

Current Status of Low Vision Care in Ophthalmology Unit in Japan

Report of the Two Surveys on Low Vision Care

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Abstract

Low vision care in the medical sector has been spreading throughout Japan. The terms “low vision care” and “low vision rehabilitation” are often used interchangeably in this sector. Initially, low vision care was difficult to disseminate as its provision was time and manpower consuming and not covered by insurance. Under these circumstances and after repeated requests from related organizations, in 2012 the national health insurance policy was revised to cover low vision services provided in ophthalmology units. Therefore, to investigate the extent to which the care had increased, we conducted questionnaire surveys twice: immediately after the revision and eight years later. The participants in the surveys were ophthalmologists who had completed the training course, which is mandatory for insurance cover. We found from the ophthalmology units who responded that the percentage of those providing low vision services increased from 66.1% to 90.9% in the eight-year period, and that the two main professions of the service providers were ophthalmologists and certified orthoptists. For low vision care to be distributed nationwide, increasing the number of ophthalmologists and certified orthoptists as well as enhancing networks of resources in relevant fields in each region are just two recommendations.

Keywords: low vision care, low vision services, medical fee for low vision care, certified orthoptists, regional gap

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1. Introduction

In the world, low vision services are delivered by a variety of providers using different strategies in health, social care and the voluntary sectors [1] [2]. In Japan, conventional medical rehabilitation services had not dealt with “visual impairment”. It is in 1960s that rehabilitation services for persons with visual impairment first

appeared in ophthalmology unit. The activity once faded away; however, it revived in 1980s and started to prevail.

Over the last ten years, low vision rehabilitation underwent changes in ophthalmology, demographics, public policy and funding, medical/social legislations and so on. We have conducted questionnaire surveys twice on current status of low vision services in

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ophthalmology unit across Japan. In this article, we introduce the current status of persons with visual impairment and models of low vision services delivery and report the results of two questionnaire surveys conducted by the authors. And we discussed the distribution and delivery of low vision services across Japan at present and the issues.

1.1. Current status of persons with visual impairment in Japan

The population of Japan is approximately 126.5 million. According to the 2016 statistics of the Ministry of Health and Welfare, 312,000 were registered persons with visual impairment [3]. The degree of severity of visual impairment defined by the law is divided from the most severe (level 1) to the least severe (level 6). 119,000 persons are in level 1 and 193,000 are in levels 2 to 6. That is, about 62% of registered persons with visual impairment are regarded as persons with low vision.

In 2009, Japan Ophthalmologists Association (JOA) announced the estimation of the population of persons with visual impairment. They conducted the estimation analyzing the data of the national census and research papers. In the estimation, the definition of the United States was used as criterion of visual impairment. That is “blind” as visual acuity of 20/200 or less and “low vision” as visual acuity less than 100/200 to 20/200 in the better eye with the best possible correction. The term “visual impairment” includes both “blind” and “low vision”. According to their estimation, persons with visual impairment were approximately 1.64 million, of which low vision 1.45 million and blind 188,000. About 88% of visual impairment was low vision. As the criterion of visual impairment were different between JOA study and the government statistics, the two estimations of persons with visual impairment differ [4] [5]. Japan is aging ever faster and there is no doubt that elderly people who spend every day with visual impairment increase significantly.

Morizane, et al. [6] investigated application

forms and the attached documents for the “registration note for people with disabilities” of 12,505 people over the age of 18 who newly obtained the note in 2015. They found that the most common age group was in their 80s with 29.6%, followed by those in their 70s with 26.3% and those in their 60s with 17.3%. This result approved the existence of the large group of elderly people living with visual impairment. They also found that the most common cause of visual impairment was glaucoma (28.6%) followed by retinitis pigmentosa (14.0%), diabetic retinopathy (12.8%), and macular degeneration (8.0%). In 2000 and 2001, a large epidemiologic study was conducted in Tajimi city. The study estimated that one out of twenty citizens older than 40 years had glaucoma [7]. High prevalence of normal-tension glaucoma is a characteristic of Japanese population [8] [9].

1.2. Typical low vision services in ophthalmology units

Figure 1 illustrates how low vision services flow in a typical ophthalmology unit. The services provided are:

1. Interview and discussion on needs and initial goal setting, sharing the information on ocular conditions, their prognosis and results of vision assessment
2. Introduction/selection of low vision aids, and instruction to use the aids and vision
3. Advice about adapting the environment with lighting, contrast and other methods of enhancing vision
4. Provision of information about social welfare services, and other vision rehabilitation services for patients in need of full-range rehabilitation programs which include trainings in orientation and mobility (OM), activities of daily living, and communication (braille and voice-output computer),
5. Referral to the program in a rehabilitation center or home-based services funded by local government and which often provided by organizations of persons with visual impairment.

