

**Results of a Questionnaire Survey Conducted During a Health Checkup for
Yakumo Town Residents
- Comparison of the Presence or Absence of Dizziness and the State of
Tinnitus, Salivation, Taste and Smell -**

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doi: 10.51505/ijmshr.2025.9612

URL: <http://dx.doi.org/10.51505/ijmshr.2025.9612>

Received: Nov 03, 2025

Accepted: Nov 10, 2025

Online Published: Dec 13, 2025

Abstract

Yakumo Town in Hokkaido, Japan is a rural town with a population of approximately 15000 people, where the population is semi-agricultural and semi-fishing. The town had little population movement and is cooperating with the prospective cohort study. A self-administered questionnaire survey in the otolaryngology department at a Yakumo Town resident health checkup compared the presence or absence of subjective dizziness with various subjective symptoms (taste, smell, saliva secretion, tinnitus, meal frequency, frequency of eating out, tongue inflammation) and simple tests (salt taste, smell, chewing ability). The results showed that of the 274 participants (114 men, 160 women), those with subjective dizziness also had poor saliva secretion (chi-square test result, $P = 0.008$) and tinnitus (chi-square test result, $P = 0.0001$). One of the home guidance measures for dizziness patients is to stay hydrated, do light exercise, and maintain a regular diet. To clarify the results of this study, we believe it is necessary to add the amount of water consumed to the questionnaire survey items and also measure saliva volume. The result of this study are cross-sectional results from a single year, we believe that in the future it will be necessary to conduct longitudinal studies on the same participants over multiple years.

Keyword: Yakumo Study, Questionnaire survey, Health checkup, Dizziness, salivation

1. Introduction

A prospective cohort study is being conducted in Yakumo Town, Hokkaido, Japan, where residents undergo a health checkup. At the end of August each year, a self-administered questionnaire survey is conducted on otolaryngological items such as dizziness, tinnitus, sense of

taste, sense of smell, and saliva secretion. The results of the otolaryngological questionnaire survey conducted in September 2024 were compiled, and each questionnaire item was compared depending on whether or not dizziness was present. The Yakumo Yown Study has been ongoing for 40 years, and the ENT Department has been participation since 2005. Due to the COVID-19 pandemic, the study was canceled in 2020 and 2021, but from 2022 to 2023 onwards it was held again with various restrictions in place, and in 2024 it was possible to conduct resident screenings similar to those in 2019. The pre-examination questionnaire about ENT issues asks about the participants condition form about one month prior to the examination. This research requires the cooperation of everyone who will participate in the Yakumo Town resident health checkups. The cooperation of the Yakumo Town Hall Staff is also essential.

It is necessary to minimize the burden on participants in resident health checkups, and to accept as many participants as possible within a given time frame by conducting only essential tests and completing a minimal number of questionnaires.

Therefore, we used a simple taste test (Solsave: manufactured by Advantec), a simple smell test (smelling stick: manufactured by Daiichi Pharmaceutical Industry Co., Ltd.), and a simple chewing force test (chewing force gum: manufactured by Lotte Co., Ltd.), and the direct questionnaire asked about the presence or absence of subjective tinnitus, dizziness, saliva secretion, tongue inflammation, taste state, smell state, number of meals a day, and frequency of eating out, in the past month. There results were compared statistically and are reported here.

2. Method

A simple test and questionnaire were conducted on people who participated in an ENT health check. In 2024, 274 people aged 40 years or older (114 men, 160 women) who participated in the Yakumo Town Resident Health Checkup in an ENT held from August 29th to September 1st.

2.1. Inspection contents

The taste test used Advantech's Solsave to assess salt teste. Participants upt a filter paper for the taste test in to their mouths to check the taste, and then selected on of the following in the answer column of the checklist: 1: sweet, 2: salty, 3: sour, 4: bitter, 5: I can't tell what it is, but I can taste it, 6: tasteless, and they wrote a number in the answer column.

The odor sticks are manufactured by Daiichi Pharmaceutical Industry Co., Ltd., and the test tests participants' ability to identify 12 odors commonly experienced in Japanese daily life (ink, wood, perfume, menthol, mandarin oranges, curry, household gas, roses, cypress, sweaty socks, condensed milk, and fried garlic). Participants smell the odors smeared on filter paper and select one of six options (numbers 1 to 4 have the names of different odors written on them, with one correct answer; number 5 is an odor that you can smell, but you don't know what it is; and number 6 is odorless), then they write the number in the answer box.

Participants were given a preliminary questionnaire in which they were asked to answer questions about their subjective dizziness, tinnitus, tongue inflammation, taste and smell, saliva secretion, number of meals eaten, and frequency of eating out.

2.2. Statistical processing

Statistical analysis (Wilcoxon test) was performed to compare the results obtained. The results of the taste test, the smell test, and subjective questionnaires were compared with the presence or absence of dizziness.

