

The Effects of Continuous Hydrogen Inhalation on Cognitive and Physical Functions

Test Data



Industry-Government-Academia Collaboration Hydrogen Gas
Intervention Test

Introduction

Our mission at AquaBank is to 'use hydrogen to extend the healthy life expectancy of people around the world'.

Under the supervision of Professor Yada of the Tsukuba Graduate School of Integrative Psychology, we have conducted clinical tests and research on the efficiency of hydrogen inhalation, and also have collected quantitative data on both its physical and mental effects.

As a result of verification by having people of a wide range of generations use it, it was confirmed that when elderly people over 60 years old inhaled hydrogen, each function controlled by the brain such as memory function, hearing, and visual acuity improves.

This evidence data led to this intervention trial.

Background of Nishinoomote City's "Dementia Risk Measurement Meeting"

While Japan as a whole is expected to have an aging population rate of around 40% in 2060, Nishinoomote City is expected to reach this by 2025. The current Nishinoomote city

It is said to be a microcosm of Japan's future 20 years from now.

About 30% of the elderly who were recognised as requiring long-term care in Motoichi were dementia patients.

Considering that there are those who have not yet been recognised as dementia patients as well as those who are at risk of suffering with dementia, the countermeasure is considered urgent.

Therefore, I was introduced to Professor Yukihiro Yada, a professor at the University of Tsukuba, who is working on measures against dementia, and started the initiative.

First of all a measurement meeting was held to confirm the situation of the elderly in the region, including dementia rates.

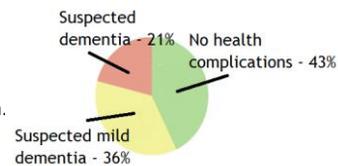
A survey was conducted on about 500 elderly people over a year from 2017, and as a result, 21% were suspected of having cognitive decline.

It turned out that some people "needed immediate treatment".

In addition, 36% of people are suspected of having mild cognitive impairment (MCI risk zone).

As a result, about 100 people had decreased living function and cognitive function. 43% were diagnosed as healthy.

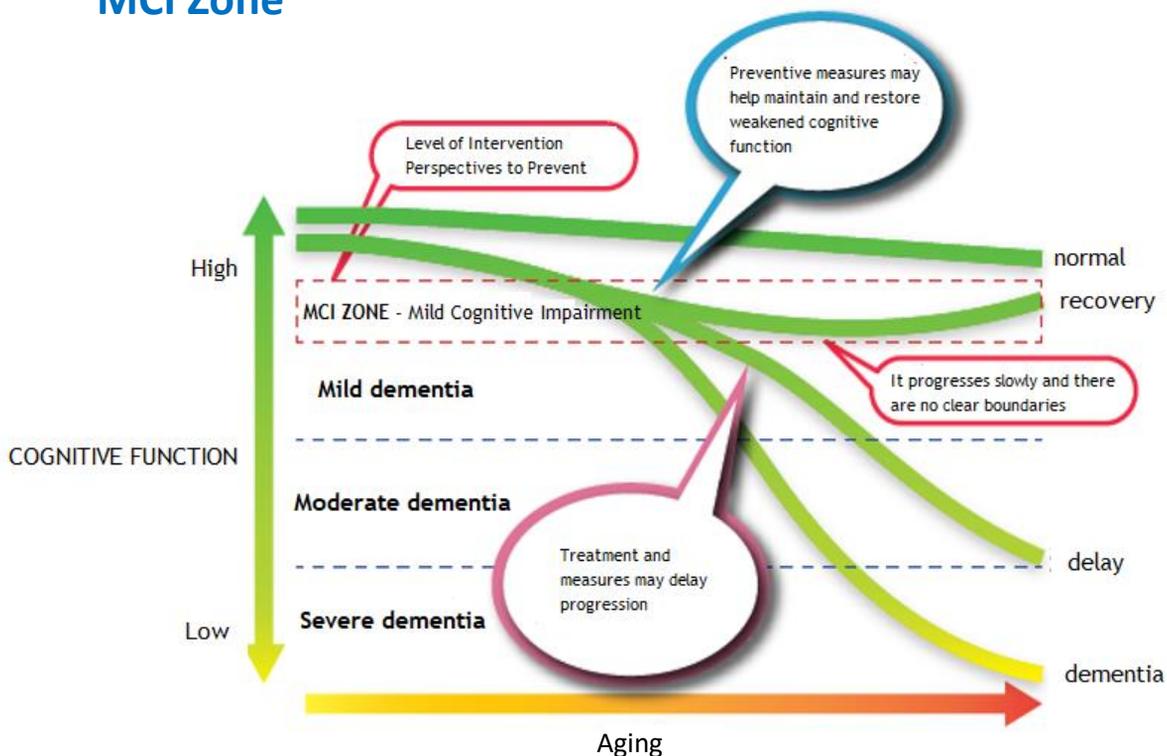
After observing and assessing the situation, I realized the importance of having defenses against dementia.



