

Evaluation of specific health guidance in small municipality using 7 years data of National Health Insurance database

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ABSTRACT

Small municipalities have few users with specific health guidance, which makes accurate evaluation difficult. This study verified the effectiveness of specific health guidance using data from specific health checkups and specific health guidance from a municipality in Gifu Prefecture over 7 years. The data were provided by *Kokuho* Database (KDB; National Health Insurance database) system and included 3,786 individuals who underwent a specific health checkup for the first time between 2008 and 2014, followed by another check the subsequent year. I calculated the differences in weight, body mass index (BMI), and waist circumference from the year of the health check to the weight, BMI, and waist circumference between the initial and the following year's checks based on health guidance usage status. I also evaluated whether there was a difference in the median and metabolic syndrome status in the following year. Weight, BMI, and waist circumference improvements were observed in the group that received health guidance at both incentive and active support groups. In the incentive support group, less than 40% of those who went from the preliminary group became the non-applicable group and more than 40% of those who went from applicable group also became the non-applicable group. In the active support group, less than 80% of those who moved from the preliminary group became the non-applicable group, while less than 30% of those who went from the applicable group also became the non-applicable group.

Keywords: specific health guidance, specific health checkup, evaluation, municipality, KDB system

Abbreviations:

BMI: body mass index

KDB: *Kokuho* Database (National Health Insurance database)

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INTRODUCTION

In Japan, a system of specific health checkups and health guidance by health insurers was established as a result of the 2006 medical system reform. The first implementation plan for specific health checkups was implemented in April 2008, and the fourth would begin in 2024. A large-scale demonstration project for specific health checkups and guidance was launched in April 2019. To support insurers in the implementing effective preventive health initiatives, it become necessary to confirm and gather evidence on the benefits of prevention and health

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promotion. Research on specific health guidance to date includes studies targeting employees at private Japanese universities,¹ employees of taxi companies and convenience stores,² and studies using the database of the Japan Medical Data Center (JMDC), where most insured individuals are employees of Japanese companies.^{3,4} Tsushita et al⁵ are also conducting an analysis using big data from national health insurance, cooperative insurance associations, and mutual aid associations.

Focusing on local governments, Enomoto et al⁶ conducted a prospective, parallel-group comparative study on 195 eligible residents in a town prone to lifestyle-related diseases. The study examined whether adding a preventive medical program to specific health guidance could improve body mass index (BMI) and estimated Glomerular Filtration Rate (eGFR). Tomita et al⁷ provided detailed health advice for 6 months to 20 individuals aged 40–64 who were at risk of developing diabetes and had undergone health checkups in a town. They compared changes over time in lifestyle habits, health awareness (via questionnaire), and blood tests results. Haruyama et al⁸ divided city residents into active support and incentive support groups based on specific health guidance criteria and examined the effectiveness of the guidance, including a control group that did not use health guidance. However, in local governments, the proportion of people who undergo specific health checkups and use specific health guidance is low,⁹ making it difficult to conduct a robust evaluation of the effectiveness of specific health guidance. Particularly, in the case of small local governments, the population is small; therefore, the number of people who undergo specific health checkups and use specific health guidance is inevitably small.

The vision and basic direction of Health Japan 21 (the third term), which began in 2024, follows Health Japan 21 (the second term). Local governments have the role of collecting and analyzing data, and are expected to implement projects effectively and efficiently, taking into account local conditions and keeping Plan-Do-Check-Act (PDCA) cycle in mind. However, it has been pointed out that there is insufficient visualization and utilization of data related to health promotion, and promotion of the PDCA cycle.¹⁰ Therefore, it is necessary to conduct an analysis and evaluation that is unique to each local government, taking into account population increases and decreases, the progress of the aging rate, and the characteristics of each local governments based on population size. In addition, when expanding research cases, it is important to promote them on a wide scale while taking into account the characteristics of each local governments.

This study aimed to examine the effectiveness of specific health guidance using data on specific health checkups and health guidance conducted by small municipality over a seven-year period.