Low vision services in ophthalmology unit generally take longer time than routine medical

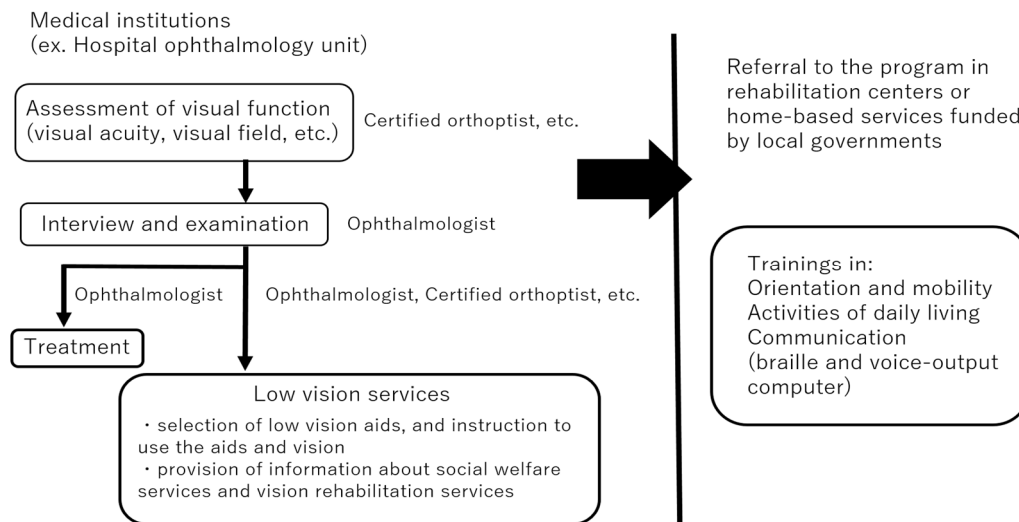


Fig.1 Flow of the low vision services

In a typical hospital ophthalmology unit, first assessment of visual function by certified orthoptists, and interview and examination by ophthalmologists are provided. Then in parallel with necessary treatment, low vision services that include selection of low vision aids; instruction on usage of the aids is provided. Full-range rehabilitation programs, which include trainings in OM and activities of daily living, are provided in rehabilitation centers for persons with visual impairment.

examinations. However, the national health insurance had not covered low vision services before 2012. JOA and relevant societies of professionals in the field of ophthalmology had proposed to the Ministry of Health, Labor and Welfare (MHLW) that low vision services should be reimbursed by the national health insurance. In 2012, the government accepted the proposals and established “medical fee for low vision care”. Providers of low vision services can claim 250 points (which is equivalent to ¥2,500) per month, when they provide:

1. Evaluation of visual function, selection of low vision aids, consultation and collaboration with rehabilitation agencies
2. To those eligible for the registration note for people with visual impairment
3. In the ophthalmology units where ophthalmologists who completed the course (described below) work on full time basis.

The course of training for ophthalmologists who engage in judgment and application of prosthetic devices has been held at National Rehabilitation Center for Persons with Disabilities since 1991 sponsored by the Ministry of Health, Labor and Welfare. So far, not less than 1,300

ophthalmologists finished the course. Currently the course is held twice a year with a capacity of 50 people each. The course includes lectures on vision rehabilitation and low vision aids, practice of human guide techniques, and experience under low vision simulation goggle.

Below, we report the results of the surveys on low vision services provided in ophthalmology unit conducted by the authors immediately after (2012) the implementation of the medical fee for low vision care and eight years later (2020).

2. Methods

2.1. Survey of 2012

The questionnaire was sent by email in June 2012 to the 327 ophthalmologists who were members of the voluntary mailing list of the ophthalmologists who had finished the course. The questionnaire consisted of three questions.

1. Whether the ophthalmology unit of a respondent provides low vision services or not?
2. Respondents who answered, “yes” to question 1 were required to choose professions of service providers from the six choices; ophthalmologist, certified orthoptist, nurse, rehabilitation worker, optician, and others.

3. Number of clients the provider offered services in a month. The choices were “one or none”, “two to four”, and “five or more”.

2.2. Survey of 2020

The questionnaire was sent by email in September 2020 to the 587 ophthalmologists who were members of the voluntary mailing list of the ophthalmologists who had finished the course. In the survey of 2020, in addition to the questions in the survey of 2012, we asked the following questions.

