Development of an Assessment Scale for Commencing Home-Visit Nursing in Japan: Examining the Construct

Short title: Assessment Guide to Home-visit Nursing

Naoko Shimohigoshi, MNS[1] and Rika Yatsushiro, PhD[2]

Abstract

This study examined the assessment criteria based on which care managers (CMs) decide to commence home-visit nursing to develop a common assessment scale to guide CMs in making sound decisions about whether to commence home-visit nursing. For this purpose, we conducted a postal survey of 200 CMs. After removing 17 items from the questionnaire based on item analysis, we analyzed the remaining factors to confirm construct validity. This factor analysis identified 96 items comprising the following four factors: 1) the daily life condition of users and the support required by them, 2) strengthening medical support, 3) scheduling medical treatment/management or recuperation, and 4) preparing for users' mental and physical changes and preventing the deterioration of the situation. The results of the study indicate the first step in the process of developing a common assessment scale; in this study, we clarified the general factors that underpin a decision to commence home-visit nursing and the relationships among the items for each factor.

Keywords: care managers, home-visit nursing, factor analysis, assessment scale, decision-making, long-term care

1 University of Shizuoka, Shizuoka, Japan 2-2-1, Oshika, Suruga-ku, Sizuoka-shi, Shizuoka 422-8021, Japan.
2 Kagoshima University, Kagoshima, Japan
Address Correspondence to: Naoko Shimohigoshi.: Email: shimo-nao@u-shizuoka-ken.ac.jp
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Introduction

Japan's population is aging at a much faster rate—26.7% in 2015[1]—than that of other countries, due to which more older adults in Japan require long-term care (LTC), longer LTC durations, and an accelerated shift in the burden of care toward nuclear families and aging family caregivers. Further, an aging population entails increasing healthcare expenditures. The estimated proportions of hospitalized patients and outpatients in Japan who are older than 65 years are 71.1% and 48.5%, respectively.[2] Healthcare expenses in Japan surpassed 41 trillion in 2016, of which more than 40% was spent on in-hospital care.[3]

To address the pressures on the healthcare system, Japan enacted the Long-Term Care Insurance Act in 2000.[4] This act, which was revised several times since its enactment, provides an integrated community healthcare system to promote healthy living and ensure that older citizens can live autonomously in their own communities till their death.[5] Revisions in 2013 enhanced in-home medical care and developed home-visit nursing to initiate the integrated community healthcare system.[4] Further, revisions in 2018 focused on assisting older residents to live independent lives, preventing them from becoming severely dependent on LTC, and developing cohesive local communities.

To ensure sustainability, revisions prioritized the delivery of services on an as-needed basis, promoting an integrated community healthcare system where healthcare professionals provide 1) LTC/rehabilitative care, 2) medical/nursing care, and 3) public health/immunization services. Further, the scope of the integrated community healthcare system includes assistance with accommodation, mobility, diet, and monitoring of the person within the community.[5] As defined in the Act, care managers (CMs) provide a framework for ensuring that people who require LTC can access appropriate in-home care services.[6] CMs providing LTC in Japan have similar roles as the case managers in other countries. However, this system of utilizing LTC services based on CM's assessment is unique to Japan.

In 2014, 63.4% of the licensed CMs in Japan were certified care workers and 11.3% were certified home caregivers. Therefore, approximately 75% of the CMs had a background in LTC care work or caregiving.[7] Further, licensed nurses account for only 11.5% of the total number, and other CMs include licensed doctors, physical therapists, occupational therapists, social workers, etc. According to the Japan Care Manager Association (JCMA), CMs having care worker licenses, or similar qualifications, are more likely to experience difficulties in managing cases related to medical needs.[8] Since care workers do not have medical system licenses, but provide care according to the user's physical and mental conditions, care workers and home-based caregivers may not be able to provide appropriate medical services. CMs analyze the issues in users' daily life structure and identify their needs. Since needs tend to be complex, CMs must understand users' needs from multiple perspectives, including environmental factors (e.g., physical and social environments and interpersonal relationships), as defined by the International Classification of Functioning, Disability and Health.[9] To provide home-visit nursing services, CMs must assess individuals' need for medical care and recuperation assistance. However, Shimohigoshi et al.[10] found that CMs' assessment of such needs can be affected by their lack of medical knowledge and anxiety about assisting the user.

