

Utilization of Japanese long-term care-related data including Kaigo-DB: An analysis of current trends and future directions

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Abstract: Despite high expectations from the government and researchers regarding data utilization, comprehensive analysis of long-term care (LTC)-related data use has been limited. This study reviewed the use of LTC-related data, including Kaigo-DB, in Japan after 2020. There was an increase in studies using LTC-related data in Japan between 2020 and 2021, followed by a stabilization period. The national government provided 13.5% of this data (6.5% from Kaigo-DB), while prefectures and municipalities contributed 85.2%, and facilities provided 1.3%. The linked data used in 90.4% of the studies primarily consisted of original questionnaire or interview surveys (34.6%) and medical claims (34.0%). None of the studies based on Kaigo-DB utilized linked data. In terms of study design, cohort studies were the most common (84.6%), followed by descriptive (5.1%), cross-sectional (3.2%), and case-control studies (1.3%). Among the 138 individual-based analytical descriptive studies, the most frequently used LTC-related data as an exposure was LTC services (26.8%), and the most common data used as an outcome was LTC certification or care need level (43.5%), followed by the independence degree of daily living for the older adults with dementia (18.1%). To enhance the use of LTC-related data, especially the valuable national Kaigo-DB, insights can be gleaned from how researchers effectively utilize municipal and prefectural data. Streamlining access to Kaigo-DB and enabling its linkage with other datasets are promising for future research in this field.

Keywords: long-term care claims, certification information, LIFE data

Introduction

Japan introduced its Long-Term Care (LTC) insurance system in 2000, providing universal coverage to ensure all citizens can access it when needed (1). Older adults requiring these services usually approach their local municipalities, which act as insurers. Subsequently, they undergo a care-needs assessment and are then certified for needed LTC. A qualified care manager then develops a personalized care plan, including home visits, day services, short-term stays, and residential or in-facility care. Service providers submit LTC claims to the National Health Insurance Organizations for processing and reimbursement, with municipalities bearing most of the costs.

In administering the Japan's LTC system, a nationwide standardized data on LTC certification and claims are generated. This data is initially held by the municipalities and aggregated at the national level for policymaking. The comprehensive LTC insurance database, Kaigo-DB, established in 2013 by the Ministry of Health, Labor and Welfare, compiles LTC-related data anonymously (2). It consists of three main data categories: anonymous LTC certification information from municipalities, anonymous

LTC receipt data from service providers, and anonymous Long-term care Information system For Evidence (LIFE) data from service providers detailing user conditions and care. LIFE data includes a wide array of information, such as demographics, daily living activities, oral health, nutrition, dementia, functional training and rehabilitation plans, and more. Although these data categories are anonymous, they share the same individual IDs, enabling interconnected analysis.

The LTC certification information and claims held by local governments and the Kaigo-DB are rich data sources in Japan, encompassing regional and national data. These datasets are invaluable for research purposes, not just for administrative use. Despite high expectations from both the government and researchers regarding the utilization of data for research, comprehensive analysis of LTC-related data use has remained limited. Apart from Jin and Tamiya's review in 2021 (3), there has been minimal in-depth exploration into the volume and trends of research papers employing this data or the themes and content of such papers. Furthermore, despite the government's efforts to promote the use of Kaigo-DB, a valuable resource at the national level, no study has focused on its utilization. To address this gap, our study

undertakes an extensive literature review post-2020, the period after Jin's coverage, examining the use of LTC-related data, including Kaigo-DB. We aim to provide an updated overview of the research landscape, highlighting the current state of this field and proposing directions for enhancing future research.

Comprehensive search of studies using LTC-related data

Search strategy and selection criteria

To conduct this review, we performed a literature search using the PubMed database in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (4). Our search included titles, keywords, and abstracts from January 1, 2020, to November 15, 2023.

We used specific search terms to narrow the results: ("long-term care" OR "long-term care insurance") AND ("data" OR "database" OR "databases" OR "claims" OR "billing" OR "certification" OR "research" OR "administrative data") AND ("Japanese" OR "Japan"). The search was limited to studies published in English or Japanese.