The Purpose of this Research

This time, people in the MCI risk zone will be examined to learn whether or not the continuous use of hydrogen gas inhalation improves brain executive function and other functions, leading to reduction of cognitive impairment.

MCI Zone



Cognitive Function & Hydrogen Gas Inhalation

Survey subjects: 7 elderly people (2 males and 5 females) living in Nishinoomote City, Kagoshima Prefecture, average age 79.3 ± 5.9

Survey period: May-July 2018

Test equipment: Portable hydrogen gas suction device KENCOS2-S

Intervention method: One-time 5-minute hydrogen aspiration is performed by each person with the goal of 5 times daily.

Measurement details: The following psychological and physiological indicators were measured before and after the intervention for comparison of interventions.

Cognitive function: Mini Mental State Examination (MMSE) LCI was suspected on a scale of 24 to 27 out of 30.

Depression Scale (SDS)

Mental health: WHO SUBI

Insomnia: Athens Insomnia Scale (AIS)

Measurement of brain age (A-TMT test) and defect age.

Measurement of brain executive function and center of gravity sway.

Inspection items: Questionnaire (QOL, fragrance inspection, course solid, etc.)

Physiological measurement: Brain executive function meter / brain age meter

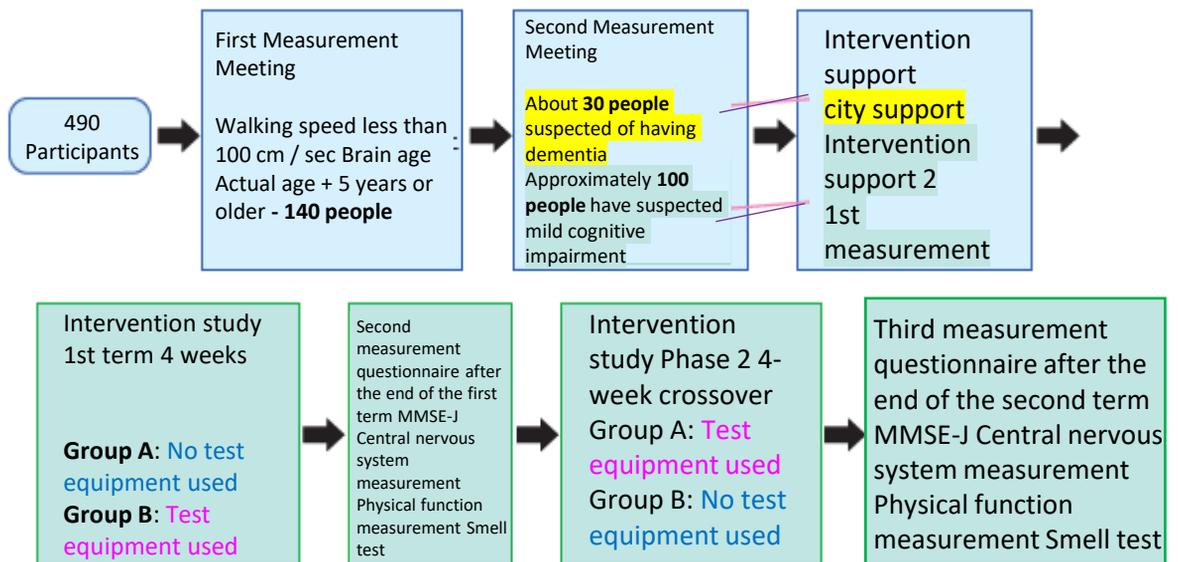
Statistical scientific analysis: t-test and effect size (r)

were calculated for comparison before and after the intervention.