Japan's care management has been reported to have several problems. For example, the JCMA reported that care worker CMs (i.e., CMs with care worker or caregiver licenses) frequently resort to ~~-~~home-visit caregiving services and similar welfare services, rather than home-visit nursing.[8] Further, the Ministry of Health, Labour and Welfare found that, since the unit cost of home-visit nursing services is high, care worker CMs tend to commence home-visit caregiving services, which is cheaper, instead of home-visit nursing, even when the situation warrants the latter.[11] Moreover, their lack of medical knowledge affects how CMs decide to commence home-visit nursing.[10] Therefore, it is necessary to introduce a more

nuanced assessment system that considers factors other than the need for implementing medical procedures and preventing the worsening of disease, including the user's daily life patterns and the CM's circumstances.

To our knowledge, none of the existing tools for assessing the necessity of home-visit nursing services consider the user's or CM's specific circumstances. Taguchi et al.[12] developed a form for assessing the necessity of home-visit nursing; however, this covers medical procedures alone. Therefore, this study aimed to examine the assessment criteria based on which CMs decide to commence home-visit nursing and develop a common assessment scale to guide them in making sound decisions on the commencement of home-visit nursing. To determine the type of the required assessment scale, we conducted qualitative surveys with CMs who were general nurses ("nurse-CMs") and CMs who were caregivers ("care worker-CMs"), compiled the findings of the qualitative surveys, and developed questionnaires based on the results. This evaluation is intended to be a preliminary step in the development of a common assessment scale.

Materials and Methods

Preparation of the Questionnaire

The study comprised two preliminary studies. In the first preliminary study, we conducted semi-structured interviews with seven nurse-CMs and six care worker CMs at home care nursing support offices that currently do not provide visiting nursing services. We prepared transcripts of each interview session and then performed a qualitative inductive analysis on them.[10,13]

In the second preliminary study, we combined the survey data collected from the nurse-CMs and care worker CMs and codified the data according to the categorical and semantic similarities of the contents. From these codes, we extracted subcategories and categories.

This process yielded 136 codes, 21 subcategories, and 4 categories, including “user’s circumstances,” “support that users require,” “the support that I am providing,” and “facilitating service provision.” We defined these categories as major items and the 21 subcategories as secondary items that constituted the factors in our construct of a decision to commence home-visit nursing[14] (Supplementary Table S1). We defined the 136 codes underlying the categories as tertiary items and prepared the questionnaire items based on them. We have already reported these two preliminary studies in Japanese journals. Before conducting the preliminary studies, we carefully examined the face validity of the question items by referring to the literature.[15-17] To examine face validity, each item was worded carefully to ensure that the meaning was accurately expressed and easily understandable. Subsequently, we checked with the CMs to confirm the suitability of the content for each item. Further, we conducted a preliminary evaluation on six CMs (four nurse-CMs and two care worker CMs) and used their feedback to finalize the 136-item questionnaire. The questionnaire data comprised respondents’ sociodemographic characteristics (e.g., sex, age, license, years of holding the license, and years as a CM) and responses to the 136 items.

Scoring System

We adopted a 5-point Likert scale: “I am pretty sure that I would commence home-visit nursing in this case,” “I think I would commence home-visit nursing in this case,” “I am not very sure whether I would commence home-visit nursing in this case,” “I do not think I would commence home-visit nursing in this case,” and “I would not commence home-visit nursing in this case.” Higher scores indicated a greater resolve to commence home-visit nursing.

Survey Method

Participants

From A City's website, we selected all 181 in-home caregiver stations in the municipality existing as of April 2017. Further, we distributed the questionnaires to all 471 CMs whose names appeared in the 2016 LTC service provider guidebook, and 211 questionnaires were returned (response rate = 44.7%). We excluded 11 of the returned questionnaires in which at least 10% of the secondary question items were left unanswered; therefore, our final sample comprised 200 participants (effective response rate = 42.4%).

Data collection

From June to August 2017, survey packages containing a briefing document, a questionnaire form, and an addressed return envelope were sent to the caregiver stations. CMs voluntarily completed the questionnaires and mailed them back to us.

