

Acta Medica Okayama

Volume 64, Issue 2

2010

Article 4

APRIL 2010

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Abstract

To assess the effects of service dogs on health-related quality of life (HRQOL), we conducted a survey of 10 service dog owners using SF-36v2 (Medical Outcomes Study 36 Item Short-Form Health Survey Version 2.0) and compared it with a matched control group of people with physical disabilities who did not have service dogs but were eligible for one. The scores for mental health and role emotional of service dog owners were relatively high, and their mental component summary was higher than the general population norm. These results indicate that service dogs affect the mentality of their owners. The comparison with the control group indicated that service dogs alleviate the mental burden of daily activities, and subjectively improved the physical functioning of their owners. This study showed that service dogs have positive functional and mental effects on their disabled owners.

Original Article

The Effect of Service Dogs on the Improvement of Health-Related Quality of Life

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To assess the effects of service dogs on health-related quality of life (HRQOL), we conducted a survey of 10 service dog owners using SF-36v2 (Medical Outcomes Study 36 Item Short-Form Health Survey Version 2.0) and compared it with a matched control group of people with physical disabilities who did not have service dogs but were eligible for one. The scores for mental health and role emotional of service dog owners were relatively high, and their mental component summary was higher than the general population norm. These results indicate that service dogs affect the mentality of their owners. The comparison with the control group indicated that service dogs alleviate the mental burden of daily activities, and subjectively improved the physical functioning of their owners. This study showed that service dogs have positive functional and mental effects on their disabled owners.

Key words: service dog, HRQOL, SF-36v2, people with physical disability

A service dog is trained to assist with various activities of daily living (ADL) of people with physical disabilities. In 2002, the Service Dogs Access Law was established in Japan. This law aimed at promoting the independence and social participation of people with physical disabilities. Standards for nurturing high-quality service dogs stipulate an obligation to collaborate with medical organizations, especially those involved with rehabilitation, and these standards established an official recognition system for ensuring the high quality of service dogs [1]. This law provides a legal category for service dogs as

welfare equipment that helps disabled people achieve independence and social participation [1].

The use of service dogs in Japan has spanned the past 15 years, but it was only after the establishment of the Service Dogs Access Law that the importance of involving medical experts in service dog ownership was recognized. Therefore, service dogs are not prevalent in Japan, and systems for facilitating their use have not yet been developed [2]. According to a report by the Japanese Service Dog Resource Academy, the potential applicants for service dogs are currently estimated at over 15 thousand whereas the number of available service dogs is only 50. Clearly, the institutions that train service dogs are far from keeping up with demand.

For a person to acquire a service dog he/she must

Received November 13, 2009; accepted November 27, 2009.

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be over 18 years of age, possess an identification booklet for the physically disabled (physical disability), and have no impairment in intelligence, mentality, or higher brain function. The person's disability must be stable or only slowly progressive, such as spinal cord injury, traumatic brain injury, muscular dystrophy, cerebral palsy, rheumatoid arthritis, multiple sclerosis, amputation of extremities, and other neurological diseases or muscular disorders [1, 3]. Service dogs can assist in a variety of ways depending on the disabilities and living arrangements of the disabled people [1]. This flexibility is a distinctive aspect of service dogs, such that a team approach by medical rehabilitation experts is required during the training program [2, 4].

An improved quality of life (QOL) for the disabled is said to be one effect of service dogs [1, 5, 6]. To examine the effect that service dogs have on the QOL of their owners, we conducted a survey of service dog owners using SF-36v2 (Medical Outcomes Study Short-Form 36 Item Health Survey version 2), which is a comprehensive measure of Health-related QOL (HRQOL). Also, we compared the results with those from a control group of disabled people who did not have service dogs.

