

Association between having a hot spring water supply in the home and prevention of long-term care



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ARTICLE INFO

Keywords:

Prevention of long-term care
Hot spring
Bathing
Elderly
Population-based study

ABSTRACT

Background and objective: According to basic studies, hot spring use has positive effects on the mind and body. However, the association between habitual hot spring use and prevention of long-term care is unknown. Using long-term care insurance data for the residents of Atami City, Japan, who can choose to install hot spring water supply in their homes, this study aimed to determine the association between the installation of a hot spring water supply in the home and prevention of long-term care.

Methods: 1. Study design: case-control study 2. Subjects: 2719 residents (754 men, 1965 women) of Atami City, Shizuoka Prefecture, Japan, who received long-term care insurance and were certified as “Needing Support” or “Needing Long-Term Care” as of March 2017. 3. Survey methods: Information on long-term care insurance certification was linked to subjects' care level dating back to their initial certification. Also, the installation (or lack thereof) of hot spring water supply in each subject's home was linked to information on Atami household water use as of March 2017. 4. Analysis methods: The age distribution of the subjects was determined. Initial care status and care status as of March 2017 were then compared for the 2194 subjects who received long-term care certification at least twice. These subjects were classified into two groups: those whose care level had not changed or had improved (no change/improvement group) and those whose care level had worsened (worsening group). Subjects were then compared by sex and initial care level in terms of hot spring installation and percentages of no change/improvement or worsening of care level; odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using the chi-square test. Lastly, the same analysis was performed for all subjects grouped together, and ORs and 95% CIs were calculated using the Mantel-Haenszel test.

Results: Hot springs were installed in the homes of 2359 subjects overall (86.8%). The no change/improvement group and the worsening group comprised 1192 and 1002 subjects, respectively. Overall, improvement or no change in care level was observed in 1050 subjects (55.2%) in the hot spring group and 142 subjects in the no hot spring group (48.5%). Sex-adjusted OR (95% CI) was 1.311 (1.025–1.677, $p = 0.036$), which represented a significant association. Having a hot spring water supply in the home may be associated with preventing worsening of care level.

Conclusion: Having a hot spring water supply in the home may be associated with preventing worsening of care level.

1. Introduction

In response to the progressive aging of Japanese society, the government of Japan established a long-term care insurance system in 2000 for elderly individuals who require long-term care [1]. Under this

system, all residents aged 40 years or older who are certified by their municipal government as requiring long-term care can receive public funds for such care. The need for long-term care is classified on a 7-level scale consisting of “Support Levels 1–2” (“Needing Support”) and “Care Levels 1–5” (“Needing Long-Term Care”). Support Level 1 (level 1)

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<https://doi.org/10.1016/j.ctcp.2018.10.001>

Received 26 August 2018; Accepted 2 October 2018

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represents the highest level of independence among those need care or support, while Care Level 5 (level 7) represents the lowest level of independence, at which the individual is bedridden and requires care for all activities of daily living (ADL). Certification of long-term care need is provided by municipalities via a review based on documents, interviews, and deliberations [1]. In Japan, where long-term care insurance payments have been increasing every year, maintenance of physical function and preventive long-term care for the elderly are major issues [2]. Another important issue is to prevent elderly individuals from requiring long-term care, thus avoiding reliance on long-term care insurance.

As reported in various studies, due to factors such as thermal action, bathing in a hot spring has a positive effect on physical and mental health. These studies have confirmed that hot springs are effective for relief of physical pain [3] and rheumatoid arthritis [4] and are therefore presumed to prevent physical decline associated with aging. Japan has 27,000 hot spring sources nationwide, which are easy to use [5]. It was previously found that habitual bathing by immersion in a bathtub is associated with good health [6]. Another small-scale Japanese study of elderly individuals undergoing outpatient treatment at a certain medical facility, found that both habitual bathing at home and use of hot springs were effective for preventing long-term care in some subjects [7]. However, despite the plethora of hot springs in Japan, the effects of habitual hot spring use on the body have not been sufficiently researched. Consequently, the association between an environment that enables the daily use of hot springs and prevention of long-term care is not known.