Data analysis

We analyzed the data using Microsoft Excel 2016 and IBM SPSS Statistics for Windows (Ver. 25, SPSS, Inc., Chicago, IL).

Item analysis

We analyzed CMs' attributes (sex, age, license, years of holding the license, and years as a CM); subsequently, we tested for ceiling and floor effects and removed items having a mean ± standard deviation ≥ 5 or < 1, performed an item-total correlation test and removed items a value of ≥ .8, and analyzed interitem correlations to remove items with a value < .3.

Validity testing

Based on Messick's[18] construct validity calculation for six aspects, we verified construct validity based on structural and content aspects,[19] since we wanted to evaluate the construct of the decision for home-visit nursing commencement.

To validate the structural aspect, we performed exploratory factor analysis; extracted factors using the maximum likelihood method; and, finally, performed Promax rotation. We removed

factors with a loading < 0.4. Consequently, we removed items with a loading ≥ 0.35 for multiple question items or a loading < 0.35 under the same factor. We defined the factors generated by the process as the construct. To establish content validity, we organized a professional committee comprising incumbent CMs to discuss various interpretations on the factor structure and whether the constituent items reflected the content.

Testing reliability

After setting the variance criterion at ≥0.8, we calculated the Cronbach's alpha of each item to determine internal consistency.

Ethical Considerations

The medical research ethics committee of the University approved this study. Data were collected anonymously. Participants were informed about the purpose, method, and period of the study; notified that participation was voluntary; and ensured that they could withdraw from the study at any time. We deemed that the participants' indicated their consent to participate by returning their completed questionnaire forms to us. This study conforms to the ICMJE Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals.

Results

As shown in Table 1, the majority of the CMs were women (74%), were in the age group 40–60 years (65%), were caregivers (61.5%), and had >10 years of experience (50.5%).

Item Analysis

Ceiling and floor effects

Six medical treatment–related items exhibited a ceiling effect: mucus clearance, bladder irrigation, nasogastric intubation, managing medical equipment, changing pressure ulcer dressings, and terminal period. In the surveys conducted by the Ministry of Health, Labour

and Welfare and other organizations,[15,16] these items were cited as examples of services provided by home-visit nurses. These items did not exhibit any floor effects.

Item-total correlation test

All items exhibited a positive interitem correlation, and none were below the 0.3 threshold.

Interitem correlation analysis

We performed a correlation analysis with the threshold coefficient set to ≥0.8 and identified 17 items ranging between 0.801 and 0.924; we concluded that these items were semantically similar and excluded them from the analysis (see Supplementary Table S1; items indicated by *).

Testing Construct Validity

We performed an exploratory factor analysis of the remaining 119 items using the maximum likelihood method and Promax rotation. Further, we referred to earlier qualitative studies[14] that derived variables associated with home-visit nursing commencement decisions based on a screen plot describing the eigenvalue variance and adopted a four-factor structure. Setting the factor loading threshold at ≥0.4, we performed a further factor analysis and removed 23 items (shaded items in Supplementary Table S1), retaining 96 items based on the following information: our factor loading and item-selection threshold; home-visit nursing care services cited in surveys by the Ministry of Health, Labour and Welfare and other organizations[20]; descriptions of home-visit nursing services by the National Association for Visiting Nurse Service[21] and Japan Visiting Nursing Foundation[22]; and a study by Tsujimura et al.[17] The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.854, and Bartlett's sphericity test indicated significant correlations ($p < .001$). The items exhibited factor loadings ≥0.35 under the same factor, and these loadings were the highest compared to their loadings with other factors.

The loadings for Factor I ranged from 0.889 (The user requires assistance to maintain hygiene, such as bathing help) to 0.040 (The user needs to access other in-home care services). The loadings for Factor II ranged from 0.930 (I am concerned about not understanding the user's physical or mental changes) to 0.410 (The nurse and in-home caregiver differ in their attention and skills). The loadings for Factor III ranged from 0.865 (The user has an indwelling urethral catheter) to 0.365 (The user has been discharged from a medical facility). Finally, the loadings for Factor IV ranged from 0.822 (It is necessary to identify abnormalities early and prevent the situation from deteriorating) to 0.361 (The user requires general recuperative guidance). Please see Supplementary Table S2 for further details.