1. Whether the ophthalmology unit of a respondent claims (calculates) “medical fee for low vision care” or not?
2. When the respondent answered, “yes” to the question 1, what low vision services are provided? When the respondent answered “No” to the question 1, reasons not to claim (calculate).
3. What are necessary to make low vision services available nationwide in the future?

For the last question, twelve choices were provided, and respondents were asked to mark for one choice they considered particularly necessary and for one or more choices they considered necessary. We also let the respondents write their opinions regarding this question.

Both surveys were conducted with the approval of the Ethical Review Committee of the National Rehabilitation Center for Persons with Disabilities. And the purpose of the survey was fully explained to the participants and those who gave their consent answered the questionnaire. The surveys were conducted anonymously, so that respondents and their institutions could not be identified.

3. Results

3.1. Survey of 2012

The response rate of the survey was 34.3%.

1. 66.1% of the respondents provided low vision services and 33.9% did not (Figure 2).
2. Professions who provide services were ophthalmologists (97.3%), certified orthoptists (67.6%), nurses (21.6%), rehabilitation workers (17.6%), opticians (16.2%) and others

(6.8%) (Figure 3). In the choice of “others”, the respondents described the profession as salesperson dealing with optical aids, social workers, care workers, and clerical staffs.

3. 47.3% provided “two to four”, 29.5% “one or none”, 18.9% “five or more”, and 4.3% answered none of the choices (Figure 4).

3.2. Survey of 2020

The response rate of the survey was 22.5%. 90.9% of the respondents provide low vision services at their main workplace, and 9.1% currently do not. Reasons for not providing low vision services included “absence of trained staff”, “lack of low vision aids”, “time consuming”, “low referral rate”, “lack of facility” and “low-cost effectiveness”.

Professions of service providers were ophthalmologists (88.3%), certified orthoptists (84.2%), and salespersons dealing with optical aids (14.2%), rehabilitation workers (13.3%), nurses (10.0%), and others (4.2%). In the choice of “others”, the respondents described the profession as clerical staffs and occupational therapists. 41.7% provided services to “two to four” clients, 31.7% to “one or none”, 26.7% to “five or more” (Figure 4).

93.3% of the respondent claimed the medical fee for low vision care but 6.7% did not. The reasons they did not claim the fee were “not working on full-time basis”, “had not completed the necessary application process”, “not familiar with the criteria for claiming”, “being in the process of fulfilling the criteria” and others.

The services they provided included provision of information on light shielding glasses and selection (98.3%), preparation of documents for application for disability registration (95.8%), provision of information on magnifiers and selection (94.2%), provision of information on social welfare benefit and other rehabilitation services including referral to such services (90.0%), provision of information on closed circuit television (CCTV) and selection (86.7%), provision of information on monocular and selection (66.7%), selection of high plus add glasses (64.2%),

provision of information on OM, instruction of OM and referral to training facilities (63.3%), and others (8.3%)(Figure 5). The responses in “others” include activities relating to information and communication technology (introduction of tablets and smartphone applications, instructions on device usage, workshops), vocational consultation,

educational consultation, advices to improve problems in daily life, eye movement training, and makeup training.

To the question “What are necessary to make low vision services available nationwide in the future?” which allows multiple answers, 78.8% chose “training of professional staffs

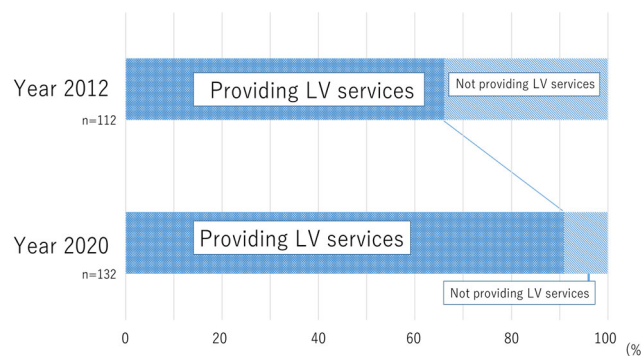


Fig.2 Changes in low vision services implementation rate between the 2012 and 2020 surveys

The percentage of the respondents who provide low vision services were 66.1% in the 2012 survey and 90.9% in the 2020 survey.