METHODS

Participants

In this study, I analyzed data on specific health checkups and specific health guidance for people aged 40–74 years at a small municipality in Gifu Prefecture (population, 26,045; aging rate, 36.2%; area, approximately 221.98 km²; land area by use: agricultural land approximately 6%, forests approximately 84%, residential land approximately 3%, and roads approximately 2%). The data were provided by the municipality's *Kokuho* Database (KDB; National Health Insurance database) system, and data on people who underwent a specific health checkup for the first time during the 7 years from 2008 to 2014 and continued to receive health checkups the following year were used. The KDB system contains data on health checkups, medical care, and nursing care for municipal residents aged 40–75 years. Specific health checkups and guidance were conducted according to a standardized protocol under the jurisdiction of the Ministry of Health, Labour and Welfare, and data were registered in this system. Data were extracted from 3,786

registered individuals. Health checkups were conducted once a year, and the data analyzed in this study did not include data from multiple health checkups or health guidance for the same person.

Statements of ethics

This study has been approved by the bioethics review committee at Nagoya University Graduate School of Medicine (Approval number: 17-115) and Medical Review Board of Gifu University Graduate School of Medicine (Approval number: 2018-109), and has been performed in accordance with the ethical standards laid down in an appropriate version of the 1964 Declaration of Helsinki.

This study was a retrospective study based on data already registered in the KDB system; therefore, the requirement for obtaining written informed consent from each participant was waived. However, an opt-out policy was implemented, allowing participants to refuse the use of their data for this study.

Survey content

Survey content. Data on age, sex, body composition, metabolic syndrome status, health guidance status, and health guidance use status were analyzed. In Japan, specific health checkups and health guidance are conducted under the jurisdiction of the Ministry of Health, Labour, and Welfare according to standardized protocols. Therefore, the content and methods of the tests, health guidance in the health checkups, and health guidance of the local government in Gifu Prefecture, which was the subject of this study, were almost uniform.

Body composition. Weight (kg), BMI (kg/m^2), and waist circumference (cm) were measured during the health checkups. Weight was measured using a scale that was precisely verified by a specialized health checkup institution entrusted with conducting health checkups. BMI was calculated by dividing the weight (kg) by the square of the height (m^2). Waist circumference was measured at navel height in the standing position. Breathing was normal and the patient was unconscious, and the scale was read at the end of expiration (exhalation). Each measurement was performed by a nurse or a public health nurse at a health checkup institution.

Metabolic syndrome status. Figure shows the criteria for health guidance based on metabolic syndrome status.

In Japan, a person is diagnosed with “metabolic syndrome” if their waist circumference (circumference at the height of the navel) is 85 cm or more for male and 90 cm or more for female, and two or more of three items (blood pressure, blood sugar, and lipids) are outside the standard range. The criteria for determining metabolic syndrome were described below.¹¹

1. Applicable: Those who met the required item and two or more optional items.
2. Preliminary: Those who met the required item and one of the optional items.
3. Non-applicable: Those who do not fall under 1 or 2.

Required item indicates waist circumference (male ≥ 85 cm, female ≥ 90 cm). Optional items are as follows: (1) Maximum blood pressure (systolic) ≥ 130 mmHg or minimum blood pressure (diastolic) ≥ 85 mmHg; (2) Triglycerides ≥ 150 mg/dL or HDL cholesterol < 40 mg/dL; (3) Blood sugar ≥ 110 mg/dL.

The criteria for health guidance indicates the following items:

1. Blood pressure: Systolic blood pressure 130 mmHg or more, or diastolic blood pressure 85 mmHg or more
2. Lipids: Triglycerides 150 mg/dL or more, or HDL cholesterol less than 40 mg/dL
3. Blood sugar: Fasting blood sugar (or random blood sugar if unavoidable) 100 mg/dL or more,

or HbA1c 5.6% or more

4. Questionnaire: Smoking history (only counted if one or more of the risks from 1 to 3 are met)

Waist circumference	Additional risks	4. Smoking history	Subject	
	1. Blood pressure 2. Lipids 3. Blood sugar		Aged 40–64 years	Aged 65–74 years
≥85cm (male)	2 matches	Smoking Non-smoking	Active support	Incentive support
≥90cm (female)	1 match			
Other than the above BMI ≥25	3 matches	smoking Non-smoking	Active support	Incentive support
	2 matches			
	1 match			

Fig. The criteria for health guidance

Incentive support involves participants reflecting on their lifestyle habits through interview support from public health nurses, setting behavioral goals, and working independently.