This review focused on studies that used LTC certification information, receipt data, and LIFE data within the Japanese LTC system. Studies based on independently obtained information about LTC certification status or the use of its services and those utilizing LTC-related data from outside Japan were excluded. Additionally, non-original articles, such as letters, were not included.

We also conducted manual searches of electronic databases, including PubMed and the Japanese Medical Abstracts Society's Ichushi Web, to supplement our primary search.

Data classification and analysis

We systematically screened studies adhering to the predetermined inclusion and exclusion criteria. The

final selection of studies and the determination of their characteristics was achieved through consensus among the authors. Each study was methodically categorized based on its year, language, and publication journal. Additionally, studies were classified according to their source of data, any linked data, design, and unit of study. Furthermore, outcomes and exposures were detailly analyzed for observational studies focusing on individuals.

Description of identified studies using LTC-related data in Japan

Study selection process

Figure 1 illustrates the study selection process. The initial search yielded 466 studies. Upon assessing eligibility, 142 studies were deemed suitable for inclusion in this review. Additionally, 14 studies emerged from manual searches, culminating in 156 studies being identified for the final review.

Publication characteristics

Studies using LTC-related data in Japan rose from 2020 to 2021, then stabilized, as depicted in Figure 2. Most publications (84.6%) are in English. "Geriatrics & Gerontology International" is the most common journal, comprising 7.1% of these studies, followed by "BMC Geriatrics" and "Japanese Journal of Public Health (Nihon Koshu Eisei Zasshi)", each accounting for 6.4% of the total publications (Table 1).

Data Characteristics

Table 2 outlines the LTC-related data sources and linked data used in the analyzed studies. The national government provided 13.5% of the data, with prefectures and municipalities contributing 85.2% and facilities 1.3%. Government-held data included 6.5% from the Kaigo-DB and 7.1% from the Statistics of Long-term Care Benefit Expenditures containing national-level

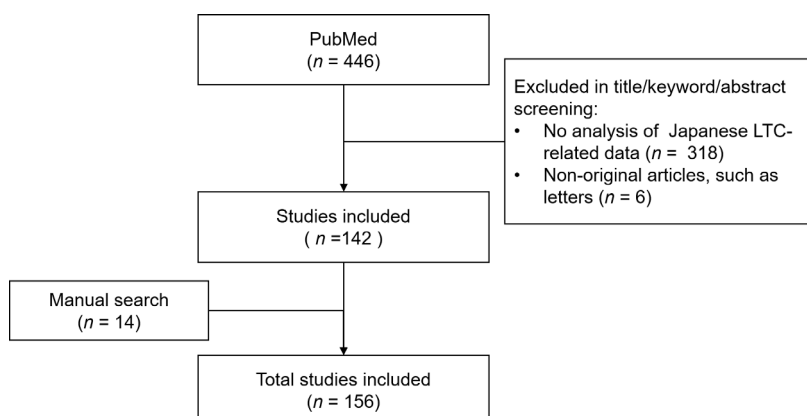


Figure 1. Study selection process.

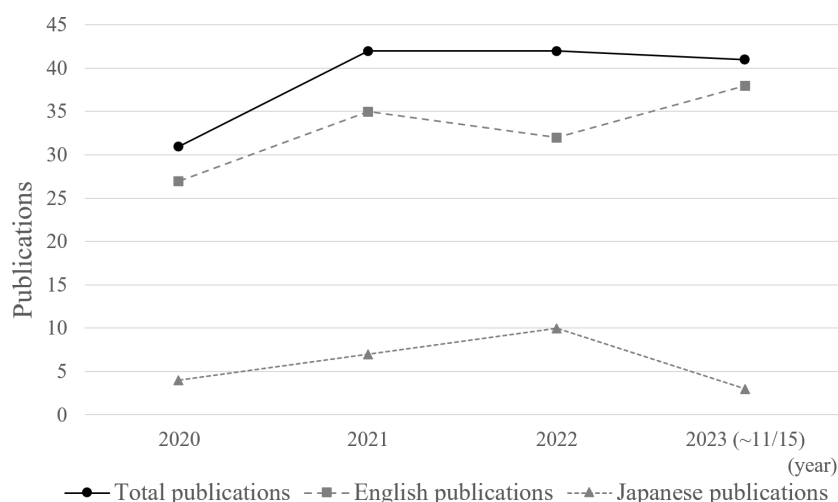


Figure 2. Frequency of publications using studies using LTC-related data in Japan.