Materials and Methods

Participants. The participants were 10 service dog owners in Japan (5 men and 5 women) living with physical disabilities for at least the previous 5 years. Their mean age was 53.2 ± 13.7 years (range 32–67 years), the mean Barthel Index score was 73.5 ± 24.2 (range 30–100), and the mean functional independence measure (FIM) score was 104.5 ± 15.1 (range 69–118). The mean duration of service dog ownership at the time of investigation was 20.9 ± 8.8 months (range 8–38 months). All participants had a first or second grade identification booklet for the physically disabled. Table 1 provides summary demographic and disability characteristics of the service dog owners.

Individuals in the control group were selected based on several matching characteristics including the following 5 conditions: 1. the age of the individual would not preclude him from having a service dog, 2. the type of disability would not preclude the individual from becoming a service dog owner, 3. the individual must have had a first or second grade identification booklet for the physically disabled, 4. the individual would have qualified to have a service dog in light of his/her intellectual, mental, and higher brain function ability, and 5. the individual was living at home. The control group was composed of 28 people (12 men and

Table 1 Summary demographics and disability data on service dog owners

Age/sex	disability/disease	BI	FIM	duration of service dog ownership (months)
36y.o. M	Spinal cord injury Th10	75	111	38
62y.o. M	Spinal cord injury Th12	70	108	27
67y.o. M	Spinal cord injury L1	65	104	18
47y.o. M	Cervical cord injury C6B	30	69	9
66y.o. M	Cerebral haemorrhage (left hemiplegia)	100	112	26
38y.o. F	Brainstem part stoppage (right hemiplegia)	100	118	8
67y.o. F	Rheumatoid arthritis	90	114	23
59y.o. F	Achondroplasia and Spinal cord injury	50	90	12
32y.o. F	Multiple sclerosis	55	101	24
58y.o. F	Myasthenia gravis	100	118	28
53.2 (13.7)		74.5 (24.2)	104.5 (15.1)	20.9 (8.8)

Values at the bottom line are the mean (SD) of each column.

16 women) with a mean age of 46.8 ± 14.2 years (range 20–66 years). Their mean Barthel Index score was 74.6 ± 20.5 (range 20–100) and the mean FIM score was 103.4 ± 18.1 (range 63–121). Table 2 provides disability characteristics of the control group. There were no significant differences ($p < 0.05$) between service dog owners and the control group in terms of age, Barthel Index, and FIM. Therefore, the degree of independence in activities of daily living between the 2 groups was regarded as equal. The purpose of this study was explained to all study participants and they gave their prior consent to being investigated in this study.

Procedure. To measure the HRQOL, we used SF-36v2, which is composed of 8 subscales and 2 summary scores. The subscales are referred to as physical functioning (PF), role physical (RP), bodily pain (BP), general health perceptions (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). The 2 summary scores consolidate the 8 subscales into a physical component summary (PCS) and a mental component summary (MCS). The subscales of PF, RP, and BP contribute to PCS; MH, RE, and SF contribute to MCS; while SF, VT, and GH contribute to both summary scores [7]. We calculated these scales by norm-based scoring (NBS; general population norm is set as a score of 50) to analyze the results. We conducted the SF-36v2 on service dog owners anonymously through a mailing (in 2006), whereas we surveyed the control

Table 2 Disability data on control group

disability/disease	
Cervical cord injury	9
Spinal cord injury	3
Rheumatoid arthritis	9
Stroke	4
Spino-cerebeller degeneration	1
Spino-cerebeller degeneration/Rheumatoid arthritis	1
SLE	1

Table 3 Result of summary scores

	Service dog owners	Control group
PCS	24.0	15.9
MCS	51.7*	39.6

The value given represents mean (SD).

Value with * indicates that there was a significant difference ($p < 0.05$) between service dog owners and control group.

group when individuals visited a hospital (from 2007 to 2008).

Statistical methods. Differences in the subscales and summary scores of SF-36v2 between the service dog owners and the control group were analyzed using Dr. SPSS II (SPSS Japan Inc.). Normally distributed subscales, such as PF, RP, GH, and MH, were analyzed by Student's *t*-test. The other subscales, which were not normally distributed, were analyzed by the Mann-Whitney U test.

