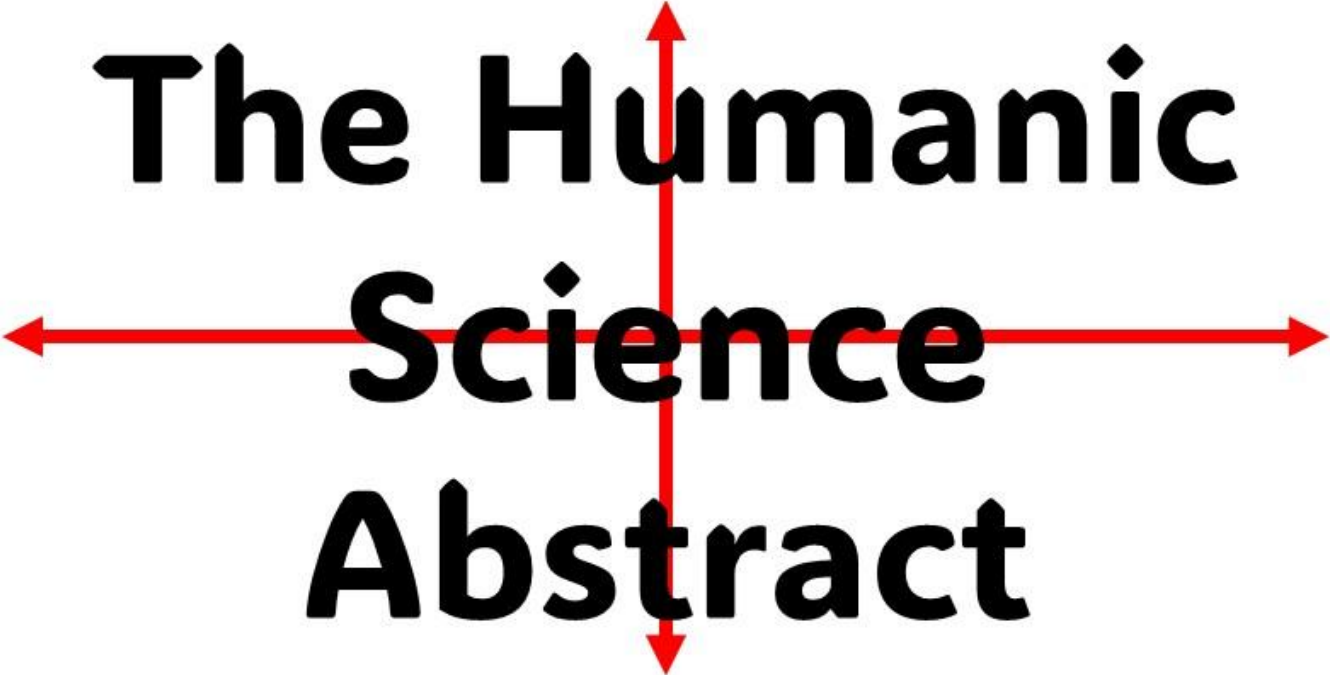


The Humanic Science Abstract



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[LETTER]

Development and Evaluation of an Insect Trapping Device: A Safe and High-Efficiency Capture Technology Utilizing Fermentation-Derived Carbon Dioxide and Multiple Attractants

NEMOTO Seiji¹ KIYOKAWA Takuma¹

< Abstract >

Blood-feeding insects such as mosquitoes are vectors of various infectious diseases, posing significant public health risks worldwide. Conventional control measures often rely on chemicals or fire, which raise safety and environmental concerns. This study presents the development of a portable insect trapping device that integrates multiple attractants—light, airflow, temperature, carbon dioxide, and fermentation odor—to achieve safe and effective capture. The device uses molasses waste and brewer's yeast for fermentation, producing carbon dioxide and odor, enhanced by a heating element. Airflow control merges heat and odor into the main airstream, directing insects to adhesive or electric trapping units. Tests demonstrated high capture efficiency without adverse human or environmental impacts, and the device functioned effectively in off-grid settings. This technology offers a sustainable alternative for vector control and public health improvement.