Table 1. Characteristics of publications utilizing LTC-related data (n = 156)

Characteristics	n	%
Language		
English	132	84.6%
Japanese	24	15.4%
Journals		
Geriatr Gerontol Int	11	7.1%
BMC Geriatr	10	6.4%
Nihon Koshu Eisei Zasshi	10	6.4%
J Am Med Dir Assoc	9	5.8%
J Epidemiol	7	4.5%
Others	109	69.9%

Table 2. Characteristics of LTC-related data and linked data utilized in studies (n = 156)

Characteristics	n	%
Data source		
Kaigo-DB	10	6.5%
Statistics of Long-term Care Benefit Expenditures	11	7.1%
One prefecture	26	16.8%
Multiple municipalities	39	25.2%
One municipality	67	43.2%
Multiple facilities	2	1.3%
Linked data*		
Questionnaire survey / Interview	54	34.6%
Medical claim	53	34.0%
Health check-up data	10	6.4%
Measurement data without health check-up	10	6.4%
Kihon checklist	7	4.5%
Vital statistics	7	4.5%
Others data only	4	14.1%
No data Linked	29	9.6%

*Multiple choices possible.

LTC receipts available to researchers before the Kaigo-DB. Data from prefectures and municipalities were split, with 16.8% from one prefecture, 25.2% from multiple municipalities, and 43.2% from a single municipality.

Linked data, used in 90.4% of studies, mainly comprised original questionnaire or interview surveys (34.6%) and medical claims (34.0%). Health check-up data and other measurement data each contributed 6.4%. Many studies used pre-created datasets such as The Japan Gerontological Evaluation Study (JAGES) survey (n = 19), Ohsaki Cohort (n = 8), National Center for Geriatric and Gerontology–Study of Geriatric Syndromes (NCGG–SGS) (n = 5), and the Longevity Improvement & Fair Evidence Study (LIFE Study) (n = 4). However, it was often unclear whether studies utilized mortality information or basic resident register data such as addresses from local governments, making it difficult to analyze these data. None of the studies employing Kaigo-DB used linked data.

Study characteristics

Table 3 provides an overview of study designs and participants. Cohort studies were the most prevalent (84.6%), followed by descriptive (5.1%), cross-sectional

(3.2%), and case-control studies (1.3%). Others were two ecological studies, two difference-in-differences approaches, one regression discontinuity design, three methodological and one validity studies. The study participants varied, with 42.9% focusing on healthy older adults, 24.4% on patients with specific conditions or treatments, and 22.4% on older adults needing care. Other studies targeted older adults, LTC facilities and users, municipalities, and secondary medical areas.

Table 4 reviews 138 individual-based analytical descriptive studies, including cross-sectional, case-control, and cohort studies. Of these, 36 (26.8%) utilized LTC-related data as exposure, 17 (12.3%) examined the use of LTC services, and 12 (8.7%) focused on LTC certification or care need level. One study utilized LIFE data, that began collection in 2021. There were 113 studies (81.9%) that employed LTC-related data as an outcome, of which 60 (43.5%) analyzed LTC certification or care needs level, and 25 (18.1%) concentrated on

Table 3. Characteristics of studies utilizing LTC-related data ($n = 156$)

Characteristics	<i>n</i>	%
Study design		
Descriptive study	8	5.1%
Cross-sectional study	5	3.2%
Case-control study	2	1.3%
Cohort study	132	84.6%
Ecological study	2	1.3%
Difference-in-differences approach	2	1.3%
Regression discontinuity design	1	0.6%
Methodological study	3	1.9%
Validity study	1	0.6%
Study subject		
Healthy older adults	67	42.9%
Patients with specific conditions or treatments	38	24.4%
Older adults needing care	35	22.4%
All older people	8	5.1%
LTC facility users	4	2.6%
LTC facilities	1	0.6%
Municipalities	1	0.6%
Secondary medical areas	2	2.6%

independence degree of daily living for older adults with dementia.