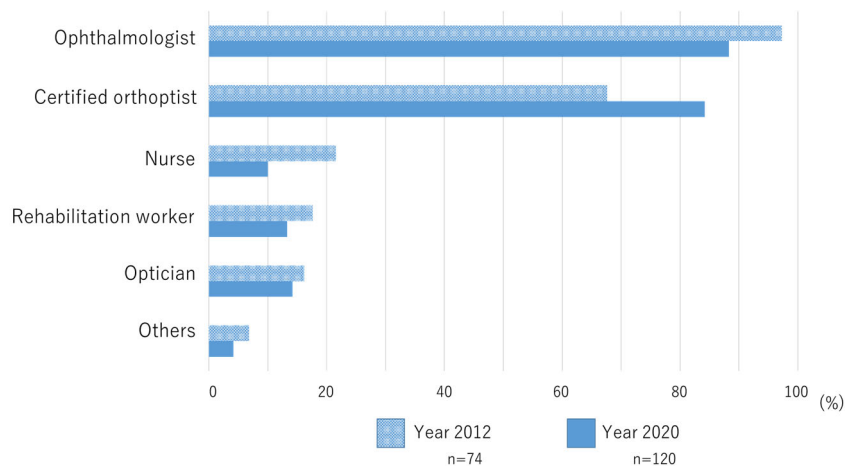


Fig.3 Professions of service providers (Survey of 2012 and 2020)

In the 2012 survey, the percentages of professions who undertook low vision services were ophthalmologists (97.3%), certified orthoptists (67.6%), and nurses (21.6%) and in the 2020 survey, they were ophthalmologists (88.3%), certified orthoptists (84.2%), salespersons dealing with optical aids (14.2%). In either of the surveys, main professions were ophthalmologists and certified orthoptists.

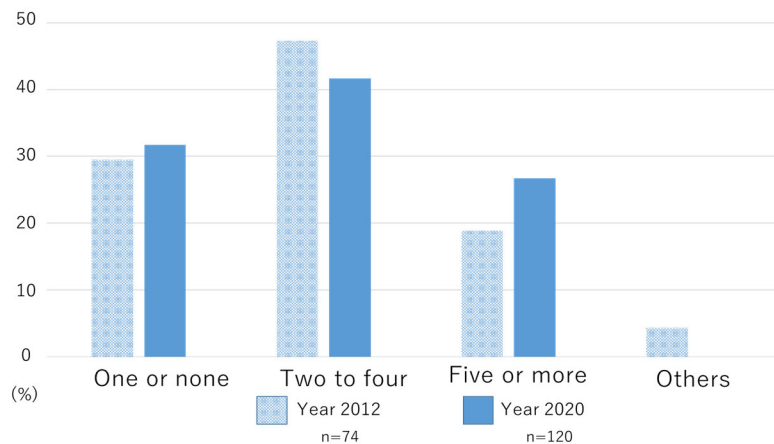


Fig.4 Number of clients the provider offered services in a month (Survey of 2012 and 2020)

To the question “Number of clients the provider offered services in a month”, in the 2012 survey 47.3% of the respondents answered “two to four”, 29.5% “one or none” and 18.9% “five or more”. In the 2020 survey, 41.7% of the respondents answered “two to four”, 31.7% “one or none” and 26.7% “five or more”. In either survey, the order of the choices was the same, but the percentage for “five or more” increased.

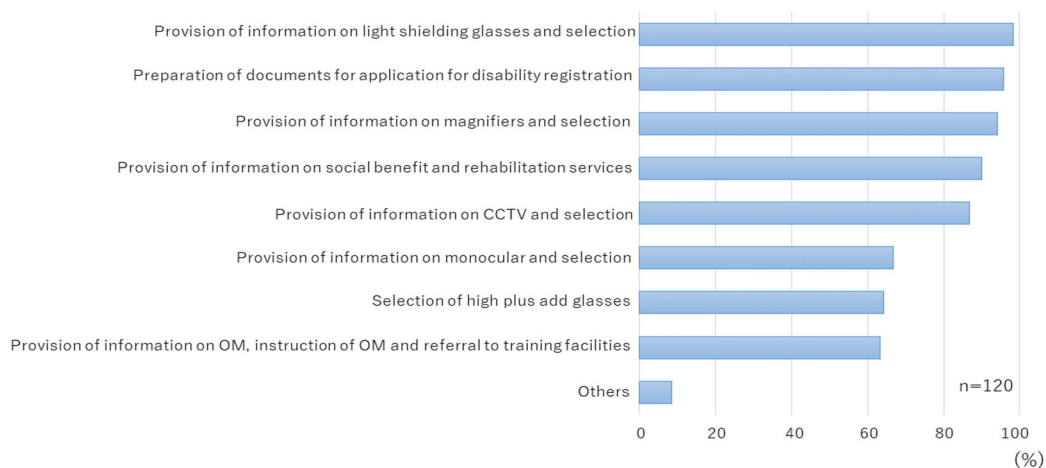


Fig.5 Services the ophthalmology units provided (Survey of 2020)

The services they provided most was about light shielding glasses (98.3%), followed by preparation of documents for application for disability registration (95.8%), consulting about magnifiers (94.2%), and provision of information on social welfare benefit and other rehabilitation services (90.0%).