Key words: Fermentation attractant Mosquito trapping device Public health

I Introduction

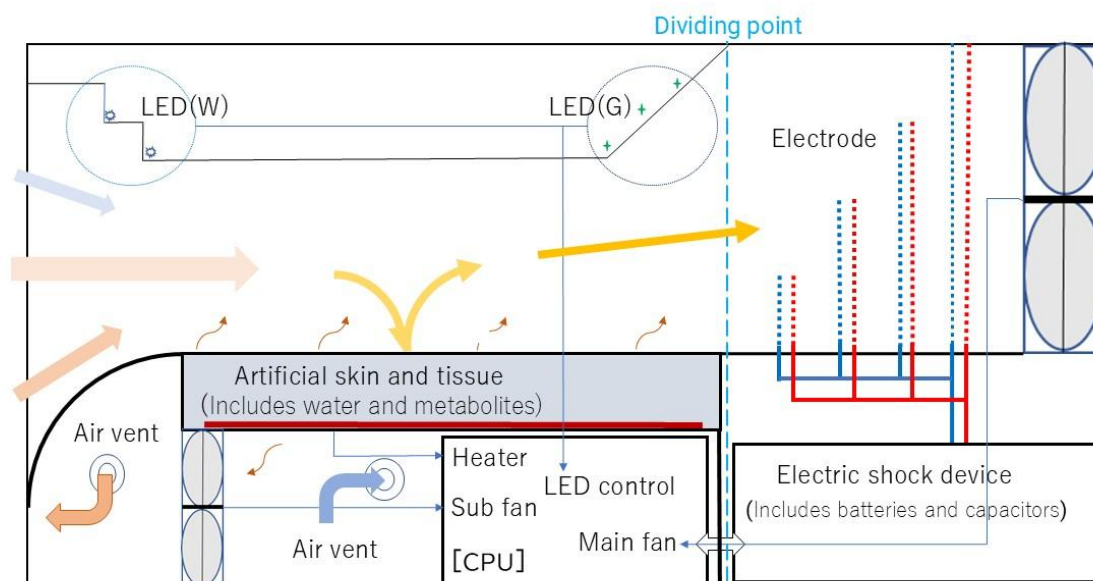
Mosquitoes and other blood-feeding insects transmit diseases such as dengue fever, Zika virus infection, and Japanese encephalitis, representing a global public health threat. Traditional control measures, including insecticides, repellents, and mosquito coils, have limitations such as human health risks, environmental pollution, and operational constraints. The spread of insecticide resistance

and chemical dependence further highlights the need for alternative, non-chemical vector control methods.

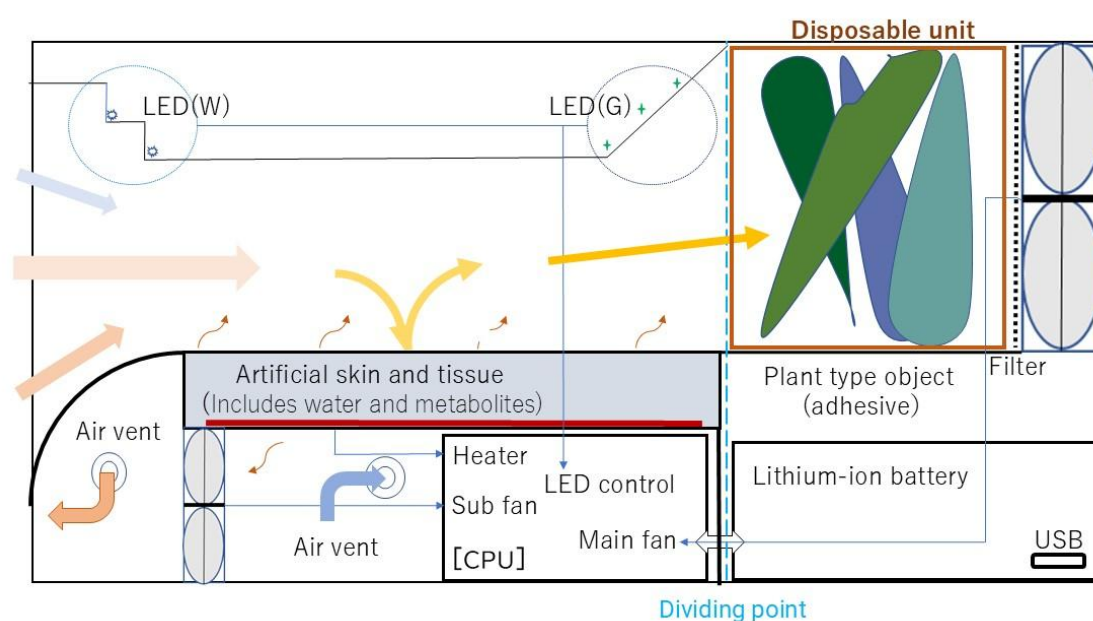
This study aims to develop an insect trapping device that is safe for humans, effective against target insects, and operable in both indoor and outdoor settings, including locations without an external power supply.