Active support involves working toward achieving goals with the support of public health nurses for several months.

BMI: body mass index

For those in the early elderly stage (aged 65–74 years), even if eligible for active support, support was provided as an incentive.

Health guidance usage status. The following criteria were used for those who received incentives and active support at a health-guidance equivalent level.

- Used: With the support of a public health nurse and health professionals, they took action toward achieving their goals and were evaluated by the public health nurse, among others
- Used but stopped halfway: With the support of a public health nurse etc, they took action toward achieving their goals but did not reach the point of being evaluated by a public health nurse, among others
- Did not use: Did not receive support from a public health nurse, among others.

Statistical analysis

The basic attributes of the participants were recorded. A secondary analysis was performed to calculate the difference between weight, BMI, and waist circumference in the year when the health check was performed and the weight, BMI, and waist circumference at the health check in the following year according to the health guidance eligibility level and health guidance usage status. In addition, the difference was divided by weight, BMI, and waist circumference in the year when the health check was performed to obtain the percentage difference. Furthermore, the Wilcoxon signed-rank test was used to check whether there was a difference between the median weight, BMI, and waist circumference in the year in which the health check was performed and the weight, BMI, and waist circumference at the health check in the following year. In addition, the McNemar-Bowker test was used to analyze whether there was a significant difference in

metabolic syndrome status in the following year according to health guidance eligibility level and health guidance usage status. Each analysis was performed using exact probability tests.

All statistical analyses were performed using Statistical Product and Service Solutions 27.0 for Windows (IBM, Tokyo, Japan). Statistical significance was set at $P < 0.05$.

RESULTS

Patient characteristics

Participants' characteristics are presented in Table 1. In total, 1,713 male (45.2%) and 2,073 female (54.8%) underwent health checkups. The average age for male was 62.6 ± 8.5 years, and for female it was 61.8 ± 8.5 years, with most of them in their 60s. In terms of body composition, the average weight for male was 64.0 ± 9.9 kg, and for female it was 52.5 ± 8.1 kg, the average BMI for male was 23.5 ± 3.2 kg/m², and for female it was 22.6 ± 3.3 kg/m², and the

Table 1 Basic characteristics of participants (n = 3,786)

		Male		Female	
		n	%	n	%
Age	$\mu \pm SD$	62.6 ± 8.5		61.8 ± 8.5	
	40s	179	10.4%	217	10.5%
	50s	259	15.1%	429	20.7%
	60s	927	54.1%	1027	49.6%
	70s	348	20.3%	399	19.3%
Body composition ($\mu \pm SD$)					
	Body weight	64.0 ± 9.9		52.5 ± 8.1	
	BMI	23.5 ± 3.2		22.6 ± 3.3	
	Waist circumference	84.4 ± 8.5		81.3 ± 9.5	
Metabolic syndrome status ^a					
	Non-applicable	982	57.8%	1727	83.8%
	Preliminary	271	16.0%	123	6.0%
	Applicable	445	26.2%	212	10.3%
Health guidance level					
	Incentive support ^b	209	58.9%	147	78.2%
	Active support ^c	146	41.1%	41	21.8%
Health guidance usage status ^d					
	Used	119	33.7%	73	38.8%
	Used but stopped halfway	44	12.5%	24	12.8%
	Did not use	190	53.8%	91	48.4%

Unknown answers were excluded from the analysis.

BMI: body mass index

^a See the Metabolic syndrome status section for a description of the status.

^b Incentive support involves participants reflecting on their lifestyle habits through interview support from public health nurses, setting behavioral goals, and working independently.

^c Active support involves working toward achieving goals with the support of public health nurses for several months.

^d See the Health guidance usage status section for a description of the status.

average waist circumference for male was 84.4 ± 8.5 cm, and for female it was 81.3 ± 9.5 cm.

