

Original Article

The physical examination content of the Japanese National Health and Nutrition Survey: temporal changes

Hisako Tanaka PhD, Shino Imai MSc, Makiko Nakade PhD, Eri Imai PhD, Hidemi Takimoto MD, PhD

Department of Nutritional Epidemiology, National Institute of Health and Nutrition, National Institutes of Biomedical Innovation, Health and Nutrition, Tokyo, Japan

Background and Objectives: Survey items of the Japan National Nutrition Survey (J-NNS) have changed over time. Several papers on dietary surveys have been published; however, to date, there are no in-depth papers regarding physical examinations. Therefore, we investigated changes in the survey items in the physical examinations performed in the J-NNS and the National Health and Nutrition Survey (NHNS), with the aim of incorporating useful data for future policy decisions. **Methods and Study Design:** We summarized the description of physical examinations and marshalled the changes of survey items from the J-NNS and NHNS from 1946 to 2012. The physical examination is roughly classified into the following six components: some are relevant to anthropometric measurements, clinical measurements, physical symptoms, blood tests, lifestyle and medication by interview, and others. **Results:** Items related to nutritional deficiency, such as anaemia and tendon reflex disappearance, and body weight measurements were collected during the early period, according to the instructions of the General Headquarters. From 1989, blood tests and measurement of physical activity were added, and serum total protein, total cholesterol, triglycerides, HDL-cholesterol, blood glucose, red blood corpuscles and haemoglobin measurements have been performed continuously for more than 20 years. **Conclusions:** This is the first report on the items of physical examination in the J-NNS and NHNS. Our research results provide basic information for the utilization of the J-NNS and NHNS, to researchers, clinicians or policy makers. Monitoring the current state correctly is essential for national health promotion, and also for improvement of the investigation methods to apply country-by-country comparisons.

Key Words: national nutrition survey in Japan, national health and nutrition survey, physical examination, survey items, national survey

INTRODUCTION

The Japan National Nutrition Survey (J-NNS)¹ launched in 1945 has been performed annually for the last 70 years. When the survey started in the immediate postwar period, malnutrition was widespread. With the economic transition that followed, improvements in diet were accompanied by changes in the prevalence of major diseases. The survey provides historical content and highlights the changing lifestyle patterns in Japanese society. There are valuable data documenting infectious diseases and malnutrition from the mid-twentieth century to the present, where increase in obesity and lifestyle-related disease have become more prominent. The historical content of this survey can be divided roughly into three periods: (1) period of the governance of the General Headquarters of the Allied Forces (1945-1951), (2) period of the Nutrition Improvement Law (1952-2002), and (3) period of the Health Promotion Law (2003-to present).

Survey items have changed over time, in correspondence with the changes in health policies. Several papers described the methods of nutrition surveys,²⁻⁶ but none has focused on the changes and transitions in health or

physical examinations. There is no systematic report on the survey items on when it was investigated, and the attribute of subjects. We describe historical changes in survey methods, survey items, and summary reports on the physical examination performed in the J-NNS and the National Health and Nutrition Survey (NHNS), and determine which items can be compared across years, with the aim of providing basic information of incorporating useful data for future policy decisions.

Corresponding Author: Dr Hidemi Takimoto, Department of Nutritional Epidemiology, National Institute of Health and Nutrition, National Institutes of Biomedical Innovation, Health and Nutrition, 1-23-1 Toyama, Shinjuku-ku, 162-8636 Tokyo, Japan.

Tel: +81-3- 3203-5721(4501); Fax: +81-3- 3202-3278

Email: thidemi@nih.go.jp

Manuscript received 30 March 2015. Initial review completed 25 June 2015. Revision accepted 19 July 2015.

doi: 10.6133/apjcn.092015.34

METHODS

We described the physical examination and consolidated changes in survey items in the J-NNS and NHNS from 1946 to 2012 (except for 1974, when the physical examination was not carried out), using officially published annual reports.^{1,7} All survey participants were given detailed information of the survey, through the local public health center in charge. The participants gave consent to the Ministry of Health, Labour, and Welfare, which is responsible for conducting the survey.¹ We also referred to tables at the website "Analysis and Evaluation of Health Japan 21 (the second term)".⁸

Survey population

The first survey comprised approximately 3,500 households (about 30,000 persons) living in Tokyo (35 wards) in December 1945. It was expanded to four cities and 19 prefectures in February 1946, to 29 prefectures. Survey periods were also expanded to May, August and November in the same year. In 1948, it was further expanded to 46 prefectures, and it became a national survey. Okinawa Prefecture was added in 1972 after reversion of Okinawa to Japan from the United States occupation. In recent years, participants have been restricted to family members aged 1 year and over (as of November 1) in households in the survey district, selected from those participating in the Comprehensive Survey of Living Conditions (CSLC) in June and July. The number of survey districts was about 300, the number of households in the districts was about 5000; some households were excluded from the enrolment because they moved from the district after the CSLC before NHNS. The scale of the investigation of NHNS was expanded for the first time in 2012, and the investigation number of households was about four times as usual.

Survey schedule

The survey was conducted four times per year (February, May, August and November) from 1946 to 1955, and two times per year (May and November) from 1956 to 1963. Although it was conducted once a year in 1964, it was consistently conducted in November from 1972 till now (1963, 1966, 1972-2012: November/1965, 1967-1971: May).