The Cronbach's alpha for all items was 0.974, and each factor had a Cronbach's alpha >0.9 (Factor I, 0.963; Factor II, 0.955; Factor III, 0.944; and Factor IV, 0.933). The coefficients indicating inter-factor correlations ranged from 0.253 to 0.497. Thus, construct validity was confirmed.

Based on the exploratory factor analysis, we interpreted the four factors as follows: Factor I, "Users' daily life condition and the support he/she requires for daily living" (37 items), Factor II, "Strengthening medical support for user" (19 items), Factor III, "Scheduling medical treatment/management or recuperation" (18 items), Factor IV, "Preparing for users' mental and physical changes and preventing the situation from deteriorating" (22 items). Incumbent CMs agreed on the names of the factors and question items, confirming content validity. After testing the model's construct validity and reliability, we ultimately confirmed 96 items (comprising four factors) as a scale for assessing whether to commence home-visit nursing or not.

Discussion

The Japan Care Manager's Association survey indicated that care worker CMs accounted for more than 70% of all CMs in Japan and 49.6% of them had "10 years or more and less than 15 years" of practical experience.[23] The sex and professional compositions of our sample were consistent with the national trend[24] and represented highly experienced CMs, with over 89% of the sample having five or more years of experience.

Four Factor Model

Factor I

Some items in Factor I describe a user's physical state that might directly lead to a decision to commence home-visit nursing, environmental factors, and caregivers' circumstances. Other items, such as "The user's eyesight has declined" (0.727) and "The user lives alone" (0.596), could not alone lead to such a decision, despite exhibiting a strong correlation with the factor. Such items describe situations where care could be provided with other services, such as home-visit caregiving or outpatient daycare. Therefore, the factor has construct validity, since it includes multiple items forming a basis for a decision to commence home-visit nursing.

Factor II

Factor II comprised 19 items describing CMs' awareness of their lack of medical knowledge and anxiety about supporting the user, which indicate the necessity of strengthening their ability to support users' medical needs. According to the Mitsubishi Research Institute, compared with nurse-CMs, care worker CMs lack sufficient medical knowledge.[24] In addition, Ishikawa et al.[25] reported that care worker CMs experienced difficulty in responding to users' medical needs, and Shimohigoshi et al.[10] found that they struggle to predict changes in users' pathological state or general condition. The CMs surveyed in the current study believed that they lacked sufficient medical knowledge; home-visit nurses would strengthen their ability to meet user's medical needs. Therefore, Factor II clarifies the perspective

adopted by CMs in assessing users' medical needs, that is, they focus on augmenting the shortcomings in their own medical assessments to improve their ability to care for users' medical needs. The items correlated strongly with the factor, suggesting that Factor II is valid as a scale for deciding to commence home-visit nursing.

Factor III

Factor III comprised 18 items, generally indicating the need for medical treatment or supervision, since they correspond with the duties of home-visit nurses (e.g., managing urethral catheter, bowel cleansing, and nutritional supervision using gastrostomy), as cited in the Ministry of Health, Labour and Welfare's survey on home-visit nursing practice.[15] The presence of these items would be sufficient for a CM to commence home-visit nursing. Further, Factor III included two items whose factor loadings were lower than the 0.4 removal threshold: "The user requires medication management" (0.384) and "The user has been discharged from a medical facility" (0.365). The JCMA cites "medication management" as a duty of home-visit nurses,[26] whereas Iwata et al.[27] highlighted anxieties about the convalescent life of users who have "been discharged from a medical facility" (0.365). The two aforementioned items correlated strongly with Factor III, and their loadings under Factor III were higher than those under other factors. Therefore, despite their low factor loadings, we concluded that they are valid factor elements.

Factor IV

Factor IV comprised 22 items describing a recuperating user whose condition might worsen due to his or her unstable mental or physical state. Based on these items, CMs would presumably commence home-visit nursing so that the nurse could predict the future course of users' symptoms and caregivers' circumstances. Nurses could then provide necessary assistance to prevent the worsening of users' physical or mental state or caregivers'

circumstances. Factor IV is valid since it captures the perspective of predicting the future course of the user's symptoms, considering users' or caregivers' circumstances.