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A



B



II Materials and Methods

1 Device Structure

The device consists of a main body with vertical and horizontal orientations, featuring:

First attractive unit: A fan system generating front-to-rear airflow and an LED lighting unit for visual attraction.

Second attractant unit: A fermentation-based CO_2 and odor generator using molasses waste and brewer's yeast, supported by a heating element to accelerate fermentation.

Airflow control: A sub-fan channels heat and

odor to the front, merging with the main airflow to enhance insect guidance toward the trap.

Trapping mechanisms: Two options—adhesive sheet capture or high-voltage electric discharge—are selectable based on operational needs.

2 Operational Principle

When activated, the LED light attracts insects toward the device. Airflow combined with fermentation odor and CO_2 directs them into the main body, while heat maintains airflow

temperature near biological norms. Insects reaching the trapping section are captured either physically or electrically.

III Results

Operational tests showed that LED illumination effectively initiated insect approach. The synergistic effect of airflow, fermentation odor, and CO₂ significantly improved internal ingress rates. The heated airflow increased lure effectiveness. Adhesive trapping allowed for easy replacement and continuous operation, while the electric discharge method ensured rapid and reliable neutralization. No adverse human health effects or environmental hazards were observed. The rechargeable battery supported efficient use in off-grid outdoor conditions.

IV Discussion

The multi-attractant strategy markedly enhanced capture performance compared to single-attractant devices. The use of safe, food-derived fermentation materials offered dual attractants—odor and CO₂—without toxicological concerns. Airflow design ensured optimal environmental parameters for insect attraction. The flexibility to switch between adhesive and electric capture modes provides adaptability for different environments. The absence of chemical agents and open flames improves safety, reduces environmental load, and enhances portability.

V Discussion

The developed insect trapping device achieves high efficiency in capturing blood-feeding

insects through the integration of light, airflow, temperature, CO₂, and fermentation odor. It is safe for humans, environmentally friendly, and functional in non-powered locations. This technology can serve as an effective tool in prevention of vector-borne disease and public health management. Future work will focus on field testing under varied climatic conditions to optimize performance and durability.

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[LETTER]

An Investigation into Nurses' Perceptions of Physical Restraints

SHIMAZU Yusuke²**< Abstract >**

This study examined nurses' attitudes toward physical restraints in a hospital setting. Forty-one nurses completed a questionnaire covering experiences, emotions, initiation criteria, patient care, and restraint removal. Nearly all had used restraints but expressed a preference to avoid them. Few relied on official guidelines when initiating restraints, and many felt responsibility for accidents after removal. While nurses aimed to provide safe and minimally burdensome care, they noted ineffective conferences and unclear criteria. Suggestions included better staffing, improved environments, guideline awareness, and education. The study recommends revising and clarifying guidelines and using them as a framework in conferences.

Key words: Physical restraints Nurses' perceptions Ethical dilemmas

I Introduction

Physical restraints compromise human dignity and, therefore, should not be implemented as a standard practice. However, in medical institutions where patient treatment takes place, there are situations in which physical restraints are necessary to ensure patient safety. During my clinical experience, I have struggled with the ethical dilemma between the belief that restraints are necessary for safety and the desire to avoid using them whenever possible. This study aims to examine nurses' attitudes toward physical restraints at our hospital and to consider how we should approach restraint use in the future. The findings are presented and discussed below.