Survey items

The physical examination is roughly classified into the following six components: some are relevant to anthropometric measurements, clinical measurements, physical symptoms, blood tests, lifestyle and medication by interview, and so on.

- a) Physical symptoms: anemia, angular cheilitis, follicular hyperkeratosis, absent tendon reflex, edema, and others.
- b) Anthropometric measurements: height, body weight, circumference of the upper arm, chest circumference, sitting height, grip strength, subcutaneous skinfold, abdominal circumference, maximal oxygen consumption.
- c) Clinical measurements: blood pressure, pulse rate: systolic blood pressure, diastolic blood pressure, and pulse rate.

- d) Blood tests: serum total protein, total cholesterol, triglycerides, HDL-cholesterol, blood glucose, red blood corpuscles (RBC), white blood corpuscles (WBC), platelet (PLT), haemoglobin (Hb), and others.
- e) Measurement of physical activity: number of steps in a day by pedometer.
- f) Lifestyle and medication by interview: use of medication, Habits of regular exercise, alcohol intake, and smoking.

RESULTS

The changes in the survey items from 1946 to 2012 are shown in Tables 1-5.

The timing and details regarding changes in survey items

Items related to nutritional deficiency, such as anaemia and tendon reflex disappearance, and body weight measurements were collected during the period according to the instructions of the General Headquarters (Tables 1, 2). From 1952, the examination involved dental checks and the presence of unusual/missing teeth/cavities were noted. Investigations of chronic digestive troubles, and height measurement when seated (sitting height) were also added. The measurements of blood pressure, pulse rate, gastrocnemius pain, and circumference of the upper arm were added in 1956, and the examination was conducted four times per year. However, the survey schedule became once a year in May, and investigation of physical symptoms investigation was conducted twice in May and November (on the same subjects). The examination method was fully revised in 1964: From the survey items in the physical examination, which was conducted in May, circumference of the upper arm, pulse rate, and noting the presence of unusual teeth were abolished. From 1989, blood tests and measurement of physical activity (number of steps in a day) were added (Tables 3, 4). The blood tests measured serum total protein, total cholesterol, triglyceride, HDL-cholesterol, LDL-cholesterol, blood glucose, Hb, aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma-GT, albumin, creatinine, fructosamine, and uric acid levels. Serum ferritin, albumin, and cotinine levels were measured in 2003. Moreover, use of medication was investigated from 2003, including use of "anti-arrhythmic drugs", "treatment of diabetes mellitus using either insulin or oral drugs", "cholesterol-lowering drugs", "anti-hyperlipidemia drugs", and "anti-anaemic agents (iron pill)" from 2008. Habits of regular exercise (number of exercise days per week, average exercise time per day, and intensity of the exercise) were also investigated.

Items investigated continuously for more than 50 years

Height, body weight and blood pressure and anthropometric measurements were measured continuously for more than 50 years (Table 2). They were investigated every year; height for 64 years since 1948, body weight for 66 years since 1947, and systolic blood pressure and diastolic blood pressure for 56 years since 1956. The target age for height and body weight was assessed initially from birth, but was changed to age 1 year and over after 1975. The target age for systolic blood pressure and dias-

Table 1. The changes of the survey items and subjects' age (Physical symptoms, lost teeth and dental caries, urinary test) from 1946 -1990

Year	Month of survey	Physical symptoms															Pregnancy and lactating status, †	Lost teeth and dental caries	Urinary test ‡
		Anaemia	Angular cheilitis	Follicular hyperkeratosis	Corneal xerosis/keratomalacia	Symptom and canker sore	Absent tendon reflex	Gastrocnemius pain	Edema	Chronic diarrhea	Bradycardia	Emmeniopathy	Poor breast milk secretion	Anostosis	Chronic gastrointestinal illness	Age at menarche			
1946	2, 5, 8, 11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
1947	2, 5, 8, 11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
1948	2, 5, 8, 11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS					
1949	2, 5, 8, 11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS					
1950	2, 5, 8, 11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS					
1951	2, 5, 8, 11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS					
1952	5, 8, 11, 2 (next year)	NS	NS	NS				NS		NS		NS	NS	NS	NS	11+F		2+	
1953	5, 8, 11, 2 (next year)	NS	NS	NS				NS		NS		NS	NS	NS	NS			2+	
1954	5, 8, 11, 2 (next year)	NS	NS	NS				NS		NS		NS	NS	NS	NS				
1955	5, 8, 11, 2 (next year)	NS	NS	NS				NS		NS		NS	NS	NS	NS			2+	
1956	5, 11	NS	NS	NS				NS	NS	NS								2+	
1957	5, 11	NS	NS	NS				NS	NS	NS								2+	
1958	5, 11	0+	0+	0+				0+	0+	0+								2+	
1959	5, 11	0+	0+	0+				0+	0+	0+								2+	
1960	5, 11	0+	0+	0+				0+	0+	0+								2+	
1961	5, 11	0+	0+	0+				0+	0+	0+								2+	
1962	5, 11	0+	0+	0+				0+	0+	0+								2+	
1963	5, 11	NS	NS	NS				NS	NS	NS								2+	
1964	11	NS	NS	NS				NS	NS	NS								NS	
1965	5	NS	NS	NS				NS	NS	NS								NS	
1966	11	NS	NS	NS				NS	NS	NS								NS	
1967	5	NS	NS	NS				NS	NS	NS								NS	
1968	5	NS	NS	NS				NS	NS	NS								NS	
1969	5	NS	NS	NS				NS	NS	NS								NS	
1970	5	NS	NS	NS				NS	NS	NS								NS	
1971	5	NS	NS	NS				NS	NS	NS								NS	
1972	11																	18-59F [§]	
1973	11																	18-59M [§]	
1975	11																		
1976	11							NS	NS	NS									
1977	11																	18-59F [§]	
1978	11																	18-59F [§]	
1990	11																	NS	

Blank: not conducted. NS: not stated; F: female; M: male. Emmeniopathy: includes bradymenorrhea and amenorrhea.