Further, Factor IV included three items that were lower than the 0.4 removal threshold: "It is necessary to advise and guide another service provider" (0.386), "Caregiving guidance is required" (0.380), and "The user requires general recuperative guidance" (0.361). Regarding the first of these items, Yonezawa et al.[28] highlighted the anxiety experienced by caregivers and day service staff when providing services to the user, and Shimohigoshi and Hatano[13] suggest that the working of other service providers with home-visit nurses helps the user maintain a stable daily life. For the other two items, "caregiving guidance" and "general recuperative guidance" are both cited as home-visit nurse duties.[15,21,22] Since the factor loadings ranged between 0.361 and 0.386 and a loading range between 0.3 and 0.6 is often considered reasonable in the literature,[19,29] we concluded that they are valid factor elements. Therefore, the reliability of the construct in making decisions to commence home-visit nursing was confirmed.

In the United States, which does not have a public LTC insurance system, an Interdisciplinary Provider Team plans comprehensive care, such as home-visit nursing, through the Program of All-Inclusive Care for the Elderly.[30] In the United Kingdom, home-visit nursing is considered a healthcare service that is provided fairly and free of charge by the country for all its residents, and a "district nurse" plans and manages regional patient assessment and service provision.[31] However, in rapidly-aging countries like Japan, care management may be performed by care workers who lack professional healthcare licenses. In such cases, home-visit nursing services may not be provided to the elderly in a timely manner. Our results show that the scale developed in the current study can be used to improve care management, particularly, when the decisions made by care worker CMs regarding the commencement of home-visit nursing are not successful.

Limitation and Future Tasks

Based on the ratio of CMs who participated in this study, the types of decisions and judgments made by them may reflect their occupational history and training, which makes it difficult to apply them in practice. To develop these individual constructs and factors for practical use, we recommend that this scale should be analyzed across diverse job types to further identify its item structure and produce a well-refined scale. To ensure the scale's practical applicability, further research with larger samples is needed.

Conclusions

We evaluated a construct of the scale underpinning the decision to commence home-visit nursing. Our item analysis and exploratory factor analysis yielded a four-factor, 96-item structure with construct validity and reliability as a scale for assessing whether to commence home-visit nursing. We believe that this new instrument is the first step in developing a common assessment scale since it demonstrates 1) the general construct of the factors underpinning a decision to commence home-visit nursing and 2) the relationships of the items within each factor.

References

1. Ministry of Health, Labour and Welfare. Heisei 28 nen ban kōsei rōdō hakusho—Jinkō kōreika o norikoeru shakai moderu o kangaeru [2016 White Paper]. In *A Social Model for Coping with the Aging Population*. http://www.mhlw.go.jp/wp/hakusyo/kousei/16/dl/all.pdf. 2016. Accessed March 1, 2018.
2. Ministry of Health, Labour and Welfare. Heisei 26 Kanjya no Gaikyō [2014 Patient overview]. https://www.mhlw.go.jp/toukei/saikin/hw/kanja/14/dl/02.pdf. 2014. Accessed January 10, 2018.
3. Ministry of Health, Labour and Welfare. Heisei 28 Iryō no dōkō. *Media* [2016: Medical spending trends]. MEDIAS. http://www.mhlw.go.jp/topics/medias/year/16/index.html. 2016. Accessed March 1, 2018.
4. Ministry of Health, Labour and Welfare. General affairs division of the health insurance bureau for the elderly. Kōteki kaigo hoken seido no genjō to Kongo no yakuwari [Current state and future role of the official long-term care insurance system]. http://www.mhlw.go.jp/file/06-Seisakujouhou-12300000-Roukenkyoku/201602kaigohokenntoha_2.pdf. 2015. Accessed March 2, 2018.
5. Ministry of Health, Labour and Welfare. *Chi'iki hōkatsu keashisutemu no itsutsu no kōsei yōsei to "jijo gojo kyōjo kōjo"* [The five elements of the integrated community healthcare system and the four forms of support—self-support, mutual support, insurance-based support, and publicly funded support]; 2013. http://www.mhlw.go.jp/seisakunitsuite/bunya/hukushi_kaigo/kaigo_koureisha/chiiki-houkatsu/dl/link1-3.pdf. Accessed February 19, 2018.
6. Ministry of Health, Labour and Welfare. *Kyotaku kaigo shien (Sankō shiryō) [In-home care assistance <referential material>] [Shakai hoshō shingikai kaigo hoken bukai—*