Results

Service dog owners' SF-36v2 results. The mean of each subscale was as follows: PF, 12.5 ± 16.1 ; RP, 35.1 ± 8.5 ; BP, 36.9 ± 10.8 ; GH, 37.2 ± 6.4 ; VT, 44.4 ± 7.3 ; SF, 38.0 ± 10.0 ; RE, 48.5 ± 9.3 ; and MH, 50.2 ± 8.2 . VT and RE were near the general population norm, and MH was almost equivalent to it. On the other hand, PF was particularly low and other subscales were also low in comparison with the general population norm. As for summary scores, PCS was 24.0 and MCS was 51.7 (Table 3). MCS was higher than the general population norm.

Control group's SF-36v2 results. The average of each subscale in the control group was as follows: PF, 1.5 ± 9.4 ; RP, 29.8 ± 17.7 ; BP, 39.6 ± 12.2 ; GH, 40.4 ± 12.2 ; VT, 43.3 ± 12.1 ; SF, 37.4 ± 15.3 ; RE, 31.7 ± 19.5 ; MH, 43.3 ± 13.2 . As for summary scores, PCS was 19.1 and MCS was 39.9 (Table 3).

Service dog owners and control group SF-36v2 results comparison. The scores of service dog owners were higher than those of the control group in PF, RP, VT, SF, RE, and MH. A significant difference ($p < 0.05$) was seen in both PF ($p = 0.03$) and RE ($p = 0.01$). The scores of service dog owners were also higher in MH and RP, but the difference was not significant difference. In contrast, the scores of the control group were slightly higher than those of service dog owners in BP and GH (Fig. 1). In the comparison of summary scores, there was a significant difference in MCS ($p = 0.005$) but not in PCS.

Discussion

Results of this study show substantially positive

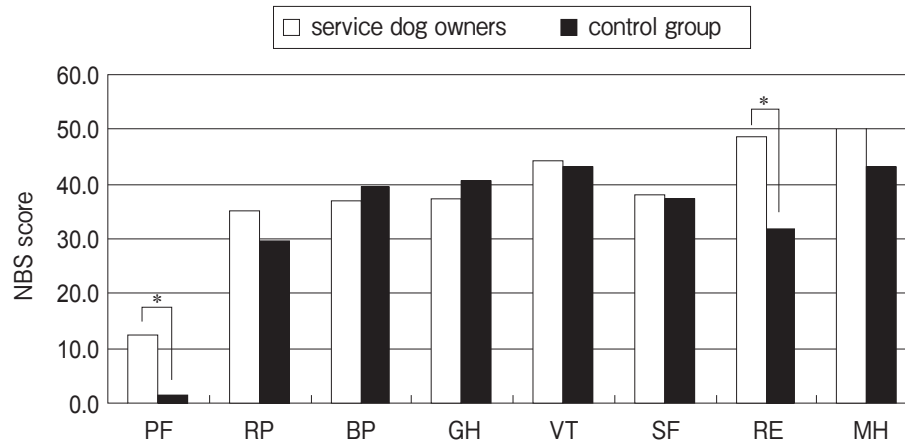


Fig. 1 Mean scores of 8 subscales by service dog owner and control group. Significant difference ($*p < 0.05$) were seen in PF and RE.

mental and functional effects of service dogs on their owners. From SF-36v2, we found that among the subscales of the service dog owners, MH was the highest, indicating that owners are living calmly, peacefully and happily. The high RE score of the service dog owners also indicated that they experience less mental difficulties in their tasks and daily activities. The fact that service dog owners scored higher than the general population norm in MCS means that the mental aspects of service dog owners' QOL were higher than the average Japanese person. Several reports have demonstrated that people with severe physical disabilities often have lower levels of self-esteem and a higher tendency toward depression than the general population [8–10] whereas the service dog owners investigated in this study seemed to experience a higher-than-average QOL, at least in the mental aspects, although they live with severe physical disabilities. Also, the service dog owners' MCS was significantly higher than the control group's, indicating that the service dogs contribute to an improved QOL by improving their owners' mental QOL. Furthermore, we saw a significant difference in RE between the service dog owners and the control group, indicating that service dog owners' mental burdens in performing daily activities are reduced. Our results clearly demonstrate the mental QOL effects of service dogs. The mental QOL aspects are so high for these dog owners because of the synergy of the various effects of the service dogs.