†Includes pregnancy length in months (women).

‡Both urinary protein and sugar.

§Measured at least 3 hours after the last meal.

The physical examination was not carried out in 1974.

tolic blood pressure was age 20 years and over during 1956-1971, age 18 years and over in 1972 and 1973, age 15 years and over in 1975-2011, and age 20 years and over in 2012.

Items investigated continuously for 20-49 years

For posture and anthropometric measurements, tests included chest circumference, and sitting height and subcutaneous skinfold (Table 2). Blood tests were added in

1989 (Table 3) and investigated almost every year; Hb has been measured for 27 years, total cholesterol for 24 years, HDL-cholesterol for 24 years, triglyceride for 23 years, blood glucose for 23 years, serum total protein for 23 years and RBC for 21 years. The target ages for the blood tests were more than 30 years old in 1989, 1990, 1992, 1993 and 1996, more than 18 years old in 1991, 20-59 years old in 1994 and 1995, and more than 20 years old from 1997 to 2012. Hours after the last meal before

Table 2. The changes of the survey items and subjects' age (anthropometric measurements et al) from 1946-2012

Year	Month	Anthropometric measurements									Clinical measurements			
		Height	Body weight	Circumference of the upper arm	Chest circumference	Sitting height	Grip strength	Subcutaneous skinfold	Abdominal circumference	Measurement status	BMI	Pulse rate	Systolic and diastolic blood pressure	Number of measurements
1946†	2, 5, 8, 11		0 ⁺											
1947†	2, 5, 8, 11		NS											
1948†	2, 5, 8, 11	0 ⁺	0 ⁺											
1949†	2, 5, 8, 11	0 ⁺	0 ⁺											
1950†	2, 5, 8, 11	0 ⁺	0 ⁺		0 ⁺									
1951†	2, 5, 8, 11	0 ⁺	0 ⁺		0 ⁺									
1952†	5, 8, 11, 2	0 ⁺	0 ⁺		0 ⁺	0 ⁺								
	(next year)													
1953†	5, 8, 11, 2	0 ⁺	0 ⁺		0 ⁺	0 ⁺								
	(next year)													
1954†	5, 8, 11, 2	0 ⁺	0 ⁺		0 ⁺	0 ⁺								
	(next year)													
1955†	5, 8, 11, 2	0 ⁺	0 ⁺		0 ⁺	0 ⁺								
	(next year)													
1956	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1957	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1958	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1959	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1960	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1961	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1962	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1963	5†, 11	0 ⁺	0 ⁺	0 ⁺	0 ⁺	0 ⁺					12 ⁺	20 ⁺	1	
1964	11	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1965	5	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1966	11	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1967	5	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1968	5	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1969	5	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1970	5	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1971	5	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10 ⁺					20 ⁺	1	
1972	11	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10-59	18 ⁺				18 ⁺	1	
1973	11	0 ⁺	0 ⁺		0 ⁺	0 ⁺	10-59	18 ⁺				18 ⁺	1	
1975	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1976	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1977	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1978	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1979	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1980	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1981	11	1 ⁺	1 ⁺		1 ⁺	1 ⁺		15 ⁺				15 ⁺	1	
1982	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1983	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1984	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1985	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1986	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1987	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1988	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	
1989	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	NS
1990	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	NS
1991	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	NS
1992	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	NS
1993	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	NS
1994	11	1 ⁺	1 ⁺					15 ⁺				15 ⁺	1	NS
1995	11	1 ⁺	1 ⁺					15 ⁺		20 ⁺		15 ⁺	1	
1996	11	1 ⁺	1 ⁺							20 ⁺		15 ⁺	1	

Table 2. The changes of the survey items and subjects' age (anthropometric measurements et al) from 1946-2012 (cont.)

Year	Month	Anthropometric measurements									Clinical measurements			
		Height	Body weight	Circumference of the upper arm	Chest circumference	Sitting height	Grip strength	Subcutaneous skinfold	Abdominal circumference	Measurement status	BMI	Pulse rate	Systolic and diastolic blood pressure	Number of measurements
1997	11	1 [†]	1 [†]								20 ⁺	15 ⁺	1	
1998	11	1 [†]	1 [†]								15 ⁺	15 ⁺	1	
1999	11	1 [†]	1 [†]								15 ⁺	15 ⁺	1	
2000	11	1 [†]	1 [†]								15 ⁺	15 ⁺	2	
2001	11	1 [†]	1 [†]								15 ⁺	15 ⁺	2	
2002	11	1 [†]	1 [†]								15 ⁺	15 ⁺	2	
2003	11	1 [†]	1 [†]							15 ⁺	15 ⁺	15 ⁺	2	
2004	11	1 [†]	1 [†]							15 ⁺	15 ⁺	15 ⁺	2	
2005	11	1 [†]	1 [†]							15 ⁺	15 ⁺	15 ⁺	2	
2006	11	1 [†]	1 [†]							6 ⁺	15 ⁺	15 ⁺	2	
2007	11	1 [†]	1 [†]							6 ⁺	15 ⁺	15 ⁺	2	
2008	11	1 [†]	1 [†]							6 ⁺	15 ⁺	15 ⁺	2	
2009	11	1 [†]	1 [†]							6 ⁺	15 ⁺	15 ⁺	2	
2010	11	6 ⁺	6 ⁺							6 ⁺	15 ⁺	15 ⁺	2	
2011	11	1 [†]	1 [†]							6 ⁺	15 ⁺	15 ⁺	2	
2012	11	1 [†]	1 [†]							6 ⁺	15 ⁺	20 ⁺	2	