(certified orthoptist)”, 68.9% “increasing training opportunities about low vision care”, 61.4% “training of professional staffs (ophthalmologist)”, 60.6% “dissemination of low vision care model (“quick low vision care”) that can be implemented in acute care hospitals and general clinics”, 59.1% “raising awareness of the ophthalmologists on low vision services who haven’t taken the course”, and 52.3% “developing a network of community

resources (“Smart Sight™”) (Figure 6).

We will describe about “quick low vision care” and “Smart Sight™” later. To the same question but when the respondents were asked to choose one “particularly necessary” choice, their choices in the descending order were “raising awareness of the ophthalmologists on low vision services who haven’t taken the course”, “increasing training opportunities about low vision care”,

“dissemination of low vision care model (“quick low vision care”) that can be implemented in acute care hospitals and general clinics”, “training of professional staffs (certified orthoptist)”, “easing of facility standard for medical fees for low vision care” and “developing a network of community resources (“Smart Sight™)”(Figure 7). As professional staffs to be trained other than ophthalmologists, certified orthoptists and nurses, the respondents listed social workers who are a hub of referral services, personnel in public offices, and salespersons dealing with optical aids.

There were other comments as follows; “incorporation of low vision care as a compulsory subject in ophthalmology for medical students to be learned” “financial assistance for purchase of

low vision aids (including light shielding glasses) and equipments” “it is necessary to discuss criterion and standards for claiming the medical fee” “enlightenment of general public on low vision care”

4. Discussion

4.1. The current status of low vision services in ophthalmology unit in Japan

The two surveys were conducted on a small group of ophthalmologists and did not cover the entire group of ophthalmology in Japan. However, since low vision services are mainly provided by the ophthalmologists who have completed the training course and those who have not completed the course refer clients to those who



Fig.6 Responses to “What are necessary to make low vision service available nationwide in the future?”(multi choices allowed)(Survey of 2020)

78.8% chose “training of professional staff (certified orthoptist)”, 68.9% “increasing training opportunities about low vision care”, and 61.4% “training of professional staff (ophthalmologist)”.

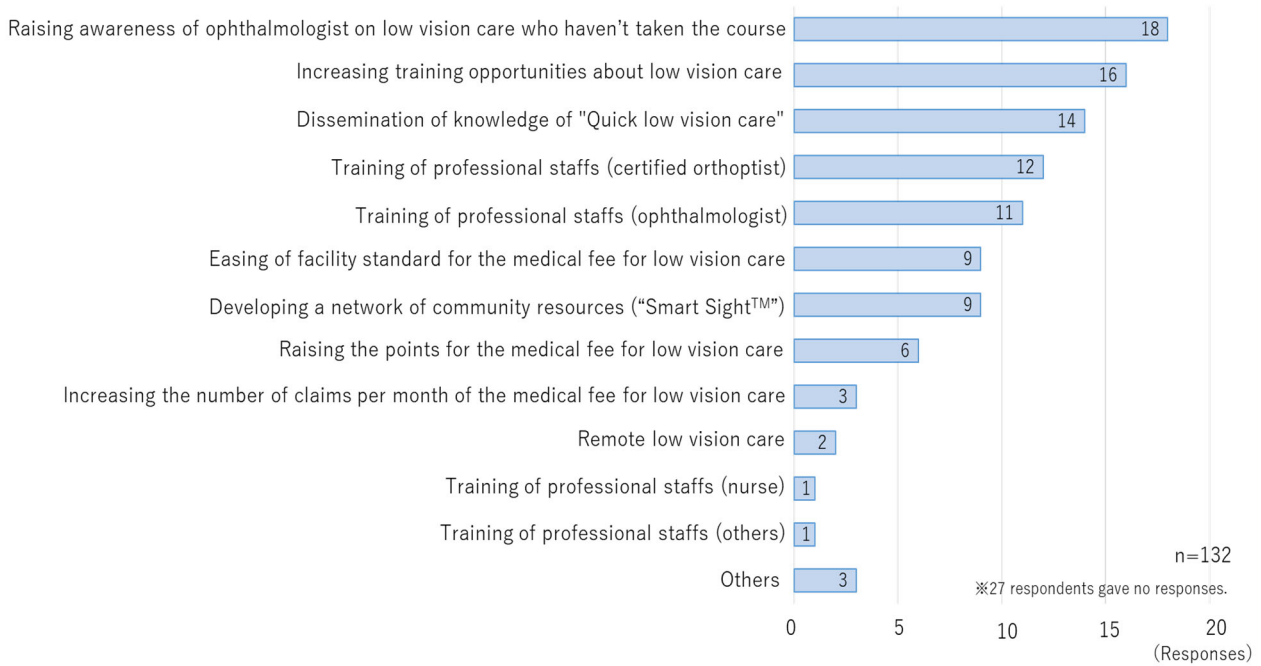


Fig.7 Responses to “What are necessary to make low vision service available nationwide in the future?”(single choice allowed)(Survey of 2020)