3. Results

The results obtained from 274 people aged 40 years or older (114 men, 160 women) who participated in the Yakumo Town Resident Health Checkup held from August 29th to September 1st, 2024, visited an otolaryngologist, and completed taste, smell, and chewing ability tests as well as otolaryngological and dietary questionnaires were divided into two groups based on whether they experienced dizziness, and each item was thoroughly compared.

3.1 Results of subjective dizziness

Of the 274 participants (114 men and 160 women), a comparison of male and female by the presence or absence of subjective dizziness showed that female reported more subjective dizziness than male (statistics: chi-square test $P = 0.019$) (see Table 1).

Table 1. Presence of absence of subjective dizziness among residents participating in health checkups

χ -square test result $P=0.019^*$		
	Presence	Absence
Male (114)	30	84
Female (160)	64	96

3.2. Results of comparison between subjective dizziness and subjective sense of another

The presence or absence of subjective dizziness was compared with the results of a simple salt taste test, simple smell test, simple chewing force test, subjective taste state, subjective smell state, frequency of food intake, frequency of eating out, presence or absence of subjective tinnitus, subjective saliva secretion state, and subjective presence or absence of tongue inflammation.

There was no statistically significant difference in the results of the taste, smell, and chewing ability tests between those with and without dizziness (See Table 2, 3, 4).

Table 2. Comparison of salt taste test results with and without dizziness

	Average value	Standard deviation	unpaired-t test
Dizziness presence	0.787	0.29	P=0.473
Dizziness absence	0.816	0.227	

Table 3. Comparison of olfactory test results with and without dizziness

	Average value	Standard deviation	unpaired-t test
Dizziness presence	7.032	2.682	P=0.668
Dizziness absence	6.883	2.743	

Table 4. Comparison of chewing force test results with and without dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	3.925	0.741	P=0.182
Dizziness absence	3.815	0.709	

There was no statistically significant difference in the results of subjective salty taste and smell between those with and without dizziness (See Table 5, 6).

Table 5. Subjective sense of taste depending on whether or not there is dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	1.681	0.553	P=0.190
Dizziness absence	1.587	0.537	

Table 6. Subjective sense of smell depending on whether or not there is dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	1.66	0.597	P=0.972
Dizziness absence	1.676	0.659	

There was also no statistically significant difference in the frequency of eating out or eating three meals a day between those with and without dizziness (See Table 7, 8).

Table 7. Comparison of eating habits (three meals a day) between with and without dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	2.436	0.887	P=0.346
Dizziness absence	2.537	0.821	

Table 8. Comparison of eating habits (frequency of eating out) between those with and without dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	5.106	1.931	P=0.959
Dizziness absence	5.102	1.868	

It was found that those with dizziness also had tinnitus (P=0.0001**) and poor saliva secretion (P=0.008**) (See Table 9, 10).

Table 9. Presence or absence of subjective tinnitus depending on the presence or absence of dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	1.776	0.612	P=0.0001**
Dizziness absence	1.48	0.682	

Table 10. Subjective salivation depending on the presence or absence of dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	1.936	0.545	P=0.008**
Dizziness absence	1.75	0.587	

There was no statistically significant difference between the presence or absence of subjective dizziness and tongue inflammation (See Table 11).

Table 11. Presence or absence of tongue inflammation depending on the presence or absence of dizziness

	Average value	Standard deviation	Mann-Whitney test
Dizziness presence	1.409	0.769	P=0.070
Dizziness absence	1.254	0.646	

4. Discussion

For many years, we have conducted questionnaire surveys and simple tests in the ENT field as part of Yakumo Town's resident health checkups and have reported on the results^{1, 2, 3, 4, 5, 6,7}.

Based on the results of a questionnaire survey conducted during a health checkup for residents of Yakumo Town (2024), we compared the presence or absence of subjective dizziness with other otolaryngological items and simple test results. Results showed no statistically significant differences between the presence or absence of subjective dizziness and the simple test results for taste, smell, chewing strength, and subjective taste and smell. There was also no statistically significant difference with subjective tongue inflammation. However, there was a statistically significant difference with tinnitus, a result consistent with previous our reports^{8, 9}). Because subjective saliva secretion was statistically significantly worse in the presence of subjective dizziness, we believe it is necessary to further investigate its relationship with fluid intake. Many researchers have reported that fluid intake is an effective treatment for dizziness^{10, 11}). This is because the fluid balance in the inner ear can be disrupted. And dizziness can be caused by edema in the inner ear.

However, in this study, participants were only asked whether they felt dizzy (there was no question about whether they had a spinning or floating sensation), and no examinations regarding dizziness were actually conducted at an otolaryngology clinic. Also, the question about saliva secretion volume was asked in a questionnaire, so actual saliva volume was not measured. We believe that there points require further detailed test results in the future.

Based on the results of this study, we believe that it will be necessary to conduct a more detailed dietary questionnaire and a survey on fluid intake related to saliva secretion (which is also related to dizziness) in the health checkups for residents of Yakumo Town, Hokkaido.