Kaigo kyūfuhi bunkakai shiryō dai 142 kai] [142nd Session of the Long-term Care Grant Subcommittee, Long-term Care Insurance Committee of the Advisory Council on Social Security]; 2017. http://www.mhlw.go.jp/file/05-Shingikai-12601000-Seisakutoukatsukan-Sanjikanshitsu_Shakaihoshoutantou/0000170291.pdf. Accessed March 1, 2018.

7. Mitsubishi Research Institute. *Kyotaku kaigo shien jigyōsho ni okeru kaigo shien senmonin no gyōmu oyobi jinzai ikusei no jittai ni kansuru chōsa hōkoku sho* [*Report on fact-finding survey on stations for supporting in-home care and the duties of professional caregivers*]. *Inc*. *Heisei 23 nendo kōsei rōdō shō rōjin hoken kenkō zōshin tō jigyō hōkoku sho* [*Report on 2011 MHLW Project to Promote Geriatric Healthcare*]. https://www.mri.co.jp/project_related/hansen/uploadfiles/h23_04.pdf. 2014. Accessed January 22, 2018.
8. Japan Care Manager Association. *Iryō niizu ga takai yō kaigo sha e no hōmon kango dōnyū tō ni muketa kadai ni kansuru chōsa kenkyū jigyō hōkoku* [*Report on research project on issues related to commencing home-visit nursing services for LTC-requiring recipients with advanced medical needs*]. Tokyo: Japan Care Manager Association; 2012.
9. Masuda T. Keamanejimento no kōsei to kadai: Kaigo hoken ni okeru keamanejimento jijō o tōshite [Constitution and problems of care management]. *Shōgai-sha kyōiku/fukushigaku kenkyū* [*J Disabil Study Welf Res*]. 2013;9:65-70.
10. Shimohigoshi N, Yatsushiro R. Grounds for determining the introduction of home-visit nursing care by care managers. *Jpn J Occupat Med Traumatol*. 2016;64(1):46-53.
11. Ministry of Health, Labour and Welfare. Shahoshin—Kaigo kyūfuhi bunkakai shiryō, dai. [111th Session of the Long-term Care Grant Subcommittee of the Advisory

Council on Social Security]. http://www.mhlw.go.jp/stf/shingi2/0000062031.html kai. 2014. Accessed February 19, 2018.

12. Taguchi A, Nagata S, Naruse T, Kuwahara Y, Yamaguchi T, Murashima S. Verification of the generalizability and utilization possibility of the home visiting nursing service need assessment form. *J Jpn Soc Healthc Adm.* 2015;52(2):67-77. doi: 10.11303/jsha.52.67
13. Shimohigoshi N, Hatano H. Decision making factors for introduction of home-visit nursing care. *J Jpn Soc Study Nurs Soc Work.* 2013;18:205-217.
14. Shimohigoshi N, Yatsushiro R. Factors that influence care managers' decision to introduce home-visiting nursing care. *Jpn J Occupat Med Traumatol*. 2018;66:276-282.
15. Ministry of Health, Labour and Welfare. *Heisei 24 nendo shinryō hōshū kaitei kekka kenshō ni kakawaru chōsa (Heisei 24 nendo chōsa) Hōmon kango no jisshi jyōkyō oyobi kōritsuteki na hōmon kango ni kakawaru hyōka ni tsuite no eikyō chōsa hōkoku sho (an)* [*Study to verify the effects of the 2012 reforms to the medical remuneration system: Draft report on the study to examine the effects of the reforms in relation to home-visit nurse practices and effective home-visit nursing-related assessments*]. Tokyo: Central Social Insurance Medical Council; 2013.
16. The National Association for Visiting Nurse Service. *Hōmon kango no kea jittai oyobi hitsuyōsei ni kansuru chōsa kenkyū jigyō hōkoku sho* [*Report on project to examine actual home-visit nursing care practices and the need for such practices*], *Heisei 28 nendo Kōsei rōdō shō rōjin hoken jigyō suishin hi tō hojo kin, Rōjin hoken kenkō zōshin tō jigyō* [2016 MHLW Grant for promoting geriatric healthcare: Project to promote geriatric healthcare]. 2017.
17. Tsujimura M, Higuchi K, Kawakami S, et al. Actual conditions related to the introduction of home-care nursing when care managers create a care plan: Comparing