Although the degree of independence in each group's ADL was considered equal, PF was signifi-

cantly higher for the service dog owners, indicating that the owners experience fewer difficulties in their daily activities than do people in the control group. Such subjective improvement of physical functioning is thought to be derived from the owners regarding the actions done by their service dogs as actions they can now do themselves; empirically, the service dog owners have remarked that they feel like the actions they ordered their service dogs to do are actions they actually did themselves [10], which we demonstrated in our current study. This is a functional effect that service dogs have in reducing the physical burden of daily activities. Some reports describe the functional effect of service dogs from an objective viewpoint; however, this study was also able to demonstrate this from the owners' subjective viewpoints. We found that service dog owners feel a decrease in physical and mental burdens in daily activities, which contributes not only to their improved QOL, but also to the possibility of independence and social participation.

In other research, the effects of service dogs have been summarized as functional, social, economical, and mental effects. Functionally, service dogs improve and extend the daily activities of their owners by offering a variety of support and meeting the needs of each owner [1]. Socially, communication between the owners and those around them can increase through their dogs [5, 12, 13], and the dogs can help to affect social rehabilitation. That is to say, the process of rebuilding a new life with a service dog, which is different from just distributing welfare equipment, can also assist their social rehabilitation; the

goal is toward new social participation and an independent life in collaboration with rehabilitative medical care when the service dogs are adopted [1]. As for the economical effect, other researchers have reported a 68% reduction of human support expenses after adopting service dogs [5]. Furthermore, many owners have succeeded in getting a job and becoming economically independent. The mental effects of owning a service dog are evident in reports that living with one improved the self-reliance, internal locus of control, and self-esteem of its owner [1, 5]. Along with the increased responsibility of caring for their service dogs comes an increase in self-esteem for the dog owners who usually tend to be supported. The owners also interact with their service dogs by giving and receiving affection, which is an important and positive aspect of people's lives. Furthermore, having a service dog as a constant companion can relieve anxiety about emergency situations and provide a great feeling of security, which is a mental effect of owning a service dog that most disabled people expect and understand [2, 4].

Service dogs are considered welfare equipment in the Basic Act for Disabled Persons, and since they are evaluated and adopted through medical rehabilitation experts for a medical purpose, adopting a service dog is considered a medical intervention. Therefore, the HRQOL is the appropriate tool for measuring the improved QOL service dogs can provide disabled persons. The SF-36v2 is a subjective outcome indicator and a measure of QOL adopted in the medical fields, especially in rehabilitation medicine, all over the world. When measuring QOL, we must not only measure objective facts, but also consider the subjective viewpoint of patients, especially since service dogs require daily care and medical upkeep, which can present a financial burden to the owner. So we believe research into how owners are feeling about both the burdens and benefits of service dog ownership is relevant and significant.

Medical rehabilitation experts play an important role in the adoption of service dogs, assuring that people with disabilities can take advantage of service dogs in an effective and safe manner. These medical personnel use their expert knowledge by disseminating information to the people who want service dogs, determining their needs and providing medical assessments. However, since there is little research, even

outside of Japan, relating to service dogs in the field of rehabilitation medicine, therapists do not yet understand what tasks service dogs can perform nor how truly effective these dogs can be. The therapists do not grasp what their roles should be. Continued research and academic progress in various fields, including rehabilitation medicine, is necessary for further developing the use of service dogs and to encourage their widespread acceptance in the future. In this study, we showed the effectiveness of service dogs from a medical viewpoint. We hope that this research will encourage more therapists to acknowledge service dogs as a new assistive technology, and to consider the recommendation of service dogs, under the right circumstances, for the people with physical disabilities they work with.

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