Regarding the metabolic syndrome status, 271 male (16.0%) were preliminary group, 445 (26.2%) were applicable group, 123 female (6.0%) were preliminary group, and 212 (10.3%) were applicable group. Regarding the health guidance level, 209 male (58.9%) were at the incentive support level and 146 male (41.1%) were at the active support level, while 147 female (78.2%) were at the incentive support level and 41 female (21.8%) were at the active support level. Regarding the use of health guidance, 119 male (33.7%) used it, 44 (12.5%) used it but stopped halfway, and 190 (53.8%) did not use it. Among female, 73 (38.8%) used it, 24 (12.8%) used it but stopped halfway, and 91 (48.4%) did not use it.

Basic attributes of subjects by health guidance level and health guidance usage status

Table 2 shows the basic attributes of participants by health guidance level and usage status. The incentive support level of health guidance was 62.6 ± 8.9 years old on average, with 188 people (52.8%) in their 60s, while the active support level was 55.6 ± 7.3 years old on average, with 75 people (40.1%) in their 50s. Regarding health guidance usage status, those who used it were 62.5 ± 7.9 years old on average, with 104 people (54.2%) in their 60s, those who used it but stopped halfway, with 28 people (41.2%) in their 60s, with an average of 57.8 ± 8.4 , and those who did not use it were 59.5 ± 9.4 on average, with 128 people (45.6%) in their 60s. The incentive support level for health guidance was 209 male (58.7%) and 147 female (41.3%), whereas the active support level was 146 male (81.4%) and 41 female (21.9%). Regarding the use of health guidance, 119 male (62.0%) and 73 female (38.0%) used it; 44 male (64.7%) and 24 female (35.3%) used it but stopped halfway; and 190 male (67.6%) and 91 female (32.4%) did

Table 2 Basic attributes of participants by health guidance level and usage status

		Health guidance level				Health guidance usage status ^c					
		Incentive support ^a		Active support ^b		Used		Used but stopped halfway		Did not use	
		n	%	n	%	n	%	n	%	n	%
Age	$\mu \pm \text{SD}$	62.6 ± 8.9		55.6 ± 7.3		62.5 ± 7.9		57.8 ± 8.4		59.5 ± 9.4	
	40s	35	9.8%	39	20.9%	17	8.9%	11	16.2%	45	16.0%
	50s	56	15.7%	75	40.1%	37	19.3%	26	38.2%	68	24.2%
	60s	188	52.8%	73	39.0%	104	54.2%	28	41.2%	128	45.6%
	70s	77	21.6%	0	0.0%	34	17.7%	3	4.4%	40	14.2%
Sex	Male	209	58.7%	146	81.4%	119	62.0%	44	64.7%	190	67.6%
	Female	147	41.3%	41	21.9%	73	38.0%	24	35.3%	91	32.4%
Body composition ($\mu \pm \text{SD}$)											
Body weight		65.6 ± 7.6		72.5 ± 9.7		66.5 ± 8.4		69.6 ± 9.8		68.4 ± 9.1	
BMI		25.7 ± 2.8		27.0 ± 2.8		25.7 ± 2.4		26.7 ± 3.2		26.3 ± 3.1	
Waist circumference		90.1 ± 5.3		92.8 ± 5.9		90.8 ± 5.1		91.8 ± 6.5		91.0 ± 5.8	

Unknown answers were excluded from the analysis.

BMI: body mass index

^a Incentive support involves participants reflecting on their lifestyle habits through interview support from public health nurses, setting behavioral goals, and working independently.

^b Active support involves working toward achieving goals with the support of public health nurses for several months.

^c See the Health guidance usage status section for a description of the status.

not use it. Regarding body composition, the level of incentive support for health guidance was as follows: mean weight 65.6 ± 7.6 kg, mean BMI 25.7 ± 2.8 kg/m², mean waist circumference 90.1 ± 5.3 cm; mean active support level was as follows: mean weight 72.5 ± 9.7 kg, mean BMI 27.0 ± 2.8 kg/m², mean waist circumference 92.8 ± 5.9 cm; and for use of health guidance, those who used it had mean weight 66.5 ± 8.4 kg, mean BMI 25.7 ± 2.4 kg/m², mean waist circumference 90.8 ± 5.1 cm; for those who used it but stopped halfway through, mean weight 69.6 ± 9.8 kg, mean BMI 26.7 ± 3.2 kg/m², mean waist circumference 91.8 ± 6.5 cm; and for those who did not use it, mean weight 68.4 ± 9.1 kg, mean BMI 26.3 ± 3.1 kg/m², mean waist circumference 91.0 ± 5.8 cm.