Blank: not conducted. NS: not stated. Measurement status: measurement status of height, body weight, abdominal circumference.

[†]Not included in the questionnaire.

The physical examination was not carried out in 1974.

the blood tests were not fixed and were different depending on the survey year, varying by hours since last meal (4 hours or 3 hours, or simply avoiding the test within 30 minutes of a meal). Measurement of physical activity (number of steps in a day) was investigated for 24 years yearly until 1989-2012. The target age for the measurement of physical activity (number of steps in a day) was more than 30 years old from 1989 to 1993, 20-59 years old in 1994, and more than 15 years old until 2012. Both anti-hypertensive drug use and habits of regular exercise by lifestyle and medication of interview were investigated every year for 27 years from 1986-2012, and the target age was consistently more than 20 years old (Table 4).

Survey items with revisions

The survey items on drinking and smoking habits were moved to the lifestyle questionnaire in 2003. The criteria for obesity was judged by subcutaneous skinfold in 1994, but was changed to BMI from 1995 (Tables 5, 6). Subcutaneous skinfold (the back scapula bottom tip + the upper arm extension side portio intermedia) was measured from 1972 to 1995, and defined for men as ≥ 40 mm and women as ≥ 50 mm for obesity. After 1995, BMI was applied, but the cutoffs for underweight/obesity changed in 1998 (Table 6).

Summary sheets on subpopulations in the annual report

Since 2000, pregnant women have been excluded from reports on body weight and BMI status. With regard to

use of medication, "anti-hypertensive drugs" was added to the interview item from 1986, "anti-arrhythmic drugs", "treatment of diabetes mellitus using either insulin or oral drugs" and "cholesterol-lowering drugs" from 2003, "anti-hyperlipidemia drugs" from 2007, "anti-anaemic agents (iron pill)" from 2008. The users of these drugs were also excluded from reports on blood pressure status or blood tests items biomarker status reports. From 2004, tables on the prevalence of metabolic syndrome and their risk factor status were added to the reports.

DISCUSSION

This is the first report on the items of physical examination in the J-NNS and NHNS. The present analysis showed that the revisions in survey methods, survey items, and summary reports on the physical examination performed in the J-NNS and NHNS. Important survey items such as height, body weight, and blood pressure measurements have been conducted for more than 50 years. While malnutrition was a problem after the war in 1945, in later years the pressing issues were prevention of lifestyle-related diseases and increasing healthy life expectancy.

Here we describe the historical outlines of health policies which influenced the survey contents of the J-NNS and NHNS.

Period of governance of the General Headquarters of the Allied Forces (1945-1951)

Table 3. The changes of the survey items and subjects' age (blood tests et al) from 1972-2012

Year	Blood tests																													
	Hours after the last meal	Specific gravity of whole blood	Serum iron (µg/dL)	Total protein (g/dL)	Total cholesterol (mg/dL)	Triglyceride (mg/dL)	HDL-cholesterol (mg/dL)	LDL-cholesterol (mg/dL)	Blood glucose (mg/dL)	Red blood corpuscles (RBC) ($\times 10^3/\text{mm}^3$)	Haemoglobin (Hb) (g/dL)	Hematocrit (%)	Haemoglobin A1c (%)	Ferritin (ng/ml)	Total iron binding capacity (TIBC) (µg/dL)	AST (GOT) (U/L)	ALT (GPT) (U/L)	γ - GT (γ - GPT) (U/L)	Albumin (g/dL)	Creatinine (mg/dL)	Fructosamine (mmol/L)	Uric acid (mg/dL)	Cotinine (blood serum) (ng/dL)	Metabolic syndrome situation	Diabetic situation	Hypertensive patients	Dyslipidemic situation	Electrocardiography		
1972	NS	18-59 F									18-59F																			
1973	NS	18-59M									18-59M																			
1975-76																														
1977	NS	18-59F									18-59F																			
1978	NS	18-59M									18-59M																			
1979-82																														
1983	NS	18-59F									18-59F																			
1984-88																														
1989 [†]			30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]					30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]							
1990 [†]			30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]					30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]						30 [†]	
1991 [†]				18 [†]	18 [†]	18 [†]	18 [†]	18 [†]	18 [†]	18 [†]	18 [†]																			
1992 [†]				30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]																			
1993 [†]				30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]																			
1994 [†]				20-59	20-59	20-59	20-59	20-59	20-59	20-59	20-59																			
1995 [†]				20-59	20-59	20-59	20-59	20-59	20-59	20-59	20-59																			
1996 [†]				30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]	30 [†]																			
1997 [†]				20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]		20 [†]																	
1998 [†]				20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]																			
1999 [‡]				20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]																			
2000 [‡]				20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]	20 [†]																			

Blank: not conducted. NS: not stated; F: female; M: male.