II Methods

The study targeted 41 nurses working in inpatient wards at our hospital. A self-developed questionnaire focusing on physical restraint was used to assess their attitudes. The questionnaire consisted of both multiple-choice and open-ended questions, covering the following five topics:

1. Experience with physical restraints
2. Emotional responses when using restraints
3. Criteria for initiating restraints
4. Patient care during restraint
5. Perceptions of restraint removal

III Results

1. **Experience:** Almost all participants reported having used physical

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3. Feelings when applying physical restraints

	Agree	Somewhat agree	Somewhat disagree	disagree
I think it is unavoidable	18	19	4	0
I would prefer not to do it	28	12	0	0
I think it should not be done under any circumstances	0	10	20	11
It does not bother me	0	3	18	20
I think it is safe	2	23	15	1

7. Assessment during the use of physical restraints

	Conscious of it	Somewhat conscious of it	Not very conscious of it	Not conscious of it
Carry it out in the most effective and least burdensome way to protect the patient's safety	18	19	4	0
Observe for adverse effects on joints, muscle strength, skin condition, mental state, etc.	28	12	0	0
Continuously evaluate the necessity and methods in conferences	0	10	20	11

restraints.

2. **Emotional Responses:** All respondents agreed with the statement, "I would prefer not to use restraints if possible."
3. **Initiation Criteria:** Only seven respondents indicated they effectively utilized the hospital's physical

restraint guidelines from the medical safety manual.

4. **Care During Restraint:** Nearly all participants agreed with the statements "We provide care using the most effective and least burdensome methods to ensure patient safety," and "We observe patients for

potential adverse effects on joints, muscles, skin, and mental state.”

5. **Restraint Removal:** Many nurses reported that “conferences are not functioning effectively” and “I feel responsible if an accident occurs after restraints are removed.”

Suggestions for reducing restraint use included: securing sufficient staffing, improving the care environment, prioritizing pharmacological management, increasing awareness of the guidelines, and enhancing knowledge and awareness through study sessions.

many respondents indicated difficulty in applying the guidelines, lack of clarity in criteria, and reliance on conferences for removal decisions.

To minimize the use of physical restraints and reduce ethical dilemmas faced by nurses, we propose the following measures:

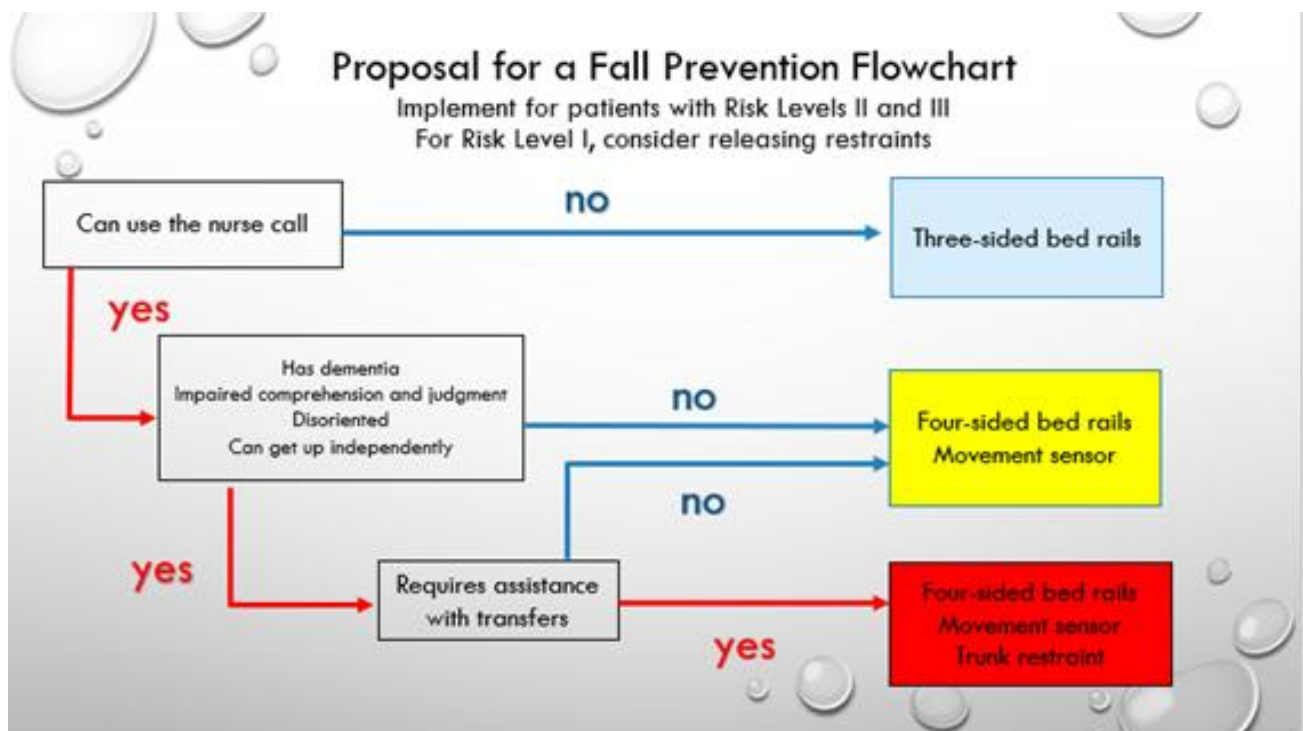
1. Revise the physical restraint guidelines in the medical safety manual to clearly define the criteria for implementation and removal.
2. Utilize the guidelines during conferences as a standardized framework for decision-making regarding the use and discontinuation of physical restraints.