Changes in body composition from previous to next year according to use of specific health guidelines

Table 3 shows the changes in body composition over 2 years based on the use of specific interventions.

Those who used health guidance at the incentive support level had mean weight -0.8 kg, -1.3% , mean BMI -0.4 kg/m², -1.4% , and mean waist circumference -1.5 cm, -1.6% , and a test of the difference in the medians between the previous and following years showed significant differences in weight ($P = 0.001$), BMI ($P < 0.001$), and waist circumference ($P = 0.007$). Those who used health guidance but stopped halfway through had mean weight -0.9 kg, -1.5% , mean BMI -0.5 kg/m², -2.0% , and mean waist circumference $+1.0$ cm, $+1.4\%$. Further, a test of the difference in the medians between the previous and following years showed significant differences in BMI ($P = 0.049$). For those who did not use the service, the mean weight was -0.6 kg, or -0.9% , the mean BMI was -0.5 kg/m², or -1.4% , and the mean waist circumference was -0.7 cm, or -0.6% , respectively; the differences in medians between the previous and following years revealed significant differences in weight ($P = 0.009$) and BMI ($P = 0.014$).

Those who used health guidance at an active level of support had mean weight -1.9 kg, -2.8% , mean BMI -0.7 kg/m², -2.8% , mean waist circumference -2.3 cm, -2.4% , and a test of the difference in medians between the previous and following years showed significant differences in weight ($P < 0.001$), BMI ($P < 0.001$), and waist circumference ($P < 0.001$). Those who used health guidance but stopped midway had mean weight -0.9 kg, -1.2% , mean BMI -0.3 kg/m², -1.0% , mean waist circumference -1.3 cm, -1.4% , and a test of the difference in medians between the previous and following years showed no significant differences in any of the items. For those who did not use the service, the average weight was -0.1 kg, 0.0% , the average BMI was 0.0 kg/m², 0.0% , and the average waist circumference was -0.5 cm and -0.5% , respectively. No significant differences were found in the tests of the median differences between the previous and following years.

Judgment of metabolic syndrome in the following year according to utilization of health guidance in the previous year's incentive and active support levels

Table 4 shows the metabolic syndrome status in the following year based on the utilization of health guidance at the incentive and active support in the previous year.

Among those who used health guidance at the incentive support level, 17 (38.6%) were in the preliminary group but became non-applicable, and 8 (42.1%) were applicable but became non-applicable, which was a statistically significant difference ($P = 0.002$). Four participants (50.0%) used health guidance but stopped halfway and became non-applicable. However, there was no statistically significant difference ($P = 0.407$). Among those who did not use health guidance, 21 (41.2%) were in the preliminary group but became non-applicable, and 6 (27.3%) were applicable but became non-applicable, which was a statistically significant difference ($P = 0.016$).

Table 3 Changes in body composition over 2 years based on the use of specific interventions^a