IBM SPSS Statistics 25 was used for the analysis.



Hydrogen inhalation intervention test protocol



This study was conducted with the approval of the Chiyoda Paramedical Clinic Logical Review Committee, and the purpose and content of the survey were explained to the subjects in advance, and consent was obtained in the consent form.

At the test site, the test was conducted in the presence of the attending physician or nurse.

MMSE-J



MMSE is often used as a test to measure dementia.

The MMSE evaluation items consist of 11 inspections using the evaluation sheet shown on the left.

Time orientation, location orientation, immediate recall, attention and computing power with delayed playback for each item, evaluate several cognitive functions such as (short-term memory), linguistic ability, and graphical ability (spatial cognition)

The subjects of this survey are those with a MMSE score of 26 to 24 who are suspected of having mild dementia.

Overall Results

Psychophysiological effects of continuous hydrogen inhalation on the elderly in the community with cognitive decline

Results: One month of hydrogen inhalation improved MMSE score ($t = 5.28$, $p < .001$, $r = .84$), decreased vascular age ($t = 2.24$, $p < .05$, $r = .54$),

Decrease in SDS score ($t = 2.25$, $p < .10$, $r = .61$), improvement in self-confidence ($t = 1.89$, $p < .10$, $r = .48$), decrease in AIS score ($t = 2.00$, $p < .10$, $r = .50$),

Movement of the center of gravity sway center point (Y) ($t = 2.68$, $p < .05$, $r = .61$) was observed.

Conclusion: It was found that continuous use of hydrogen suction for one month improved cognitive function and made the blood vessel age younger than the actual age. Also, there were psychological improvement effects such as improvement of depression and insomnia and improvement of self-confidence were also recognized, so the overall improvement of mental and physical functions by hydrogen is suggested in the results.

- The MMSE score recovered to the normal range.
- The blood vessel age became younger than the actual age.
- Depression score dropped significantly
- Improved self-confidence
- The score for insomnia has dropped

Some very interesting results can be learned from this:

The MMSE consists of simple questions, therefore it may seem easy to achieve a high score. However, the participants who could not answer the questions 4 weeks prior could do so after the regular hydrogen inhalation.

In an unprecedented intervention trial involving industry, government and academia, we discover that hydrogen may help prevent dementia. A ray of light has been found.

Despite the tasteless and odorless hydrogen, more than 90% of the subjects requested to continue hydrogen inhalation even after the intervention test.

The results are nothing but what the subject actually felt and experienced. Hydrogen inhalation could become the norm for assistance in dementia prevention. In the future, we will continue to analyze but analyze from various angles, and continue to clarify the health effects of hydrogen inhalation.

*Graduate School of Comprehensive Human Sciences, University of Tsukuba
Yuichi Okamura*

Voice of the person in charge of the local government

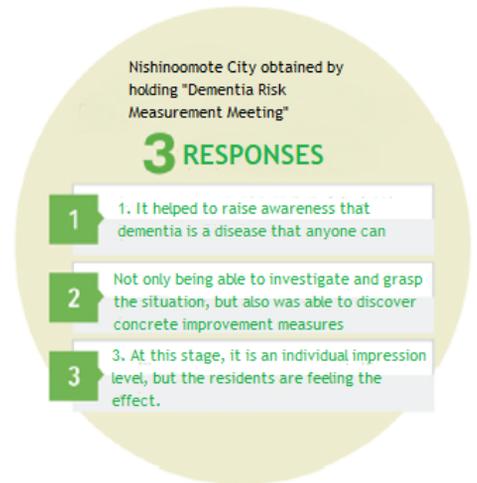
There are positive opinions from users.

As a matter of fact, I am also currently participating in a special hydrogen inhalation program. I have personally felt the positive effects, in particular improved sleep.

In addition to this product being portable and easy to use, it is said to have a direct effect on cognitive function. I believe it will be very popular.

The original goal of this research was to understand the current situation and spread awareness.