IV Discussion

This survey revealed that although most nurses recognize that physical restraints should ideally be avoided, they still consider them necessary in some situations and apply them accordingly. Regarding decisions to initiate or remove restraints,

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[LETTER]

How University Libraries Respond to the Emerging Issue of Young Carers

IMOTO Saori³

< Abstract >

This study examines how university libraries in Japan respond to emerging social challenges, focusing on young carers—a relatively new concept in Japan. By analyzing 59 selected materials across 777 universities, the research reveals disparities in access based on university type and size. National and public universities generally hold more resources, while nearly one-third of private universities lack relevant materials. Education-focused institutions tend to have richer collections, whereas those specializing in technology or the arts often have fewer. These findings suggest that institutional characteristics shape libraries' responsiveness. Enhancing collections to reflect students' diverse realities is vital for inclusive academic environments.

Key words: Library Collection Development Young Carers Information Equity
Institutional Characteristics Student Support Services

I Objective

This study aims to examine how university libraries in Japan respond to emerging social issues by investigating the availability of materials related to "young carers"—a relatively new concept in Japanese society. The research explores whether university libraries are equipped to support students who may themselves be young carers or former young carers.

II Methods

A total of 59 books and audiovisual materials related to young carers were selected through subject and keyword searches

in CiNii Books. Holdings data were collected from 777 universities registered in NACSIS-CAT, including national, public, and private institutions.

The analysis focused on two main factors:
(1) the relationship between university type (national, public, private) and holdings,
(2) the relationship between university size (classified as A-D) and the number of holdings. Based on a survey by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Colleges and universities are classified according to the number of faculties A : 8 or more faculties B : 5-7faculties C : 2-4faculties D : 1faculty.

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Table 1. Number of Institutions Lacking Related Books, by Institutional Category

Type of University	Number of Institutions Surveyed	Not Held	Non-holding Rate
National	85	12	14.1%
Public	101	18	17.8%
Private	591	183	31.0%

Table 2. Median Number of Holdings and Total Volumes by University Size

Category	Median Number of Holdings	Median Total Volumes
National and Public Universities (Overall)	7.0	7.0
University Size A	15.5	16.5
B	7.0	8.0
C	7.0	7.0
D	2.0	2.0

Table 4. Universities with the Most Holdings (Public Universities)

University Name	University Size	Number of Holdings
Saitama Prefectural University	D	30
Osaka Metropolitan University	A	27
Tokyo Metropolitan University	B	23
Tsuru University	C	23
University of Shimane	C	20
Prefectural University of Hiroshima	B	20
Aichi Prefectural University	B	19
Hiroshima City University	C	19
Aomori University of Health and Welfare	D	18
Iwate Prefectural University	C	18
Mie Prefectural College of Nursing	D	18
Kumamoto Prefectural University	C	18

Table 3. Universities with the Most Holdings (National Universities)

University Name	University Size	Number of Holdings
Hokkaido University of Education	D	24
Osaka Kyoiku University	D	23
Shimane University	B	22
The University of Tokyo	A	21
Kanazawa University	A	20
Kyoto University	A	20
Nagoya University	A	19
Kagoshima University	A	19
Hokkaido University	A	18
Miyagi University of Education	D	18
Kyushu University	A	18
University of the Ryukyus	B	18