[†]At least 4 hours after the last meal.

[‡]At least 3 hours after the last meal.

[§]Refrain from testing within 30 minutes just after meal3.

Diabetic situation: "Those who are highly suspected to have diabetes" and "those with a possibility to have diabetes", Dyslipidemic situation: "Those who are highly suspected to have dyslipidemia". During 2003-2011, measurement of white blood corpuscles (WBC) and platelet (PLT) count was conducted, but not reported. The physical examination was not carried out in 1974.

Table 4. The changes of the survey items and subjects' age (Lifestyle and medication of interview et al) from 1976-2012

Year	Month	Number of steps in a day	Lifestyle and medication by interview													Questionnaire about the health	Single leg stance and time			
			Use of medication				Habits of regular exercise				Drinking habits		Smoking habits							
			Anti-hypertensive drug	Anti-arrhythmic drug	Treatment of diabetes mellitus using insulin or oral drug	Cholesterol-lowering drug	Anti-hyperlipidemia drug	Anti-anemic agent (iron pill)	Habits of regular exercise	Number of exercise days per week	Average exercise time per day	Intensity of the exercise	Drinking habits	Quantity	Drinking history			Smoking habits	Mean number of cigarettes smoked (per day)	Smoking history
1976	11																	12-49		
1977-85	11																			
1986	11		20 ⁺						20 ⁺				20 ⁺			20 ⁺	20 ⁺			
1987	11		20 ⁺						20 ⁺				20 ⁺			20 ⁺	20 ⁺			
1988	11		20 ⁺						20 ⁺				20 ⁺			20 ⁺	20 ⁺			
1989	11	30 ⁺	20 ⁺						20 ⁺				20 ⁺			20 ⁺	20 ⁺			
1990	11	30 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1991	11	30 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1992	11	30 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1993	11	30 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1994	11	20-59	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1995	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1996	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1997	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1998	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
1999	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
2000	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
2001	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
2002	11	15 ⁺	20 ⁺						20 ⁺				20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	
2003	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2004	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2005	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2006	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺		20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2007	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺								40 ⁺
2008	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2009	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2010	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2011	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺								
2012	11	15 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺	20 ⁺								

Blank: not conducted. The physical examination was not carried out in 1974.

Table 5. The changes of the survey items (additional and deleted items) from 1946-2012

Year	Additional items	Items conducted only on the specific year	Deleted items
1946	-	[Physical symptom]: anostosis	-
1947	-	[Physical symptom]: anostosis	-
1948-49	-	-	-
1950	[Anthropometric measurements]: chest circumference	-	-
1951	-	-	-
1952	[Anthropometric measurements]: sitting height [Physical symptom]: chronic gastrointestinal injury	[Physical symptom]: age at menarche (only May and Aug) [Lost tooth and caries]	[Physical symptom]: corneal xerosis, keratomalacia, symptom and canker sore, chronic diarrhea
1953	-	[Lost tooth and caries]	-
1954	-	-	-
1955	[Lost teeth and dental caries]	-	-
1956	[Anthropometric measurements]: circumference of the upper arm [Clinical measurements]: pulse rate, blood pressure	-	[Physical symptom]: bradycardia, Emmeniopathy/ bradymenorrhoea and amenorrhoea, poor breast milk secretion, chronic gastrointestinal injury
1957-58	-	-	-
1959	[Physical symptom]: gastrocnemius pain	-	-
1960-62	-	-	-
1963	-	-	[Anthropometric measurements]: circumference of the upper arm [Clinical measurements]: pulse rate [Lost tooth and caries]
1964	[Anthropometric measurements]: grasping power [Physical symptom]: pregnancy and lactating status, pregnancy length in months (women)	-	-
1965-71	-	-	-
1972	[Anthropometric measurements]: subcutaneous skinfold	[Urinary test], [Blood tests]:female only	[Physical symptom]: all items
1973	-	[Urinary test], [Blood tests]:male only	-
1975	-	-	[Anthropometric measurements]: chest circumfer- ence, sitting height [Lifestyle and medication of interview]: grasping power
1976	-	[Physical symptom]: absent tendon reflex, gastrocnemius pain, edema [Questionnaire about the health]	-
1977	-	[Urinary test], [Blood tests]: female only	-
1978	-	[Urinary test], [Blood tests]: female only	-
1979-80	-	-	-
1981	-	[Anthropometric measurements]: chest circumference, sitting height	-
1982	-	-	-
1983	-	[Urinary test], [Blood tests]: female only	-
1984-85	-	-	-
1986	Lifestyle and medication of interview]: use of anti-hypertensive drugs, habits of regular exercise, drinking habits, smoking history (including average number of cigarettes smoked per day)	-	-

(re): re-appeared; -: none. The physical examination was not carried out in 1974.

Table 5. The changes of the survey items (additional and deleted items) from 1946-2012 (cont.)