The most common choice was “raising awareness of the ophthalmologists on low vision care who haven’t taken the course” followed by “increasing training opportunities about low vision care

have completed and provide low vision services, the results of these surveys could be considered to reflect the situation of low vision services in Japan.

The results of the two surveys: in the 2012 survey 66.1% of the ophthalmologists who completed the course answered that they provided low vision services, and in the 2020 survey the percentage increased to 90.9%, suggests that ophthalmologists who provide low vision services are increasing.

The results of the two surveys also showed that main professions who undertook low vision services were ophthalmologists and certified orthoptists. It can be said that ophthalmologists and certified orthoptists are the main staff in low vision services in ophthalmology unit in Japan.

In Japan, certified orthoptists are a profession licensed by the law enacted in 1971. Certified orthoptists initially were to deal with conditions of strabismus and amblyopia and the binocular vision, and to engage in the management and correction of these conditions. However, as

the orthoptic profession has developed, they have come to be recognized as the experts in routine eye examinations. Some of them have developed their role in provision of low vision services. Other than the two professions, nurses, rehabilitation workers, opticians took parts in low vision services. Looking closely at the survey results, in the 2012 survey, the percentage of main professions who undertook low vision services were 97.3% for ophthalmologists and 21.6% for nurses. However, in the 2020 survey, the percentages were 88.3% for ophthalmologists and 10.0% for nurses. The percentages of the two professions decreases by about 10%, while the percentage of certified orthoptists increased from 67.6% in the 2012 survey to 84.2% in the 2020 survey. This may be due to the fact that certified orthoptists have more time to attend clients than ophthalmologists, that certified orthoptists are in better position to provide services than nurses because certified orthoptists can make use of examination results they undertake to select low vision aids, and that awareness among

ophthalmology staffs about the role of certified orthoptists have been increased. The responses to the question “What are necessary to make low vision services available nationwide in the future?” seem to support this assumption. The most common response was “training of professional staffs (certified orthoptist)” and about 80% of ophthalmologists think that certified orthoptists are suitable as a profession who undertake low vision services.

In the 2012 survey, 47.3% of the respondents had “two to four” appointments per month, 29.5% “one or none” and 18.9% “five or more”. These figures were less than what the authors had expected. In the 2020 survey, 41.7% had “two to four”, 31.7% “one or none” and 26.7% “five or more”. From the results of the two surveys, it was found that nearly half of the hospitals or clinics offered services to two to four clients per month. It is presumed that ophthalmologists who are gatekeepers to low vision services are often too eager for eye disease treatment to think of the clients’ inconveniences about their daily living situation. Some of the ophthalmologists might regard candidates for low vision services narrowly. Realizing benefits of low vision services and each patient’s needs will broaden patients’ chance to get to the services. In addition, the percentage of respondents who answered “five or more” to the question “Number of clients the provider offered services in a month” in the 2020 survey (Figure 4) had increased since the 2012 survey. It is presumed that hospitals/clinics that incorporate low vision services into a routine part of medical activities are increasing.

93.3% of the respondents answered that they claimed the medical fee for low vision care at their main workplace, which means almost all of the ophthalmologists who had completed the course claimed the fee. Nishida-Shimizu et al. conducted an opinion survey of 264 ophthalmologists across the country about “medical fee for low vision care” which was established six months previously. 78.2% of 142 respondents viewed the fee favorably [10]. 76.2% pointed out that the fee would raise awareness of the people on the importance of low

vision care. One of the conditions for insurance coverage requires the provider to collaborate with vision rehabilitation agencies. The government’s current position is to approve low vision services as medical services and to promote cooperation with nonmedical world of vision rehabilitation. As a result, it looks that the establishment of the fee contributed to the spread of low vision services.

On the other hand, some respondents complained that even if they provided low vision services, they could not claim the fee because “they work on part-time basis”. It seems that further discussion on requirements for the claim of the medical fee is necessary.