In Atami City, one of Japan's most prominent hot spring areas, a massive 1,055,000 m³/year of municipally managed hot spring water, which is extracted from 60 hot spring sources, is drawn into residences, with a certain percentage of residents able to bathe in hot spring water at home on a daily basis (Fig. 1). Along with water supply information, information is also available regarding the supply of hot spring water (or lack thereof) to every household in Atami [8]. Therefore, with the cooperation of Atami City, the present study aimed to do the following: to link long-term care insurance information with hot spring water supply information in Atami City, both of which are public data; and,

using accurate long-term care insurance data for residents of Atami who can access hot spring water in their homes, and thus can bathe in a hot spring at home, to determine the association between the installation (or lack thereof) a hot spring water supply in the home (i.e. the presence or absence of an environment that enables daily use of a hot spring) and prevention of long-term care.

2. Methods

2.1. Study design

Case-control study (population-based study).

2.2. Subjects

Subjects were 2719 residents (754 men, 1965 women) of Atami City, Shizuoka Prefecture, Japan, who received long-term care insurance and were certified as “Needing Support” or “Needing Long-Term Care” as of March 2017.

2.3. Survey methods

Information on subjects' long-term care insurance certification was linked to their care level dating back to their initial certification. Also, the installation (or lack thereof) of a hot spring water supply in each subject's home was linked to information on Atami household water use as of March 2017.

2.4. Analysis methods

The age distribution of the subjects was determined. Initial level of care needed and level of care needed as of March 2017 were then compared for the 2194 subjects who had received long-term care certification at least twice. Long-term care periods (observation periods for changes) were calculated based on the date of initial long-term care certification and the most recent date of long-term certification. For comparison using the 7-level scale consisting of “Support Levels 1–2”

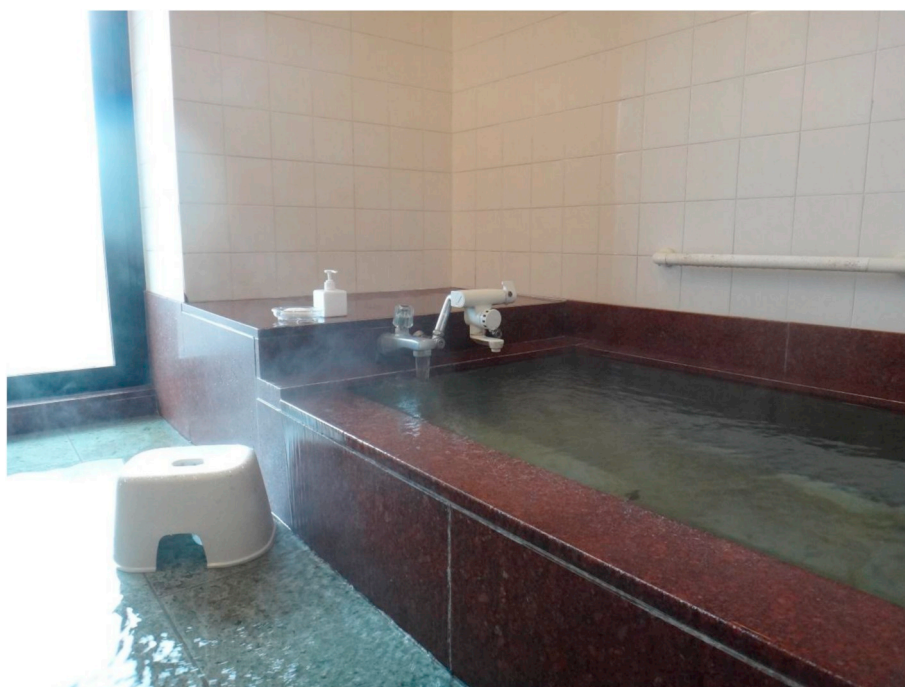


Fig. 1. An example of a hot spring for general home use in Atami. Hot spring water with high chloride content can be accessed in the home by simply turning on a faucet.

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