Health guidance usage status ^b	Previous year – Next year		Previous year			Next year			P-value					
	$\Delta(\mu)$	$\Delta(\%\mu)$	μ	SD	Percentile	μ	SD	Percentile						
										25	50	75	25	50
Used	Body weight	-0.8	-1.3	64.7	7.4	59.8	63.9	69.5	64.1	7.9	58.4	63.5	70.2	0.001
	BMI	-0.4	-1.4	25.4	2.3	24.0	25.3	26.9	25.1	2.4	23.6	24.9	26.4	<0.001
	Waist circumference	-1.5	-1.6	90.1	5.0	86.1	89.3	92.8	88.5	6.0	85.0	88.0	91.4	0.007
Used incentive support ^c but stopped halfway	Body weight	-0.9	-1.5	65.4	8.7	58.2	62.1	66.5	62.8	9.3	56.1	61.0	66.6	0.237
	BMI	-0.5	-2.0	25.7	2.6	24.1	25.5	26.9	25.2	2.8	22.6	25.1	27.0	0.049
	Waist circumference	1.0	1.4	89.8	6.4	85.3	88.0	93.2	89.7	6.5	85.8	89.9	94.3	0.587
Did not use	Body weight	-0.6	-0.9	66.2	7.5	60.6	65.4	70.2	65.0	7.3	59.6	65.0	70.1	0.009
	BMI	-0.5	-1.4	25.9	3.2	24.6	25.7	27.4	25.7	2.0	24.4	25.6	26.9	0.014
	Waist circumference	-0.7	-0.6	90.2	5.4	87.0	90.0	93.1	89.5	6.0	85.5	89.0	93.0	0.096
Used	Body weight	-1.9	-2.8	70.7	9.2	64.4	69.2	74.3	68.2	9.8	62.4	66.3	72.3	<0.001
	BMI	-0.7	-2.8	26.5	2.5	24.6	26.4	28.0	25.8	2.8	23.7	25.4	27.1	<0.001
	Waist circumference	-2.3	-2.4	92.3	4.9	88.8	93.0	95.4	90.4	6.4	84.8	89.0	95.0	<0.001
Used active support ^d but stopped halfway	Body weight	-0.9	-1.2	73.1	9.4	65.6	71.5	79.7	71.9	9.1	65.0	68.6	80.7	0.747
	BMI	-0.3	-1.0	27.5	3.5	24.6	26.5	27.8	26.2	2.5	24.1	26.5	28.0	0.587
	Waist circumference	-1.3	-1.4	93.5	6.2	88.3	91.0	97.0	91.4	7.9	85.3	91.5	99.5	0.347
Did not use	Body weight	-0.1	0.0	73.3	10.2	68.0	72.3	80.2	73.6	9.8	67.6	72.6	80.3	0.850
	BMI	0.0	0.0	27.0	2.7	25.5	27.5	28.7	27.1	2.5	25.4	27.2	28.5	0.931
	Waist circumference	-0.5	-0.5	92.7	6.4	88.2	92.0	96.0	92.2	6.0	87.7	92.0	95.7	0.336

Unknown answers were excluded from the analysis.

$\Delta(\mu)$ indicates difference between the average of each body composition value for the next year and the average of each body composition value for the previous year.

$\Delta(\% \mu)$ indicates difference between the average of each body composition value for the next year and the average of each body composition value for the previous year divided by the each body composition value for the previous year.

BMI: body mass index

^a Wilcoxon signed-rank test

^b See the Health guidance usage status section for a description of the status.

^c Incentive support involves participants reflecting on their lifestyle habits through interview support from public health nurses, setting behavioral goals, and working independently.

^d Active support involves working toward achieving goals with the support of public health nurses for several months.

Table 4 Metabolic syndrome status in the following year based on the utilization of health guidance at the incentive and active support in the previous year^a

Health guidance usage status ^b		Metabolic syndrome status for next year				P-value
			Non-applicable	Preliminary	Applicable	
Incentive support ^c	Used	Preliminary	n	17	16	11
			%	38.6%	36.4%	25.0%
		Applicable	n	8	3	8
			%	42.1%	15.8%	42.1%
	Used but stopped halfway	Preliminary	n	4	3	1
			%	50.0%	37.5%	12.5%
		Applicable	n	0	1	2
			%	0.0%	33.3%	66.7%
	Did not use	Preliminary	n	21	23	7
			%	41.2%	45.1%	13.7%
		Applicable	n	6	8	8
			%	27.3%	36.4%	36.4%
Active support ^d	Used	Preliminary	n	7	2	0
			%	77.8%	22.2%	0.0%
		Applicable	n	10	10	18
			%	26.3%	26.3%	47.4%
	Used but stopped halfway	Preliminary	n	2	0	4
			%	33.3%	0.0%	66.7%
		Applicable	n	3	1	7
			%	27.3%	9.1%	63.6%
	Did not use	Preliminary	n	3	9	2
			%	21.4%	64.3%	14.3%
		Applicable	n	4	9	10
			%	17.4%	39.1%	43.5%

Unknown answers were excluded from the analysis.