4.2. Future agenda of low vision services in the medical sector in Japan

In Japan, which is facing a super-aging society, there is an urgent need to build a society in which the elderly can actively participate. In 2016, Yoshida et al. conducted a study on the relationship between “quality of vision” and social participation among community-dwelling elderly people in Japan, and reported that “quality of vision” is an important determinant of social participation [11] . It can be said that the development of low vision services could be one of the factors that promote the social participation of the elderly in the future. As can be seen from the above results, although low vision services are gradually spread across the country, it is not widespread enough to reach all patients who need services.

When persons with visual impairment have services subsidized, such as trainings at rehabilitation agencies, they are required to be registered. There has been disputes over some of the eligibility criteria for registration of persons with visual impairment [12] [13] . In July 2018, the criterion on visual acuity and visual field were revised [14] . By the new criterion, visual acuity is to be determined not by the "sum of the visual acuity of both eyes" but by "the visual acuity of the better eye". For determining visual field, new criterion for central perimeter utilizing automated perimeters was introduced and clarified. The

new criterion was expected to work favorably for those with macular or parafoveal lesions having functional disabilities who had been regarded not eligible for welfare services. We will watch the changes brought by this revision with an interest in the number of persons with registered visual impairment.

It is desirable that more patients with functional disabilities are eligible for the registration and able to receive welfare services. However, the easing of eligibility criteria brings increase of recipients of low vision services and makes regional variations in availability of low vision services apparent.

Currently there are about 14,000 ophthalmologists in Japan, but not all ophthalmologists are equally able to provide low vision services. Some ophthalmologists think of treatments as a top priority and are reluctant to provide low vision services because providing the services makes them feel defeated. Some ophthalmologists are aware of the importance of low vision services, but they shy away from low vision services that take time and manpower. Under the circumstances, the JOA identifies and makes a list of hospitals and clinics which provide low vision services and publishes the list on its website so that people who are in need can access the services. As of November 2020, about 600 hospitals/clinics were on the list [15]. Many of them are clustered in urban areas. The numbers of the hospitals/clinics vary among the 47 prefectures. The largest number is 60 and the smallest is one. There is a considerable variation between prefectures. Considering visual impairment generally deteriorates persons' ability to travel, it is presumed that for many people, especially who live in suburban or rural area, low vision services are scarce and distant for them to get to it.

4.3. Activities to promote low vision services at medical sector

In 2020 survey, to the question "What are necessary to make low vision services available nationwide in the future?" which allows multiple answers, 78.8% chose "training of

professional staffs (certified orthoptist)", 68.9% "increasing training opportunities about low vision care", 61.4% "training of professional staffs (ophthalmologist)". Most training in ophthalmology is related to medical care, surgery and examinations. There are few training opportunities for low vision care other than the one mentioned earlier. Therefore, even if they recognize the importance of low vision care, few ophthalmologists and certified orthoptists may miss opportunity to learn. In order to increase the number of ophthalmologists practicing low vision care in the future, we plan to double the capacity of the training course from 50 to 100 participants in fiscal year 2021. Under COVID19 pandemic, more and more conferences and training courses are held online. It is easier to increase the capacity when conducting online compared to face-to-face. However, when holding training courses online, there is a demerit that it is difficult to get an understanding through the experience, such as reading with a CCTV and guided walk under a simulation goggle. In context of these circumstances, we need to devise ways to hold training courses so that as many ophthalmologists and certified orthoptists as possible can be involved in low vision care.

Even if an ophthalmologist realizes the importance of low vision care, it might not be practical for the ophthalmologist to provide services. Such is the case; the ophthalmologist can still involve oneself in the process of rehabilitation by referring the patients to the ophthalmologists who practice low vision care, or to vision rehabilitation services. In an effort to systematize the collaboration among low vision service providers, a low vision care network which is regarded as an adaptation of AAOA Smart Sight™ [16] initiative has emerged across the country. This network calls on all ophthalmologists to give the handout to patients with visual acuity less than 20/40. The handout provides information about rehabilitation services in their community and directs patients to a range of local agencies. It was 2010 that the first network emerged in Hyogo prefecture in Japan.

At present under the leadership of JOA the plans to make the network in every prefecture are steadily underway. In the 2020 survey, 52.3% of the respondents answered “developing a network of community resources(“Smart Sight™”) to the question “What are necessary to make low vision services available nationwide in the future”. As of December 2020, “Smart Sight™” is diffused in 46 of the 47 prefectures.

Nishida-Shimizu argues that not all ophthalmology units needs pursuit comprehensive low vision services. Instead, she suggests provision of low vision services which meet each hospital’s budget and capacity of staff. She names it “Quick low vision care” [17] . When an ophthalmologist recognizes a patient with visual acuity less than 20/40, the ophthalmologist should have active interest in patients’ inconveniences or inabilities caused by the visual impairment. For example, if it is found that the patient has difficulties in reading and writing, introducing tips for daily living or letting them try basic low vision items such as a typo scope or a signature guide are well within the capabilities of the general ophthalmologist. In the 2020 survey,

60.6% of the respondents answered, “quick low vision care” to the question “What are necessary to make low vision services available nationwide in the future?”

