Exploring Stress Factors Among Family Caregivers of Older Adults with Dementia Using a Virtual Agent
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Purpose It is clear that home caregiving for Older Adults with dementia imposes substantial stress on family who live with them. For Older Adult with dementia to continue living at home, the physical and mental condition of the caregiver has a major influence [1]. In particular, the caregiver's burden is a subjective feeling unique to each caregiver, and the factors contributing to this burden are diverse [2]. In past research on dementia caregiving, many studies have quantitatively only using burden scales. Although many studies have qualitatively the contents of caregiver burden through interviews, there are few studies that understand the caregiver's subjective sense and objective state in real time. This study attempted to comprehensively explore factors that affect the stress of family caregivers of older adults with dementia in Japan. **Method** To interpret factors related to caregiver stress temporally and in real time, was used that integrates quantitative and qualitative analyses. The study involved two families who caregivers and Older Adults with dementia living in Tokyo. Quantitative data were collected by having the family caregivers and older adults wear smartwatches to gather seven days of stress data. A personal computer equipped with a conversational Virtual Agent(VA) was installed to collect caregivers' experiences and thoughts. Qualitative data were collected through conversations with VA and caregivers. Stress status was scored on a 0–100 scale, based on heart rate variability. Daily mean, minimum, and maximum stress scores were calculated. The content of the VA conversations was analyzed from log-time-stamped whispers recorded. Key findings are summarized in Table 1. **Results and Discussion** The seven-day fluctuation of caregivers' stress scores was as follows. In both caregivers, there was not a large overall range of stress fluctuation, but there were days with sharp increases and declines within a single day. To explore the causes of the sharp rises, the VA conversations were analyzed to determine what events or what aspects were burdensome for both the dementia patient and the caregiver. The results showed that core symptoms of dementia (memory loss, running away, etc.) and behavioral and psychological symptoms (going out and not being able to return home, etc.) were stress factors. Since the stress values during VA conversations tended to reflect average levels, having the conversation in real time about what happened that day is likely not only to identify stress factors but also to have some effect in reducing caregiver stress.

References
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Table 1. Caregivers Stress

Day	care giver 1			care giver 2		
	stress_mean	stress_min	stress_max	stress_mean	stress_min	stress_max
1	34.46	13	84	26.26	2	84
2	23.19	1	69	36.49	1	96
3	23.16	3	63	22.26	1	87
4	31.73	2	76	21.62	1	79
5	37.36	7	93	30.42	1	90
6	34.45	10	90	37.62	11	84
7	28.58	13	70	29.46	2	88