Year	Additional items	Items conducted only on the specific year	Deleted items
1987-88	-	-	-
1989	[Measurement of physical activity]: number of steps in a day [Lifestyle and medication of interview]: habit of regular exercise, definition of drinking habit	[Blood tests]: serum iron, GOT, GPT, γ -GPT, albumin, creatinine, fructosamine, uric acid	-
1990	[Anthropometric measurements]: maximal oxygen consumption [Lifestyle and medication of interview]: quantity of drinks (average), drinking history, smoking history	[Blood tests]: serum iron, GOT, GPT, γ -GPT, albumin, creatinine, fructosamine, uric acid [Urinary test], [Electrocardiography]	-
1991	[Blood tests]: RBC	-	-
1992-95	-	-	-
1996	-	-	[Anthropometric measurements]: subcutaneous skinfold [Maximal oxygen consumption]
1997	-	[Blood tests]: hemoglobin A1c (stable form)	-
1998-2001	-	-	-
2002	[Blood tests]: haemoglobin A1c	[Blood tests]: hematocrit	-
2003	[Anthropometric measurements]: abdominal circumference [Blood tests]: WBC, PLT, ferritin, albumin(re) [Lifestyle and medication of interview]: use of anti-arrhythmic drugs, treatment of diabetes mellitus using either insulin or oral drugs, cholesterol-lowering drugs • Number of exercise days per week, average exercise time per day, intensity of the exercise	[Blood tests]: cotinine (blood serum)	[Lifestyle and medication of interview]: drinking and smoking habits were moved to the lifestyle questionnaire from this year.
2004	[Blood tests](re): hematocrit	-	-
2005	-	-	-
2006	-	[Single leg stance]	-
2007	[Blood tests]: LDL-cholesterol [Lifestyle and medication of interview]: anti-hyperlipidemia drug	-	-
2008	[Lifestyle and medication of interview]: anti-anaemic agent(iron pill) [Blood tests](re): creatinine	-	-
2009	-	-	-
2010	[Blood tests]: TIBC [Blood tests](re): AST, ALT, γ -GT, uric acid	[Blood tests]: serum iron	[Blood tests]: ferritin
2011	-	[Blood tests]: serum iron	-
2012	-	-	Blood tests]: serum iron, total protein, triglyceride, blood glucose, RBC, WBC, PLT, Hb, hematocrit, ferritin, TIBC, AST, ALT, γ -GT, albumin, creatinine, Uric acid [Lifestyle and medication of interview]: anti-anemic agent (iron pill)

(re): re-appeared; -: none. The physical examination was not carried out in 1974.

Table 6. Criteria for obesity, 1995-2012

1995-97		1998-2012	
Definition	BMI (kg/m ²)	Definition	BMI (kg/m ²)
Thin (Underweight)	Less than 19.8	Thin (underweight)	Less than 18.5
Normal	19.8 -24.2	Normal	18.5 -24.9
Overweight	24.2 - 26.4	-	-
Obesity	26.4 or more	Obesity	25.0 or more

The J-NNS was implemented in Tokyo under the directive of the Japanese government from the General Headquarters in 1945, to obtain basic data for estimating food imports. Furthermore, its objective expanded to provide data for diet and physical status improvement as well as for the development of food security policies in the aftermath of the Second World War.⁹

Period of the Nutrition Improvement Law (1952-2002)

The Nutrition Improvement Law was enacted in 1952. Article 2 required that “the government conduct a national nutrition survey to clarify the relationship between health conditions and nutrition, and nutrition intake and economic liability with the aim of improving public nutrition”.¹⁰ The purpose of the law was not only to provide basic data on food imports, but also to improve dietary intake and the health of the nation, and to apply the results for developing food security policies.

From 1956, economic development was accompanied by a remarkable improvement in national eating habits.¹⁰ After 1961, disparities in nutritional status among different regions or social classes became prominent, arising as a new problem. Furthermore, instead of preventing conventional diseases such as nutrient deficiencies or infectious diseases, the pressure to emphasize health promotion to prevent chronic diseases increased year by year. To tackle these issues, a need arose to establish a relationship between health promotion and nutrition. The National Nutrition Council drastically revised the survey in 1964.⁹ The major changes regarded survey periods, analyses of nutritional intake according to social class and regions, monitoring of food eaten outside homes, revision of physical examination, and analyzing food intake according to 21 newly defined food groups. The Nutrition Council in 1972 further decided to investigate the eating habits of adults, as well as to obtain blood, urinalysis, and skinfold data,⁹ as chronic diseases related to high blood pressure, obesity, and diabetes became a problem in the 1970s.¹¹ Reductions in survey days and sampling have been also reconsidered. To prepare for a rapidly aging society, the first National Positive Health Measures in 1978 set targets for health promotion, to build a cheerful and vigorous society.¹¹

The 1990s brought new problems. In particular, there were more people opting to skip breakfast, children were becoming fussy eaters and there was an increase in consumption of processed food.¹¹ These problems greatly reflected the changes in social structure. As the elderly population increased, there was an extra drive to promote age-related health policies. In 1988, the Ministry of Health and Welfare developed the “Second National Positive Health Measure (Active 80 Health Plan)”,¹² and be-

gan to promote healthy eating habits together with exercise and periods of rest. Blood tests and measurement of physical activity (number of steps in a day) were added to the J-NNS in 1989. At this time, it was widely recognized that lifestyle factors were associated with the risk of so-called adult diseases. In 1996, the concept of “lifestyle-related disease” was introduced by the Public Health Council of the Ministry of Health and Welfare instead of “adult diseases” to enforce the idea that people can prevent the development and progress of disease by changing their lifestyles.¹³ “National Health Promotion Movement in the twenty-first century (Health Japan 21)” was adopted as the third National Positive Health Measure in 2000.¹⁴ This aimed to encourage people to take active responsibility for their health so as to ensure and maintain good health in old age. This concept of “healthy life expectancy” highlighted that Japan should not progress to a nursing care state, with people bedridden or suffering from dementia. Older people were encouraged to be active and lead a vigorous life.