As one of the strategies to refer patients who need comprehensive vision rehabilitation to rehabilitation agencies, “Intermediate outreach assistance” is available (Figure 8).

Professional staffs of rehabilitation agencies visit locations that patients commute such as clinics, hospitals and other related agencies or community organizations to provide information and give individualized consultations to persons with visual impairment. It can be hard for some patients who live far away to make it to a rehabilitation agency. For patients, the outreach effort makes them get to professional services easier, and for rehabilitation agencies, it exposes staffs to a pool of patients, some of whom they might otherwise never encounter. As outreach activity needs money and staffs, for some agencies it is not feasible. However, the outreach efforts are gradually increasing.

Recently, some agencies experiment benefit of remote low vision services to improve regional

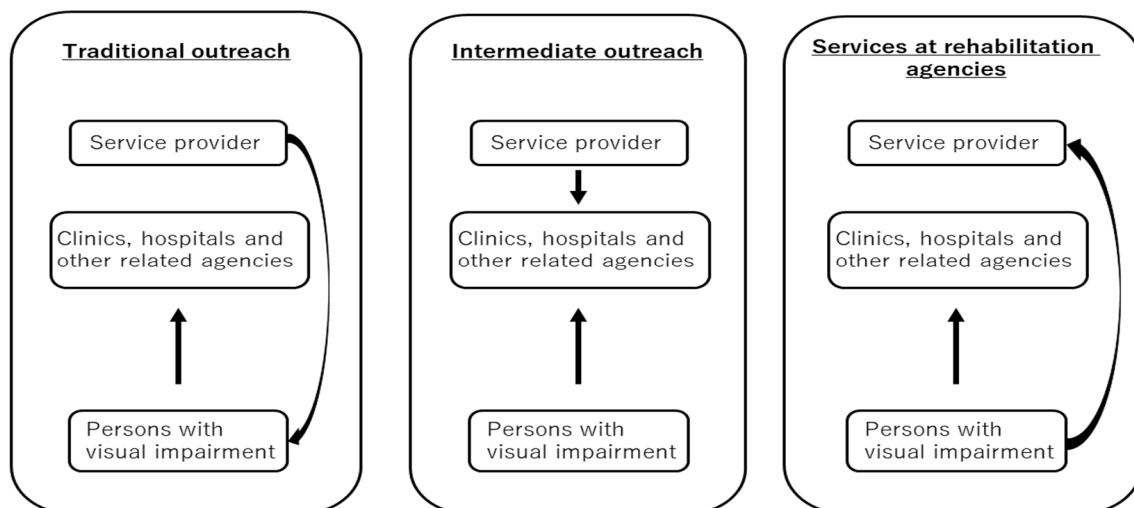


Fig.8 How persons with visual impairment, services providers and related agencies relate in the “Intermediate outreach assistance” strategy.

In this strategy, professional staffs of rehabilitation agencies visit locations which patients commute such as clinics, provide information, and give consultation on vision rehabilitation services. This model of services delivery is regarded as an intermediate model between traditional outreach and institution-based models.

variations of accessibility to low vision services. Using an Internet connection, clients sit facing ophthalmologist or vision rehabilitation specialists online who have expertise in low vision services, and get consultation, information and/or even training remotely. Now that information and communication technology (ICT) has achieved tremendous development, the new type of delivery system for low vision services has been experimented. In the 2020 survey, 34.8% answered “construction of a remote low vision services system” to the question “What are necessary to make low vision services available nationwide in the future?”

The various approaches to vision restoration have been ongoing. In Japan, there has been encouraging progress in vision restoration using advanced technology such as regeneration treatment of the retina and cornea by iPS cells. The time we will have patients with restored low vision is just around the corner. It is likely that a patient with restored vision offers unique opportunities and challenges for the provider of low vision services. It is hard to tell whether our traditional way of services works for this new group of patients or not. If not, what the future low vision services will be like.

We are all committed to the common goal of supporting those people with low vision. Our unfinished efforts to alleviate their hardship will lead us to a better future for low vision services.

5. Conclusions

It is probable that low vision services in Japan have been developing partly due to the medical fee for low vision care established in 2012. However, in order for low vision care to spread nationwide, increasing the number of ophthalmologists and certified orthoptists and enhancing networks of resources in relevant fields in each region are some of efforts to be done.

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