per cent of those evaluated). These patients were referred to the occupational therapist for further focal lighting advice and demonstration.

The mean near addition was +3.74 D (SD 1.89 D; range plano to +20.00 D), and the majority of patients required only low addition ($\leq +4.50$ D).

The majority of patients (n = 202, 74.8 per cent) were referred by the optometrist to the onsite occupational therapist for basic

rehabilitation services, as well as referral for interdisciplinary care as required.

Short-term loan magnifier pilot study

A total of 63 participants were recruited into the loan magnifier pilot, of whom 49 (77.8 per cent) completed the study; thus 22.2 per cent failed to complete the study.

At the initial consultation, 35 participants elected to take a singular magnifier and the other 14 elected to take two magnifiers on loan; a total of 63 magnifiers, the types of which are outlined in Table 4.

Of the 49 participants who completed the study, the majority (n = 33, 67.3 per cent) made no changes and retained the magnifier/s initially prescribed. A further seven (14.3 per cent) declined the loan device. Nine participants (18.4 per cent) opted to change the magnifier/s. Of the nine patients who changed their magnifier/s, three required to do so due to a change in visual function (two declines due to progressing exudative age-related macular degeneration and one improvement due to neodymium-doped yttrium aluminium garnet laser capsulotomy). The remaining six optimised their magnifiers by adjusting magnification factor (four patients) and type (two patients); only one of these patients made a change of magnification power of a factor of more than two times.

Type of device	n (%)
Spectacles	125
Single vision distance	51 (40.8)
Single vision near (up to +4.50 D added)	45 (36.0)
Single vision near (+4.75 D added and higher)	15 (12.0)
Single vision intermediate	1 (0.8)
Bifocal	11 (8.8)
Progressive	2 (1.6)
Magnifiers	179
Hand magnifiers	99 (55.3)
Stand magnifiers	31 (17.3)
Visulettes	21 (11.7)
Monocular telescopes	9 (5.0)
Electronic vision enhancement systems (portable)	8 (4.5)
Binocular telescopes	4 (2.2)
High addition prism spectacles	3 (1.7)
Chest magnifiers	2 (1.1)
Clip-on loupes	2 (1.1)
Glare control	
Ultraviolet shields	2

Table 3. Spectacle and magnifier prescriptions

Discussion

The ACO low vision service, run by a public health optometry clinic in collaboration with a national not-for-profit low vision agency, is unique in Australia. This study has established baseline data for the service. In its first two years of operation, 270 patients with low vision were provided with care and support. Almost half had a primary ocular diagnosis of age-related macular degeneration or other macular disease. At least one-third primarily spoke a language other than English. The majority of patients (75 per cent) were referred by the optometrist to the onsite consultant occupational therapist for immediate assistance with activities of daily living and onward referral for additional comprehensive services as required. For those who participated in a loan magnifier program, more than two-thirds retained the original device(s) prescribed.

Comparisons to this audit may be drawn with similar studies on the Vision Australia

Magnifier type	n (%)
Hand magnifiers	35 (55.6)
Stand magnifiers	12 (19.0)
Telescopes	6 (9.5)
Visulettes	5 (7.9)
High-addition prism spectacles	3 (4.8)
Clip-on loupes	2 (3.2)

Table 4. Magnifiers loaned

Kooyong low vision clinic. The Kooyong clinic is a long-established service operating within a comprehensive care model in a socio-economically advantaged location. While the profile of clients attending Kooyong has changed somewhat over the years,^{19–21} the most recent audit suggests that the average age of those attending the ACO low vision clinic is younger (77 years) compared to those attending Kooyong (84 years). The older average age of patients and low numbers of patients aged under 29 years of age are reflections of the typical low vision demographic. The recent National Eye Health Survey found the predominant causes of non-refractive vision impairment in the Australian population to be age-related (age-related macular degeneration, diabetic retinopathy and cataract).¹

The causes of vision impairment are similar to the Kooyong clinic population; predominantly age-related, with age-related macular degeneration accounting for most impairment (40 per cent ACO versus 49 per cent Kooyong), glaucoma (7.0 per cent ACO versus 10.3 per cent Kooyong) and diabetic retinopathy (10.7 per cent ACO versus 5.2 per cent Kooyong). Early detection due to the availability of imaging technology and improved treatment options are reducing the impact of age-related macular degeneration. However, this remains the leading cause of blindness in economically developed nations including Australia,¹ and this is reflected in both the ACO and Kooyong low vision clinic cohorts studied.