Period of the Health Promotion Law (2003-2012)

With the increase in the elderly population, prevention of lifestyle-related diseases and promotion of health was widely considered a serious public health problem, leading to enactment of the Health Promotion Law in May 2003.¹⁵ The J-NNS expanded the survey items to include not only nutrition but also exercise, rest (sleep), alcohol intake, smoking, and dental health. This new law replaced the Nutrition Improvement Law and the J-NNS was renamed the National Health and Nutrition Survey (NHNS).⁷ “The second term of the National Health Promotion Movement in the twenty-first century (Health Japan 21 (the second term))” from 2013 fiscal year to 2022 fiscal year was adopted as the fourth National Positive Health Measure in 2012. The target was prevention of lifestyle-related disease and mental health, increasing healthy life expectancy and reducing health disparities.¹⁴ The survey items were expanded to measure the living habits in general, to cover not only nutrition but also exercise, rest (sleep), alcohol intake, smoking, and dental health. Regional differences became available after expansion of the scale of investigations in 2012.¹⁴

Therefore, the J-NNS and NHNS have contributed to nutritional improvement in Japan for more than half a century. The anthropometric data was used to determine of the standard height and body weight in the Japanese Dietary Reference Intakes (2005, 2010 and 2015),¹⁶⁻¹⁸ and it also provided information for the planning and evaluation of Healthy Japan 21 (first and second term).^{19,8} We expect that this survey will be useful not only for national and local administration, but also for improvement of

living habits and effective improvement in the support of health care throughout Japan in future. These data should also be of value in developing policies for prevention of lifestyle-related diseases. The results from our research will be the basic information for the utilization of the J-NNS and NHNS, to researchers, clinicians or policy makers.

As we have already mentioned, because the original purpose of the J-NNS was nutritional improvement, comparing the results across years wasn't considered important. So the target age was dispersive, and the survey scale wasn't unified, and some of the individual data for the survey items doesn't exist from 1946 to 1994. Therefore for those years, the only data available are the reported statistical tables in the official annual reports. However, we envisage that our analysis will be useful to developing nations with high economic growth, where the social structure is rapidly changing and the onset of lifestyle-related diseases are prominent. Height, body weight and blood pressure had been investigated for years, so we hypothesized that any relationship between nutritional status and changes in body size would become clearer if they were analyzed together with the dietary survey. We think it's also significant to analyze the relationship between nutrient intake and blood tests over 20 years, because of the addition of serum total protein, total cholesterol, triglycerides, HDL-cholesterol, blood sugar level, RBC and Hb measurements.

This study showed that data collection became focused on monitoring the health status of the population after 2003, but it's still necessary to re-examine the methods for measurement and the survey items. Some changes have been adopted to refine the survey items. For example, starting in 2006, the survey included questions on whether height, weight and abdominal circumference were measured directly and whether pedometer measurements were taken throughout the day. However, there is still a need to reconsider the definition about habits of regular exercise. Furthermore, there are also several survey items which are not performed in Japan, but are conducted in other countries. For example, items on hepatitis, kidney function and osteoporosis are conducted in the United States,²⁰ items on 24-hour urinal collection in the United Kingdom,²¹ items on community survey in China,²² items on hepatitis and osteoporosis in Korea.²³ These survey items may be considered in the future. Timely updates of measurement methods should be carefully planned and implemented to present accurate and reliable data on the health status of the general population.

ACKNOWLEDGEMENT

We appreciate the efforts of all staff of the Department of Nutritional Epidemiology, for cooperating in data collection of this study. We especially thank Dr. Suminori Kono, President of the National Institute of Health and Nutrition, Drs. Miho Kawano, Megumi Haga, Ms. Sanae Tanaka and Aki Saito, of the Ministry of Health, Labour, and Welfare, for their valuable comments on this study.

AUTHOR DISCLOSURES

None of the authors had any personal or financial conflict of interest to declare.