care managers in social welfare and nursing in prefecture “A.” *J Health Care Nurs.* 2014;10:18-26.

18. Messick S. Validity and washback in language testing. *Lang Test.* 1996;13(3):241-256. doi: 10.1177/026553229601300302

19. Hirai A. *Kyōiku/shinri kei kenkyū no tame no deita bunseki nyūmon* [*Introduction to data analysis for education and psychology research*]. 2nd ed. Tokyo: Tosho Co., Ltd; 2012.

20. Ministry of Health, Labour and Welfare. Chi’iki hōkatsu keashisutemu no kōchiku ni mukete” [Toward an integrated community healthcare system]. *Shakai Hoshō Shingikai Kaigo Hoken Bukai (Dai 46 Kai) Shiryō, 3* [Documents, 3. The 46th Session of the Long-term Care Insurance Committee of the Advisory Council on Social Security]. 2013. http://www.mhlw.go.jp/file/05-Shingikai-12601000-Seisakutoukatsukan-Sanjikanshitsu_Shakaihoshoutantou/0000018729.pdf. Accessed February 19, 2018.

21. The National Association for Visiting Nurse Service. *Konnichiwa! Hōmon kango desu [Hello! I’m your home-visit nurse], Heisei 27 nendo ippan shadan hōjin Nihon songai hoken kyōkai josei jigyō* [2015 Grant of the General Insurance Association of Japan]. 2015.

22. Japan Visiting Nursing Foundation. *Hōmon kango suteishon no sābisu naiyō* [Descriptions of the Services Provided by Home-visit Nurse Stations]. https://www.zenhokan.or.jp/nursing/index.html. 2015. Accessed February 10, 2018.

23. Japan Care Manager Association. *Keamanejimento ni okeru iryō kei sābisu no katsuyō jittai to rihabiriteishon senmon shokushu to no kyōdō no arikata ni kansuru chōsa kenkyū jigyō* [Project to examine the use of medical care services as part of care management and ways to collaborate with rehabilitation professionals], *Heisei 26*

nendo kōsei rōdō shō rōjin hoken kenkō zōshin tō jigyō hōkoku sho [*Report on 2014 MHLW project to promote geriatric healthcare*]. 2015.

24. Mitsubishi Research Institute, Inc. *Kyotaku kaigo shien jigyōsyo ni okeru sābisu no jittai ni kansuru chōsa kenkyu* [Fact-finding survey on stations for supporting in-home care]. http://www.mri.co.jp/project_related/hansen/uploadfiles/h22_05.pdf. 2010. Accessed February 10, 2018.
25. Ishikawa Y. The consciousness of duties in care managers qualified as care workers. *Bull Kochi Women's Univ.* 2010;60:125-141.
26. Japan Care Manager Association. *Riyōsha ga jibun rashiku yūtaka ni seikatsusuru tame no keamanejimento hōmon kango no jyōzu na riyō rei* [Care management that enables users to live autonomous and enriched lives: Examples of effective home-visit nursing]. 2012.
27. Iwata N, Ishigaki K, Ito R. The anxieties of elderly people living alone associated with the move from an inpatient to home care setting. *J Chiba Acad Nurs Sci.* 2015;20:21-29.
28. Yonezawa J, Sugimoto M, Arai Y, Leibowit Y. Support and cooperation of visiting nurses in home palliative care for end-stage cancer patients living alone. *J Jpn Acad Health Sci.* 2014;17(2):67-75.
29. Matsuo T, Nakamura T. Dare mo oshiete-kurenakatta inshi bunseki. In *Factor analysis that no one taught you*. Kyoto: Kitaoji Shobo; 2002.
30. Medicaid.gov. Programs of All-Inclusive Care for the Elderly (PACE) benefits. https://www.medicaid.gov/medicaid/ltss/pace/pace-benefits/index.html. Accessed September 10, 2018.
31. Department of Health and Social Care. Health visitor implementation plan 2011 to 2015: A call to action. Department of Health, 1-41.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/213759/dh_124208.pdf. February 2011. Accessed September 10, 2018.