This time we were able to go into specific improvement measures. In the future, we hope that this initiative will develop and spread nationwide as a model case of dementia countermeasures originating in Nishinoomote City.



University of Tsukuba Graduate School of Global Education Human Biology Degree Program Professor

Doctor of Medicine Yukihiro Yada

If we can combine "government and academia" with "industry" technology, we can take measures against dementia.

The AquaBank product we used this time has already been proven. We have completed the intervention trial and we are now in the process of analyzing the data, and I think there is a clear improvement in each case. The great value of this project, aside from the results being analyzed, is that we were able to conduct an interventional study with the participation of 'industry'. In the past, there have been many efforts by "government and academia". In fact, all kinds of studies have been conducted and published. However, most of them end there and nothing usually comes of the research. It should be important to take measures in response to the surveys and presentations. Support for the elderly usually gets stuck at that point. Local governments also tend to limit themselves to promoting exercise such as walking and gymnastics. It is true that exercise is a good approach, but it is not the only one. There is no doubt that exercise is a good approach. But in many cases, it is just that. That's why I believe that this specific initiative, which incorporates 'industry' technology, is a breakthrough.

Dementia is a disease, and the burden of medical costs can be reduced by providing care in the preliminary stages. In the future,

I would like to continue our efforts to prevent dementia through 'industry-government-academia' initiatives.

Takashi Takehara, CEO of Aquabank Co., Ltd.

Research has been progressing for a long time because it has been said that inhaling hydrogen may have a positive effect on the body, and we are also paying attention to it.

Hydrogen inhalation machines have been around for a long time, but they are stationary types and large in size and usually the method of inhalation is through the nose. This method is of course not portable. You cannot see hydrogen and it has no scent, therefore it can be hard to enjoy as a regular habit. Therefore, we developed a portable inhaler that has a flavor option equipped and is portable to allow the user to inhale hydrogen through the mouth.

Furthermore, under the supervision of Dr. Yada, we verified the effects of inhaling hydrogen on the body.

We do not necessarily believe that hydrogen is a perfect solution. If the lifestyle of "breathing in hydrogen" on a daily basis in addition to walking and exercising becomes widespread, we will be able to provide more health benefits to the elderly. This is the mission of our company as a healthcare venture.

Future outlook

- Increase the number of samples and verify in detail such as gender and age.
- Practice of health care aimed at maintaining and improving the health of the elderly.

The 25th Annual Meeting of the Japanese Society of Behavioral Medicine

*What we can do for lifestyle-related diseases
and mental health problems in an aging
society:*

*Fusion of clinical medicine, public health
and psychology*

Program . Summary

2018.12.08 (Sat) • 12.09 (Sun)

- 📍 Venue - Tokushima University, Jousanjima Campus - 1-chome, Minamijousanjima-cho, Tokushima-shi
- ★ University President - Mitsuhiro Nakao (International University of Health and Welfare School of Medicine - Psychosomatic Medicine (Sanno Hospital) Professor) **JSBM**

Psychophysiological effects of hydrogen therapy on elderly people living in areas with cognitive decline

Okamura Yuu
Seiko Hirokawa
Junya Shimada
Momoka Tagami
Takehara Takashi
Toshiharu Miyake
Hayashi Yukari
Yukihiro Yada

Graduate School of Comprehensive Human Sciences, University of Tsukuba
Okayama Prefectural University Graduate School of Health and Welfare
University of Tsukuba Graduate School of Global Education
Kurume University Faculty of Letters Department of Psychology
AquaBank Co., Ltd
AquaBank Co., Ltd
AquaBank Co., Ltd
University of Tsukuba Graduate School of Global Education

(Objective)

With the increase in the elderly population, the number of elderly people with cognitive impairment is increasing year by year, and the prevalence of cognitive impairment is expected to reach 20% by 2025, which suggests the importance of preventive care to prevent cognitive decline.

In recent years, the psychophysiological effects of hydrogen inhalation have caught the world's attention. Reported scientific findings suggest that hydrogen inhalation offers improvement of cognitive function such as improvement of memory and concentration, and activation of the brain. Therefore, this research was conducted over a one-month period for elderly people living in the community who were suspected of having mild cognitive impairment.