^a McNemar-Bowker test

^b See the Health guidance usage status section for a description of the status.

^c Incentive support involves participants reflecting on their lifestyle habits through interview support from public health nurses, setting behavioral goals, and working independently.

^d Active support involves working toward achieving goals with the support of public health nurses for several months.

Among those who used health guidance at the active support level, 7 (77.8%) were in the preliminary group but became non-applicable, and 10 (26.3%) were applicable but became non-applicable, which was a statistically significant difference ($P < 0.001$). Two people (33.3%) used the service but were in the preliminary group of those who stopped taking the service halfway and then became non-applicable; three people (27.3%) were applicable but became non-applicable, but this difference was not statistically significant. There were three people (21.4%) in the preliminary group who did not use the service but became non-applicable, and four people (17.4%) who were applicable but became non-applicable, but this difference was statistically significant ($P = 0.024$).

DISCUSSION

This study aimed to evaluate the effectiveness of specific health guidance programs in small municipalities.

The study population's basic characteristics was that the proportion of female who underwent health checkups was higher, but the proportion of male who were in the preliminary and applicable groups tended to be higher, similar to previous studies.^{6,8} In addition, the results were similar for the average age, as well as the average body weight, BMI, and waist circumference before the health guidance. In terms of changes in body composition between the previous and following years according to the use of specific health guidance, at the incentive support level, the group that used health guidance showed an improvement of -1.5 cm in average waist circumference, while at the active support level, the group that used health guidance showed an improvement of -1.9 kg in average weight and -2.3 cm in average waist circumference. In the fourth phase of the specific health checkup and specific health guidance plan,¹² the main goals of specific health guidance are set at -2 kg in weight and -2 cm in waist circumference, so the results of this study suggest that health guidance is effective.

Furthermore, at the active support level, the group that used health guidance showed improvements of -2.8% in average weight, -2.8% in average BMI, and -2.4% in average waist circumference. Muramoto et al¹³ and Nagahara et al¹⁴ mentioned that the minimum weight loss required to improve obesity-related risk factors or conditions in Japanese people is -3% , and Nagahara et al¹⁴ pointed out that it is appropriate to set a target of -2% body weight and evaluate it after 3 months.

Based on the results of this study, I believe that health guidance has certain beneficial effects. In terms of the effectiveness of health guidance, it is possible to adjust the content of the guidance according to each preferences, interests, and the stage at which they are currently in the process of behavioral change in order to achieve desirable behavioral change and the formation of habits.¹⁵⁻¹⁸ Additionally, goal settings¹⁹⁻²¹ which defines behaviors or results to be achieved, and encouraging self-monitoring,^{19,22,23} such as regularly recording specific behaviors or results, can be effective. Both incentive and active supports improved body composition; however, active support was more effective. This is consistent with the results of a previous study conducted by Haruyama et al⁸ among local residents of a city. Incentive support involves participants reflecting on their lifestyle habits through interview support from public health nurses, setting behavioral goals, and working independently, whereas active support involves working toward achieving goals with the support of public health nurses for several months. Additionally, the metabolic syndrome assessment for the following year, based on the level of health guidance usage in the previous year, showed that in the incentive support group, less than 40% of individuals transitioned from preliminary group to non-applicable group, while over 40% transitioned from the applicable to the non-applicable. In the case of active support, less than 80% of participants went from being in preliminary group to non-applicable, while just under 30% went from the applicable to the non-applicable.