Table 5. List of Universities with Zero Holdings (National and Public Universities)

Type	University Name	University Size
National	Muroran Institute of Technology	D
National	Kitami Institute of Technology	D
National	Tokyo University of the Arts	C
National	Tokyo University of Marine Science and Technology	C
National	The University of Electro-Communications	D
National	Nagaoka University of Technology	D
National	The Graduate University for Advanced Studies (SOKENDAI)	D
National	Hamamatsu University School of Medicine	D
National	Nagoya Institute of Technology	D
National	Japan Advanced Institute of Science and Technology	D
National	Nara Institute of Science and Technology	D
National	National Institute of Fitness and Sports in Kanoya	D
Public	Yamagata Prefectural Yonezawa University of Nutrition Sciences	D
Public	Tohoku University of Agriculture and Forestry	D

III Results

The results revealed significant disparities in holdings based on university type and size. The number of universities that do not hold the related books is shown in Table 1. National and public universities had higher holding rates, while about one-third of private universities held none of the

selected materials.

For national and public universities, the relationship between university size and the number of related books held was examined. Table 2 presents the median values for university size, number of related books held, and total number of volumes held. Tables 3 and 4 list the top 10 universities with the largest holdings. And Table 5 provides a list of

universities that do not hold the related books. Larger universities (size A: 8 or more faculties) tended to have more holdings, but some smaller institutions, particularly teacher-training universities, also showed active collection efforts. In contrast, technical and arts-focused universities, especially those with a narrow disciplinary scope, often had no holdings. This suggests a gap in access to information for students who may be affected by the young carer issue.

IV Conclusion

The findings highlight the influence of institutional characteristics—such as size, type, and academic focus—on the responsiveness of university libraries to new social issues. While some libraries demonstrate proactive collection practices, others lack relevant materials, potentially limiting support for student carers. University libraries must consider not only academic needs but also the diverse social realities of their students. Addressing these disparities is essential for creating inclusive and supportive learning environments.

[Reception : 8, Aug, 2025]

[Accept : 22, Aug, 2025]

[LETTER]

Regional Variations in the Effectiveness of Specific Health Guidance: A Comparative Analysis of Intensive and Motivational Support on Weight and Waist Circumference

KIYOKAWA Takuma⁴

< Abstract >

Specific health guidance (SHG) in Japan provides either intensive or motivational support to individuals at risk of metabolic syndrome. This study evaluated regional differences in SHG effectiveness on weight and waist circumference among participants from 2008 to 2018. A total of 530 intensive and 577 motivational cases were analyzed across Kanto regions. Intensive support consistently achieved greater reductions, though outcomes varied by area. In Tokyo's central wards, intensive support was highly effective, while results in eastern wards were more variable. Regional context appears crucial for optimizing SHG strategies.

Key words: Specific health guidance Metabolic syndrome lifestyle-related diseases

I Introduction

Specific health guidance (SHG) was introduced in Japan to reduce the prevalence of metabolic syndrome and prevent the onset of lifestyle-related diseases. Based on health checkup results, individuals identified as at risk are offered either intensive support or motivational support. Intensive support emphasizes structured, long-term interventions, while motivational support provides brief guidance aimed at encouraging initial behavior change.

Previous research has demonstrated the effectiveness of SHG in reducing weight and waist circumference, two key indicators of metabolic risk. However, the influence of

regional differences—specifically, the relationship between participants' residential areas and the facilities where SHG is delivered—has not been sufficiently explored. This study aims to address this gap by investigating whether SHG outcomes differ by region and support type.

II Methods

This study analyzed individuals who participated in specific health guidance (SHG) at facilities affiliated with our association between fiscal years 2008 and 2018. Participants were grouped according to their residential regions, including North Kanto, Saitama, Chiba, Kanagawa, Tokyo (23

⁴ TOHTO University / 1-1, Hibino, Mihama-ku, Chiba-shi, Chiba-ken, 261-0021

wards), and areas outside the Kanto region. Two types of SHG were considered: intensive support, which involved continuous and structured intervention through repeated counseling and follow-up, and motivational support, which primarily provided shorter-term guidance aimed at initiating behavioral change.