We conducted a comparative test before and after continuous use of hydrogen inhalation to verify the psychophysiological effectiveness.

(Method)

Participants: Seven elderly residents of Nishinoomote City, Kagoshima Prefecture (two males and five females, average age 79.3 ± 5.9 years).

. Mini-Mental State Examination (MMSE) was used as a screening test for dementia.

. The Self-rating Depression Scale, the WHO SUBI, and the Athens Insomnia Scale were used to measure the psychological aspects.

. In addition, brain age and vascular age measurements (Raku-Raku Wellness, Inc.) were used as physiological measurements. The measurements were conducted before and after the intervention. Intervention method: A hydrogen inhaler (KENCOS2-S, AquaBank Co., Ltd. was inhaled for 5 minutes 5 times a day for 1 month.

The study was conducted under the approval of the Ethical Review Committee of the Chiyodara Medical Care Clinic. After the consent form was obtained, the study was conducted in the presence of the doctor or nurse in charge of the city hall. Methods of analysis:

MMSE scores of 27 or higher on the MMSE out of a total of 30 were classified as not applicable, and scores between 24 and 26 were classified as suspected mild cognitive impairment.

The t-test and effect size (r) test were performed for comparison.

(Results)

【MMSE score improved ($t = 5.28, p < .001, r = .84$) and blood vessel age decreased by 1 month hydrogen suction ($t = 2.24, p < .05, r = .54$), decrease in SDS score ($t = 2.25, p < .10, r = .61$), improvement in self-confidence ($t = 1.89, p < .10, r = .48$), AIS score

A decrease in points ($t = 2.00, p < .10, r = .50$) and a shift in the center of gravity sway center point (Y) ($t = 2.68, p < .05, r = .61$) were observed.

(Conclusion)

It was found that continuous hydrogen aspiration for one month improved cognitive function and made vascular age younger than actual age.

In addition, psychological effects such as improvement of depression, insomnia, and self-confidence were also observed.

The results suggest that hydrogen inhalation improves mental and physical functions.

Health Support

Japanese Journal of Health Promotion

Volume 21 No. 1

1st February 2019

Original Treatise

- Basic research on swelling of lower legs of female nurses.....1
Akiko Shirogamoto, Noriko Hato
- Physical, cognitive, and psychological functional characteristics of presarcopenia in community-dwelling elderly.....11
Mori Kōhei, Murata Shin, Shiraiwa Kayoko, Abiko Teppei, Iwase Hiroaki, Naitō Kō ,
Nonaka Hiroshi Nakano, Hideki, Horie Jun
- Relationship between driving anxiety and cognitive function in elderly drivers-Fukuoka Nakagawa study.....19
Yujiro Furuse, Masahiro Ikenaga, Yosuke Yamada, Noriko Takeda, Kazuhiro Morimura,
Yukiko Machida, Midori Kuriyama, Nobuyuki Miyoshi,
Misaka Kimura, Akira Kiyonaga, Yasuki Higaki, Hiroaki Tanaka
- Verification of the results of a weight loss support
program led by residents considering the issues extracted by qualitative analysis.....29
Ryoko Mizushima, Hiroyuki Sasai, Yoshio Tanaka, Kiyoji Maeda, Kiyoji Tanaka
- The reality of the sense of purpose of life of frail
elderly people living in the community and the factors that influence it.....39
Hiromi Kimura, Mitori Nishio, Hiroko Kukihara, Kayoko Koga, Yuriko Inoue
- Factors related to worker sleep and subjective health 6 months after the Kumamoto earthquake.....45
Kayoko Koga, Hiromi Kimura, Yasuki Higaki, Mitori Nishio, Hiroko Kukihara, Satoshi
Ikeda, Yuriko Inoue

Conference News

- Information on the 20th Annual Meeting of the Japan Society for Health Support.....53
- Treatise rules (Japanese, European).....133
- Japan Society for Health Support Constitution.....137
- Japan Society for Health Support Officers, Directors, Councilors.....139
- Supporting member list.....142

健康支援

Jpn.J.Health Promotion

ホームページ <http://jsbp.umin.jp/>

Japan Society for Health Support

Analysis of the mind and body of the elderly living in Nishinoomote City and an attempt to support intervention by industry, government and academia IV