Acknowledgments

The research was supported by the Japan Society for the Promotion of Science (JSPS) Grant-in-Aid for Scientific Research (C) No.20K02372.

Reference

- Naomi Katayama, Shoko Kondo, Hironao Ootake, Masaaki Teraichi, Michihiko Sone, Yasushi Fujimoto, Hirokazu Suzuki, Saiko Sugiura, Seiichi Nakata, Tsutomu Nakashima (2017). Odor and Salt Taste Identification in Older Adults : Evidence from Yakumo Study. *Advances in Sciences and Engineering*, Vol . 9, No.1 P20-31
- Naomi Katayama, Shoko Kondo, Satofumi Sugimoto, Seiya Goto, Wakako Kinoshita, Masaaki Teranishi, Michihiko Sone, Yasushi Fujimoto, Hironao Otake, Hirokazu Suzuki, Naoki Saji, Takafumi Nakada, Seiichi Nakata, Tsutomu Nakashima (2019). Odor and salt taste identification in older adults: evidence from the Yakumo study in August 2014. *Journal of Human Virology & Retrovirology* 2019; 7(1):10–12.

- Naomi Katayama, Shoko Kondo, Yui Nakayama, Takafumi Nakada, Seiya Goto, Satofumi Sugimoto, Wakako Kinoshita, Masaaki Teranishi, Michihiko Sone, Yasushi Fujimoto, Hironao Otake, Hirokazu Suzuki, Seiichi Nakata and Tsutomu Nakashima (2019). The olfactometry and taste examination results for ten years (2009-2018) in the Yakumo study by using the data of the teste list. *Academia Journal of Medicinal Plants* 7(2): 055-065, February 2019
- Naomi Katayama, Shoko Kondo, Satofumi Sugimoto, Wakako Kinoshita, Masaaki Teranishi, Michihiko Sone, Yasushi Fujimoto, Hironao Otake, Hirokazu Suzuki, Saiko Sugiura, Takafumi Nakada, Naoki Saji, Seiichi Nakata and Tsutomu Nakashima (2019). Odor and salt taste identification in older adults: Evidence from the Yakumo Study in August, 2018. *Academia Journal of Medicinal Plants* 7(3): 066-071, March 2019
- Naomi Katayama, Shoko Kondo, Yui Nakayama, Takafumi Nakada, Seiya Goto, Satofumi Sugimoto, Wakako Kinoshita, Masaaki Teranishi, Michihiko Sone, Yasushi Fujimoto, Hironao Otake, Hirokazu Suzuki, Naoki Saji, Seiichi Nakata and Tsutomu Nakashima (2019). Comparison of Inspection Data by Difference in Odor Inspection Kit (Including Results of Young and Old age). *Journal of Health Science* 7(2019) 160-165
- Naomi katayama, Shoko Kondo, Satofumi Sugimoto, Tadao Yoshida, Masaaki Teranishi, Michihiko Sone, Yasushi Fujimoto, Hironao Otake, Hirokazu Suzuki, Takafumi Nakada, Naoki Saji, Seiichi Nakata nad Tsutomu Nakashima (2020). Odor and salt taste identification in older adults: Evidence form the Yakumo (2019). *Academia Journal of Medicinal Plants* 8(3): 030-035
- Naomi Katayama, Shoko Kondo, Satofumi Sugimoto, Tadao Yoshida, Masaaki Teranishi, Michihiko Sone, Yasushi Fujimoto, Hironao Otake, Hirokazu Suzuki, Takafumi Nakada, Naoki Saji, Seiichi Nakata & Tsutomu Nakashima (2020). Odor Identification in Older Adults: Evidence from the Yakumo (2019)- Results by Gender and Age. *Global Journal of Medical Research: K Interdisciplinary* Volume 20 Issue 4 Version 1.0 Year 2020 17-22
- Naomi Katayama: (2022). Comparison of Taste and Smell Test Results Before and After COVID-19 in Yakumo Residents Health Checkup Comparison between 2019_and 2022. *Global Journal of Medical Research: L_Nutrition & Food Science_Volume* 22 Issue 2 Version 1.0: 21-29
- Katayama N, Yoshida T, Nakasguna T, Kobayashi M, Suzuki H, Hamajima N, Sone M.: Lifestyle habits and examination findings before and during the COVID-19 pandemic: From health checkup in a rural area in Japan (2024). Epub 2024 June 24. Pmid: 38913077 *Nutrition and Health* 2024 May 22:2601060241256201
Online ahead of print PMID: 38778709
- Naganuma H et.al. (2006). Water may cure patients with Meniere's disease. *Laryngoscope* 116: 1455-1460.
- Fukuoka, H., Usamai S (2018). Reduction of the rate of recurrence of benign paroxysmal positional vertigo after hydration treatment. *Otologia* 64:7-10