The primary outcomes were changes in body weight and waist circumference measured at baseline and follow-up. Comparisons were made between intensive and motivational support within each region to evaluate differences in effectiveness. Ethical approval for this study was obtained from the institutional ethics committee, and all data were anonymized and securely stored. At the time of health checkups and initial SHG sessions, participants were informed both verbally and in writing about the secondary use of their data for research purposes.

III Results

A total of 530 participants received intensive support, including 5 in North Kanto and 525 in South Kanto. Motivational support was provided to 577 participants, including 5 in North Kanto and 572 in South Kanto.

In South Kanto, mean weight reduction for intensive support ranged from 1.79 to 2.05 kg, with waist circumference reduction ranging from 2.21 to 2.60 cm. Motivational support achieved mean reductions of 1.09 to 1.73 kg in weight and 0.83 to 2.23 cm in waist circumference. Similar trends were observed in other regions, with intensive support generally outperforming motivational support.

Analysis of Tokyo's 23 wards revealed

heterogeneity in outcomes. In central wards (Chiyoda, Chuo, Minato), intensive support achieved mean weight reductions of 1.34-2.69 kg and waist reductions of 2.25-3.42 cm. Motivational support in these wards was less effective, with weight changes from -0.14 to 0.77 kg and waist reductions of 0.20-1.04 cm. In eastern wards (Taito, Sumida, Koto, Arakawa, Adachi, Katsushika, Edogawa), intensive support yielded larger reductions (weight: 1.56-3.90 kg; waist: 0.63-8.00 cm), while motivational support outcomes varied more widely (weight: 0.58-2.54 kg; waist: -0.94-2.92 cm).

Table 1: Number of cases of specific health guidance by region, and weight and waist circumference

		intensive			motivational		
		weight	waist circumference	subject	weight	waist circumference	subject
North Kanto		2.51	3.1	5	-0.66	1.62	5
South Kanto	Saitama	1.794068	2.479661	59	1.728261	2.228986	69
	Chiba	2.047647	2.597647	85	1.221512	2.087209	86
	Kanagawa	1.86519	2.212658	79	1.114865	1.522973	111
	Tokyo	2.013411	2.366887	302	1.088725	0.829575	306
23 wards (central)	Chiyoda	2.690909	3.418182	22	0.769643	0.776786	28
	Chuo	1.421277	2.731915	47	-0.14348	0.195652	23
	Minato	1.340909	2.254545	11	0.363889	1.038889	18
23 wards (subcenter)	Shinjuku	2.2	1.26	5	2.292308	2.207692	13
	Bunkyo	3	2.6	5	1.49375	1.125	8
	Shibuya	0.442857	-0.75714	7	1	0.34	5
	Toshima	2.4625	1.4375	8	3.5125	2.25	4
23 wards (eastern)	Taito	1.8375	0.625	4	0.983333	-0.5	3
	Sumida	2.146154	1.723077	13	1.325	0.625	4
	Koto	1.563636	2.190909	11	1.077778	1.166667	18
	Arakawa	3.9	8	1	1.35	1.75	2
	Adachi	1.8875	3.5125	8	0.575	-0.9375	8
	Katsushika	1.9375	0.5	8	1.4	-0.33333	6
	Edogawa	2.890909	1.409091	11	2.536667	2.92	15
23 wards (Southern)	Shinagawa	2.1375	0.625	4	2.221429	1.6	7
	Meguro	1.855556	3.333333	9	1.072222	0.477778	9
	Ota	0.853571	1.607143	14	0.466667	0.646667	15
23 wards (Western)	Setagaya	1.991667	2.545833	24	0.68913	-0.01739	23
	Nakano	0.975	3.425	4	1.163636	-0.12727	11
	Suginami	2.183333	2.75	6	2.52	2.4	10
	Nerima	2.647222	3.061111	18	0.946429	-0.00714	14
23 wards (Northern)	Kita	1.625	2	2	1.242857	0.642857	7
	Itabashi	2.1	0.92	5	1.085714	0.157143	7
other		1.96428	2.35714	7	0.9125	1.06666	12

IV Discussion

This study demonstrates that intensive support is generally more effective than motivational support in reducing both weight and waist circumference among participants in SHG¹⁾. However, the degree of effectiveness

varied across regions, highlighting the role of contextual and environmental factors.

In central Tokyo wards, where health awareness and access to resources may be relatively high, intensive support interventions appeared particularly effective. By contrast, in certain eastern wards, motivational support showed unexpectedly favorable results, potentially reflecting participant demographics, program fit, or sample bias.