REFERENCES

1. Ministry of Health, Labour and Welfare. Annual report of the National Nutrition Survey. Tokyo: Daiichi Publishing Co.; 1946-2002. (In Japanese)
2. Yamaguchi M, Suzue R, Watanabe S. Summary of National Nutrition Survey 1980-1984 by prefecture. *Jpn J Clin Oncol*. 1990;20:113-20.
3. Kobayashi S. Trends in national nutritional survey of Japan. *Nutr Health*. 1992;8:91-6. doi: 10.1177/026010609200800304.
4. Yoshiike N, Matsumura Y, Iwaya M, Sugiyama M, Yamaguchi M. National Nutrition Survey in Japan. *J Epidemiol*. 1996;6:189-200. doi: 10.2188/jea.6.3sup_189.
5. Matsumura Y. Nutrition trends in Japan. *Asia Pac J Clin Nutr*. 2001;10(Suppl):S40-7. doi: 10.1046/j.1440-6047.2001.0100s1S40.x.
6. Katanoda K, Matsumura Y. National Nutrition Survey in Japan--its methodological transition and current findings. *J Nutr Sci Vitaminol*. 2002;48:423-32. doi: 10.3177/jnsv.48.423.
7. Ministry of Health, Labour and Welfare. Annual report of the National Health and Nutrition Survey. Tokyo: Daiichi Publishing Co; 2003-2012. (In Japanese)
8. Ministry of Health, Labour and Welfare. Japan: analysis and evaluation project of Health Japan 21 (the second term). 2015/3/26 [cited 2015/3/26]; Available from: http://www.mhlw.go.jp/seisakunitsuite/bunya/kenkou_iryoku/kenkou/kenkoukounippon21/index.html.
9. Oda S, Nakahara S, Inoue K. Advances in the Japan National Nutrition Survey for 40 years ("Kokumin Eiyō Chōsa 40nen no Ayumi"). *Journal of Health and Welfare Statistics*. 1987;34:4-60. (In Japanese)
10. The Nutrition Improvement Law, Act No 248, 1952. 2001/4/1 [cited 2015/2/27]; Available from: <http://law.e-gov.go.jp/haishi/S27HO248.html>.
11. Ootani Y, Nakahara S. The Japan Dietetic Association. The nutritional trend of the postwar Showa period ("Sengo Showa no Eiyō Doukō"). Tokyo: Daiichi Publishing Co.; 1998. (In Japanese)
12. Health, Labour and Welfare statistics Association. Chapter2, section1 Health promotion measure. *Journal of Health and Welfare Statistics*. 2000;47(Suppl):86-7. (In Japanese)
13. Ministry of Health, Labour and Welfare. Japan: The basic policy directions for life-style related disease control (Opinions). 1996/12/18 [cited 2015/2/27]; Available from: <http://www1.mhlw.go.jp/houdou/0812/1217-4.html>.
14. Health, Labour and Welfare statistics Association. Chapter1, section2 Health promotion measure *Journal of Health and Welfare Statistics*. 2012/2013;59 Suppl:89-95. (In Japanese)
15. The Health Promotion Law, Act No103, 2003. 2001/4/1 [cited 2015/2/27]; Available from: <http://law.e-gov.go.jp/htmldata/H14/H14HO103.html>.
16. Daiichi Publishing Co. Japanese Dietary Reference Intakes (2005). Tokyo: Daiichi Publishing Co; 2005. p. 17. (In Japanese)
17. Daiichi Publishing Co. Japanese Dietary Reference Intakes (2010). Tokyo: Daiichi Publishing Co; 2010. p. 11. (In Japanese)
18. Daiichi Publishing Co. Japanese Dietary Reference Intakes (2015). Tokyo: Daiichi Publishing Co; 2015. p. 10. (In Japanese)
19. Ministry of Health, Labour and Welfare. Japan: Health Japan 21. [cited 2015/3/26]; Available from: http://www1.mhlw.go.jp/topics/kenko21_11/top.html.
20. Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey. [cited 2015/7/9]; Available from: <http://www.cdc.gov/nchs/nhanes.htm>.
21. GOV.UK. National Diet and Nutrition Survey. 2012 [cited 2015/7/9]; Available from: <https://www.gov.uk/government/statistics/national-diet-and-nutrition-survey-headline-results>

- from-years-1-2-and-3-combined-of-the-rolling-programme-200809-201011.
22. Carolina Population Center. China Health and Nutrition Survey. [cited 2015/7/9]; Available from: <http://www.cpc.unc.edu/projects/china>.
23. Korea National Health and Nutrition Examination Survey. Korea National Health and Nutrition Examination Survey. [cited 2015/7/9]; Available from: <https://knhanes.cdc.go.kr/knhanes/eng/index.do>.

Original Article

The physical examination content of the Japanese National Health and Nutrition Survey: temporal changes

Hisako Tanaka PhD, Shino Imai MSc, Makiko Nakade PhD, Eri Imai PhD, Hidemi Takimoto MD, PhD

Department of Nutritional Epidemiology, National Institute of Health and Nutrition, National Institutes of Biomedical Innovation, Health and Nutrition, Tokyo, Japan

日本国民健康和营养普查中体检内容随时间变化

背景和目的：日本国民营养普查(J-NNS)项目随时间变化。关于饮食调查的几篇论文已经发表，但是，到目前为止，还没有关于体检的进一步论文发表。因此，我们研究了 J-NNS 和国民健康和营养普查 (NHNS) 中体检项目的变化，为进一步的政策制定提供有用的数据。**方法与研究设计：**我们总结了从 1946 年 J-NNS 到 2012 年 NHNS 体检项目的变化。体检大致分为以下六个部分：人体测量相关参数、临床测量、身体症状、血液检测、生活方式和药物治疗及其它。**结果：**根据总部的建议，早期就已经收集与营养缺乏有关内容，如贫血、肌腱反射消失和体重测量。从 1989 年开始，增加了血液检测和身体活动的测量，血清总蛋白、总胆固醇、甘油三酯、高密度脂蛋白胆固醇、血糖、红细胞和血红蛋白，已连续检测 20 多年。**结论：**这是 J-NNS 更名为 NHNS 后的第一份关于体检的报告。我们的研究结果为研究人员、临床医生和政策决策者使用 J-NNS 和 NHNS 提供了基本信息。正确监测当前状态是国民健康促进的必要手段；也可改善普查方法，从而适用于国与国之间的相互比较。

关键词：日本国民营养普查、国民健康与营养普查、体格检查、调查条目、全民普查