Living situation is not directly comparable between the ACO and Kooyong low vision clinics, as there were differences in reporting categories. As expected, due to the different models of service delivery, target populations and sources of funding, there are differences in referral patterns. The majority of ACO referrals (59 per cent) were from internal (ACO) optometrists and the

majority of Kooyong referrals (59 per cent) were self or family. The high proportion of internal referrals for the ACO is consistent with the model of care, which involves initial triage of most patients in general clinics before low vision care is offered. Additionally, this likely reflects that the ACO low vision clinic is newly established, with less awareness among patients and carers of its existence compared with the Kooyong clinic. Ophthalmology referrals were similar (22 per cent ACO versus 23 per cent Kooyong), possibly because the ACO has longstanding relationships with numerous ophthalmologists and the nearby Royal Victorian Eye and Ear Hospital.

The ACO had a higher spectacle and magnifier prescribing rate per patient (0.46 ACO versus 0.39 Kooyong and 0.66 ACO versus 0.39 Kooyong for spectacles and magnifiers, respectively). With regard to the spectacle prescribing rate, this may be because Kooyong is in a socio-economically advantaged location and provides tertiary low vision care (with clients already having received primary refractive care), while the ACO predominantly provides primary eye care to disadvantaged populations. The higher magnifier prescribing rate may be due to the ACO population being younger, having better visual acuity, being more accepting of such devices and the lower cost of devices. Single vision was the most common form of spectacle prescription at both clinics, with over 50 per cent for near correction only.

With regard to magnifiers, hand magnifiers were the most frequently prescribed at both clinics, followed by stand magnifiers. Interestingly, the prescription rate of the more expensive electronic magnifiers was equally low at both sites (0.03 units per patient), which is somewhat unexpected given the relatively advantaged demographic at Kooyong compared with the ACO. However, it would not seem to be a cost issue, as a similarly low rate of electronic magnifier prescription was found in a United Kingdom model of care, where these devices were provided at no charge.²²

The reasons for low uptake of electronic devices, especially in light of the benefits of digital magnification, remain uncertain. Further work is required to assess the impact of improving technology, reduced costs, increased availability and acceptance of technology on the uptake of these devices.

In contrast with Australia, unlimited-term loan magnifiers have long been the

standard of care provided through the National Health Service in the United Kingdom. However, short-term loan magnifiers have been provided in the past by Australian low vision organisations. They were considered to be of benefit to patients with variable vision and changing ocular disease, and those new to magnifiers having difficulty deciding on the optimal device. Even so, short-term loans are costly to organisations, particularly when devices are damaged or patients are lost to review. In this pilot study, the majority of patients were satisfied with the initial magnifier selected and did not want the inconvenience of an unnecessary review consultation, suggesting that in a Medicare-funded model of eye care, with subsidised low-cost magnifiers, there may be little benefit in a loan magnifier program, even for patients experiencing economic disadvantage.

There will be increasing demand for low vision services in Australia.^{1,4,5} The findings from this study are useful to clinicians, managers and policy makers for planning future low vision services. The ACO has established that a low vision service located within a large existing optometry clinic is feasible in Australia. Such a model may increase acceptance of low vision services and continuity of care within a primary care optometry organisation. It can also serve as an interim link between community optometrists who may not provide low vision management and tertiary low vision service organisations.

Additionally, support from an onsite consultant occupational therapist may facilitate increased awareness and acceptance of a range of more comprehensive low vision supports and services. Affordability of at least basic optical magnifiers through the support of a state government-subsidised funding scheme is especially important for patients with low vision who are experiencing economic disadvantage. Further studies are required to determine if this model can be replicated in large private practices, university clinics and hospitals, as well as to explore the uptake and acceptance of low vision services in more depth.

There are some potential limitations to this study, primarily it being a retrospective clinical audit. Hence, data for some variables were missing or incomplete, or may have been inaccurate. Furthermore, the loan magnifier pilot was run as part of the clinical service, and for reasons of efficiency and feasibility, the proportion of eligible

people who opted in, is not known. Also, data on the reasons why some participants changed their magnifier are limited. Further studies are required to more fully understand the effectiveness of a loan magnifier program in various low vision rehabilitation settings.

Conclusions

The ACO has established a low vision service within a large optometry clinic for people experiencing social and economic disadvantage. The majority of attending patients were aged 70 years or over, with the most frequent cause of vision impairment or blindness being age-related macular degeneration. At least one-third spoke a language other than English. There was low uptake of the short-term loan magnifiers, a high rate of patient attrition in this pilot study and low numbers of patients who fully utilised the study to make changes to their magnifier/s.

Where a program of subsidised low-cost magnifiers is available, there appears to be little benefit to short-term magnifier loans. Providing basic affordable low vision aids and rehabilitation within a large primary care optometry setting may facilitate acceptability and uptake of low vision services that are known to increase quality of life.

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