Furthermore, motivational support was more common in regions farther from SHG facilities, suggesting that logistical challenges associated with repeated visits may limit the feasibility of intensive support in these areas. These findings highlight the need to tailor SHG strategies to participants' geographic and socioeconomic contexts²⁾.

V Conclusion

Intensive support in SHG consistently achieved greater improvements in weight and waist circumference compared with motivational support. Nevertheless, regional variations suggest that program effectiveness is influenced by participants' residential locations and related contextual factors. Tailoring intervention strategies to address regional characteristics may improve overall program outcomes.

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[Accept : 25, Aug, 2025]

[SHORT NOTE]

Epidural Analgesia in Childbirth in Japan: Current Status, Personal Experience, and Challenges

KIYOKAWA Yuka⁵ KIYOKAWA Itoha

< Abstract >

This paper examines the status of epidural analgesia in childbirth in Japan and discusses its challenges based on the author's personal experience. In Japan, 505 facilities provide epidural analgesia, representing approximately 26% of all obstetric facilities. The rate of epidural-assisted deliveries was 6.1% in 2016 and 8.6% in 2020, showing a gradual increase. However, this is considerably lower than in Western countries, where 60–80% of deliveries involve epidural analgesia. The author's personal experience indicated that epidural analgesia significantly reduced labor pain, allowing preservation of maternal physical strength and mental stability. Epidural analgesia may contribute to postpartum care and prevention of postpartum depression. However, economic constraints and limited facility availability prevent many women from accessing this option. To improve maternal care, expanding medical infrastructure and financial support for epidural analgesia nationwide is recommended.

Key words: Epidural analgesia Childbirth in Japan Maternal care

I Introduction

Epidural analgesia is a method of reducing labor pain by administering anesthesia that blocks nerves in the back. The most used techniques are epidural anesthesia and combined spinal-epidural anesthesia (Ministry of Health, Labour and Welfare, 2020). Although epidural analgesia is widely used in Western countries, its adoption in Japan remains limited. This paper aims to clarify the benefits of epidural analgesia through personal experience and to discuss challenges in its wider implementation.

II Current Status in Japan

As of recent surveys, 505 obstetric facilities in Japan provide epidural analgesia, accounting for 26% of all delivery facilities (Japan Society of Obstetrics and Gynecology, 2021). The rate of epidural-assisted deliveries was 6.1% in 2016 and 8.6% in 2020, indicating a gradual increase. In contrast, Western countries report 60–80% of deliveries using epidural analgesia, highlighting Japan's low adoption rate.

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III Personal Experience

In March 2025, the author delivered her first child using epidural analgesia. The decision was motivated by the desire to reduce labor pain and conserve strength for postpartum childcare. The availability of a nearby facility and affordable costs facilitated the choice of epidural delivery.

Although planned deliveries are standard, the author experienced spontaneous labor prior to the scheduled date. Epidural anesthesia was initiated upon hospital arrival, reducing pain to a level like menstrual cramps. Cervical dilation progressed to 8 cm with manageable pain; however, pressure sensations increased as the fetus descended. Epidural analgesia effectively reduced labor pain while preserving the mother's ability to push. The total delivery time was 10 hours, during which the author-maintained sleep and nutrition, preserving physical strength. Postpartum, mother-infant rooming-in was implemented from day one, allowing real-time guidance from healthcare staff and reducing psychological burden, potentially contributing to postpartum depression prevention.

IV Challenges

Despite the availability of epidural analgesia, many women cannot access it due to economic or logistical barriers. A survey in Tokyo indicated that 44% of women who wished to receive epidural analgesia were unable to do so (Tokyo Metropolitan Government, 2023). Common reasons included conversion to cesarean delivery, high costs, and lack of nearby facilities. To ensure equitable access,

epidural analgesia should become a standard option for eligible women. Financial support initiatives, currently piloted in Tokyo, should be expanded nationwide.

V Conclusion

Epidural analgesia effectively reduces labor pain, preserves maternal strength, and alleviates psychological burden, potentially aiding postpartum childcare and depression prevention. Nationwide implementation requires strengthening medical infrastructure and providing financial support, enabling all eligible women to choose epidural analgesia when desired.

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