Discussion of current status and perspectives of studies using LTC-related data

This review has demonstrated increased research involving LTC-related data in Japan from 2020 to 2021, consistent with Jin's findings of a similar rise from 2016 to 2020 (3). However, recently, this growth has slowed down. Most of these studies, published in English and focused on gerontology and public health, align with Jin's findings (3).

The national government provided 13.5% of the LTC-related data, with 6.5% coming from Kaigo-DB (5-14). However, prefectures and municipalities contributed the majority (85.2%). Despite governmental support for Kaigo-DB, there has been a noticeable preference among researchers for local LTC-related data. This could be attributed to the challenges associated with Kaigo-DB, such as its limited allowance for linkage (restricted to NDB and DPC-DB) and the complexities involved in accessing it (15,16). Linked data, utilized in 90.4% of the studies, mainly consisted of original questionnaire or interview surveys (34.6%) and medical claims (34.0%). Notably, none of the studies using Kaigo-DB incorporated linked data. Datasets like the JAGES survey ($n = 19$), Ohsaki Cohort ($n = 8$), NCGG-SGS ($n = 5$), and the LIFE Study ($n = 4$), which integrated local LTC-related data with unique surveys and/or medical claims, were frequently employed. The widespread use of pre-created, user-friendly linked data may offer valuable insights for enhancing the utilization of Kaigo-DB.

In terms of study design, cohort studies were predominant, accounting for 84.6% of the research, followed by descriptive (5.1%), cross-sectional (3.2%),

Table 4. Characteristics of individual-based analytical descriptive studies utilizing LTC-related data ($n = 138$)

Characteristics	<i>n</i>	%
Exposure*		
LTC certification or care needs level	12	8.7%
Use of LTC Services	17	12.3%
Independence degree of daily living for the disabled elderly	4	2.9%
Independence degree of daily living for older adults with dementia	4	2.9%
LTC certification information	3	2.2%
LIFE data	1	0.7%
Other than LTC-related data	101	73.2%
Outcome*		
LTC certification or care needs level	60	43.5%
Use of LTC Services	13	9.4%
Independence degree of daily living for older adults with dementia	25	18.1%
LTC cost	18	13.0%
Other than LTC-related data	25	18.1%

*Multiple choices possible.

and case-control (1.3%) studies. Within the individual-based analytical descriptive studies, including cross-sectional, case-control, and cohort studies, the most commonly used LTC-related data as exposure was the use of LTC services (26.8%). The most frequent outcome data involved LTC certification or care needs level (43.5%), followed by the independence degree of daily living for older adults with dementia (18.1%). The typical study was a cohort of healthy older adults, with information from unique questionnaires, interviews, health check-up data, other measurement data measurements and medical claims as the exposure and LTC certification or care needs level data as the outcome (17-42). Additionally, several similar studies with the independent degree of daily living for older adults with dementia as an outcome were conducted (43-59). Easily applicable research like this is expected to continue to be widely conducted. Only one study has utilized LIFE data, collected by the Ministry of Health, Labor and Welfare since 2021, and this study used data from facilities (60). Although currently underutilized, this rich dataset holds potential for broader application in future research, thereby enhancing studies related to LTC (61).

To optimize the utilization of LTC-related data, especially national Kaigo-DB, we can learn from the successful use of municipal and prefectural data by researchers. Furthermore, drawing insights from implementing datasets like the JAGES study is crucial. An important consideration is reducing the time and effort required to access Kaigo-DB and enabling its integration with other datasets while maintaining personal data protection. The government's initiatives aimed at simplifying access to the Kaigo-DB and enhancing its integration with other databases are promising for future research in this field (15,16).

This study is not without limitations. Given the

variations in how LTC-related data is expressed in English, we followed Jin's methodology and limited our searches to some common keywords, such as "long-term care" and "databases" (3). Despite conducting an extensive search, it's possible that we might have overlooked some relevant publications.

Conclusion

This review highlights an increase in the utilization of LTC-related data between 2020 and 2021, followed by a stabilization period. The national government's contribution to the data source was modest, including data from Kaigo-DB, while most data was sourced from prefectures and municipalities. Notably, most studies utilized linked data. This study underscores the importance of concerted efforts to streamline access to Kaigo-DB and promote its integration with diverse data sources. Implementing these measures is essential for enhancing research involving LTC-related data in Japan.

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