Regarding changes in body composition between the previous and following years based on specific health guidance usage, both the incentive support level and active support level groups, who used health guidance but stopped halfway through, also saw a decrease in average weight, average BMI. In particular, the average percentage decrease in weight and BMI at the incentive support level exceeded that of the group that received health guidance. However, at the active support level, the decrease in average weight, average BMI, and average waist circumference was smaller than in the group that used health guidance to the end, and no items showed a statistically significant difference. At the incentive support level, there appears to be a certain

degree of effect even if health guidance is used but stopped halfway; however, it is important to end health guidance at both the incentive and active support levels. Hirakawa et al²⁴ conducted group interviews with public health nurses and nutritionists and clarified that the four themes of self-study, rebellion, hesitation, and resignation are characteristic health-related behaviors of people who neglect specific health guidance. Park et al²⁵ mentioned that continuous support by public health nurses through health guidance closely related to the lifestyle of the target person for three years may comprehensively reduce the risk of lifestyle-related diseases. In recent years, health guidance using information and communication technology (ICT), such as online counseling,²⁶ communication and messaging via video calls,^{27,28} and smartphone apps²⁹⁻³¹ have been devised. It is important to take measures to reduce the physical burden on the target person, increase their motivation and self-efficacy, and support them until health guidance is completed.

In terms of changes in body composition between the previous and following years according to the use of specific health guidance, the group that did not use health guidance showed a decrease in average weight, BMI, and waist circumference in terms of incentive support group. However, as with the group that used health guidance but stopped halfway, the active support level showed almost no decrease in average weight, average BMI, or average waist circumference compared with the group that used health guidance to the end, and no items showed statistically significant differences. It is vital to encourage specific health guidance usage, and Murayama et al³² reported that the rate of health guidance use among participants who received a phone reminder was significantly higher than the rate of use among participants who did not answer the phone. In addition, Okuda et al³³ attempted to reduce the risk factors for lifestyle-related diseases using a unique intervention method that incorporated the Japanese drum rhythm exercise, a local traditional art, into a specific health guidance program. Furthermore, Kuwabara³⁴ developed an individual support plan program to encourage individuals who do not receive regular health checkups to receive regular specific health checkups. For support programs, the following year's metabolic syndrome assessment based on the use of health guidance at the level of support was as follows: in the group that did not use health guidance with incentive support, more than 40% went from being in the preliminary group to non-applicable group, and less than 30% went from applicable group to non-applicable group. With active support, more than 20% went from the preliminary group to non-applicable group, just under 20% went from applicable group to non-applicable group, and just under 40% went into the preliminary group. Therefore, further research on this topic is required.

Research limitations and challenges

The results of this study were based on some of the evaluation criteria for the fourth phase of specific health guidance, and in order to make a more accurate evaluation, it would be necessary to use blood, biochemistry, and medical treatment data etc. In addition, there are limitations to claiming that all improvements in the residents' body composition data and metabolic syndrome status are the result of health guidance; other factors such as medical consultations, medication, and support from family and workplaces may also be considered to be contributing factors.

The data used in this study were longitudinal from a municipality's KDB system, and there are limitations to generalizing the results to other local governments. In addition, health checkups were conducted at medical institutions and venues designated by the local government and did not include hospitalized individuals or those who had difficulty traveling to the health checkup venue.

In the future, I would like to use longitudinal data from the KDB system, including data from other local governments, to conduct an evaluation analysis of specific health guidance that includes items such as living habits, lifestyle, medical expenses, and nursing care status.

CONCLUSION

In this study, I used data from specific health checkups and health guidance accumulated over several years in the KDB system, and confirmed improvements in body composition and metabolic syndrome status among first-time health guidance recipients in small municipality. In addition, based on the evaluation perspective of the latest, fourth-phase standard specific health checkup and health guidance program, the study clarified changes in body composition and metabolic syndrome status in the following year not only for the group used health guidance, but also for the group used it but stopped halfway, and the group did not use it.

The effects of specific health guidance in small municipality were seen as improvements in average weight, average BMI, and average waist circumference in the groups that received health guidance at both incentive support and active support levels. Particularly, the extent of improvement was greater in the group that received health guidance at the active support level. Furthermore, in the health guidance and incentive support groups, just under 40% of those who were in the preliminary group of the previous year did non-applicable change in the following year, and just over 40% of those who were in the applicable group did non-applicable change. In the active support group, less than 80% of those who were in the preliminary group in the previous year changed to non-applicable, and less than 30% of those who were in the applicable group changed to non-applicable group in the following year or to the preliminary group.

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CONFLICT OF INTEREST

I declare that I have no competing interests.

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