Effect on cognitive function by continuous use of hydrogen inhalation

Yu Okamura, Takashi Takehara, Toshiharu Miyake, Yukari Hayashi, Masaki Mori, Toshikazu Yamanaka, Seiko Hirokawa, Junya Shimada, Yukihiko Yada, Graduate School of Comprehensive Human Sciences, Aquabank Co., Ltd., Okayama Prefectural University Graduate School of Health and Welfare, University of Tsukuba Graduate School of Global Education

(Background)

Nishinoomote City, Kagoshima Prefecture (Elderly Support Division) conducted a year-long survey on the cognitive function of the local elderly in collaboration with the government and academia last year.

As a result, it became clear that the decline in physical and mental health status and issues were broadly classified into "suspected cognitive decline," "problems sleeping," "frequent urination and light incontinence," and "suspected sarcopenia.

However, health conditions vary greatly from person to person, and there is a need for optimal methods of care tailored to individual health conditions.

In recent years, early detection and treatment of cognitive impairment due to aging are important, and efforts are being made to solve and alleviate the problem. However, it must be said that appropriate care to suppress the decline in cognitive function is still in a state of limbo.

(Objective)

In order to solve the health issues of the residents, we have started to provide intervention support in collaboration with industry, government and academia. Recently, the psychophysiological effects of hydrogen inhalation have been attracting attention.

According to Takehara et al. (2018), hydrogen inhalation has been suggested to improve cognitive functions such as memory and concentration.

According to Okamura et al. (2018), as a result of continuous hydrogen inhalation for one month in elderly people suspected of having mild cognitive impairment, improvement in cognitive function and reduction in vascular age, as well as reduction in depression and improvement in insomnia symptoms were reported.

In the present study, based on the results of the previous year, we conducted a comparative study on elderly people living in the community before and after continuous hydrogen aspiration for one month, and reported the psychophysiological efficacy.

(Method)

Participants: Residents of Nishinoomote City, Kagoshima Prefecture (12 males and 12 females, mean age 75.9 years old).

Content of the study: Mini-Mental State Examination (MMSE) was used as a screening tool for dementia.

Psychosocial measures included the Health Related Quality of Life Scale sf-36, the Self-rating Depression Scale, and the Mental Health WHO SUBI' Neuroticism Assessment GHQ-12.

For sleep, we used the Athens Insomnia Scale for insomnia assessment, and the Japanese version of the Pittsburgh Sleep Questionnaire for sleep disorders assessment.

In addition, brain age and vascular age measurements (Raku-Raku Wellness, WellUp Co., Ltd.), brain executive function measurement (Brain Executive Function Meter EF-60, Anima Co., Ltd.), 30-second chair rise test, and Timed Up & Go Test were conducted as physiological measurements.

The measurements were performed before and after the intervention of hydrogen aspiration.

Intervention method: A hydrogen aspiration apparatus (KENCOS2-S, Aquabank, Inc.) was used for one month, with the target of five minutes of hydrogen aspiration per session, five times a day.

Ethical considerations: The study was conducted under the approval of the Ethical Review Committee of the Chodabara Medical Care Clinic, and the consent form was obtained before the study was conducted in the presence of a doctor or nurse in charge of the city hall. There are no conflicts of interest related to this presentation that should be disclosed.

Methods of analysis: A t-test and an effect size (r) test were performed for the effect of continuous hydrogen aspiration.

(Results)

As a result of the t-test, the MMSE score improved ($t = 2.54$, $p < .05$, $r = .41$), the number of 30-second chair standing examinations increased ($t = 1.93$, $p < .10$, $r = .32$), A decrease in the fluctuation value of postural function ($t = 2.13$, $p < .05$, $r = .35$) was observed.

(Conclusion)

Improvement of cognitive function was confirmed as an effect of continuous hydrogen inhalation for 1 month.

In particular, it was suggested that it has the effect of enhancing cognitive function in the elderly who are suspected of having mild cognitive impairment.

It was also suggested that physical functions were improved, such as knee movements and decreased postural wobble.

Since the effects of hydrogen inhalation are still not well-known, we would like to clarify its effectiveness not only for the elderly but also for the health support of young people and working generations.