Table 1. *Participants' backgrounds (N = 200)*

Variable	n (%)
Sex	
Male	52 (26.0)
Female	148 (74.0)
Age (years)	
30s	48 (24.0)
40s	65 (32.5)
50s	65 (32.5)
>60	22 (11.0)
Years of experience	
<1	1 (0.5)
1–3	4 (2.0)
3–5	17 (8.5)
5–10	77 (38.5)
>10	101 (50.5)
License	
Caregiver	123 (61.5)
Nurse	50 (25.0)
Other medical or social work profession	27 (13.5)

Supplementary Tables

Supplementary Table S1. *Factors that contribute to a decision to commence home-visit nursing*

User's circumstances			Support that the user requires		
Medical treatment	A1	User has a stoma	Need for rehabilitative care	H1	User is continuing to undergo rehabilitation
	A2	User is undergoing oxygen therapy		H2	User requires new rehabilitative care*
	A3	User has a gastrostomy	Emergency response	I1	It is necessary to prepare for acute changes or other emergencies
	A4	User currently has an indwelling urethral catheter		I2	Respond to emergencies before commencing home-visit nursing
	A5	User requires mucus clearance		I3	24-hour standby is necessary*
	A6	User requires enema, bowel cleansing, etc.		I4	Nurse should visit when the condition changes
	A7	User requires bladder irrigation	Regular supervision	J1	It is necessary to regularly monitor symptoms
	A8	User requires diaper changing		J2	It is necessary to identify abnormalities early and to prevent the condition from deteriorating
	A9	User is on nasogastric intubation	Psychological state of the user and caregiver	K1	User feels assured*
	A10	It is necessary to manage and maintain medical equipment		K2	User requires support for his/her anxiety
	A11	It is necessary to change pressure ulcer dressings		K3	Caregiver is confident about service use*
Stage	B1	User has been discharged from a medical facility		K4	Caregiver requires support for his/her anxiety
	B2	User is in the terminal stage		K5	User or caregiver requires continual briefings about the condition
Existing symptoms	C1	User is dehydrated#		K6	User requires support to come to terms with their condition

	C2	User exhibits problem behavior associated with advancing cognitive dementia		K7	Following hospital treatment, the user's condition has improved, putting him/her at ease#
	C3	Difficult to provide alimentary therapy		K8	Family members want the user to live at home#
	C4	User's nutritional intake has declined#		K9	Family members want to care for the user for the rest of his/her life
	C5	User is at risk of falling		K10	User/caregiver requires support to maintain a positive outlook
	C6	User's Sp02 is sometimes low#	Environment and modifications	L1	User and his/her spouse live alone together
	C7	User has pressure ulcers		L2	User's everyday life requires supervision
	C8	User has difficulty with bowel movements#		L3	Caregiver's caregiving skills are poor
	C9	User has worsening back pain		L4	User lives alone
	C10	User is unable to walk and is at risk of becoming bedbound		L5	It is necessary to modify the environment
	C11	User has persistent diarrhea		L6	User cannot be hospitalized because the principal doctor does not consider it appropriate#
	C12	Progress of disease is leading to physical decline#		L7	User and caregiver disagree about recuperative life
	C13	Difficult to provide health management		L8	User has shifted from medical insurance to LTC insurance
	C14	Difficult to provide medication management		L9	User requires ongoing recuperation guidance#
	C15	User's symptoms and general condition require supervision		L10	User is unable to access in-home care services
Watch-keeping necessary	D1	User's eyesight has declined		L11	The user was transferred to me from another care manager

	D2	User has cognitive dementia		L12	User only using home-visit caregiving services
	D3	User takes too many medical drugs or nutritional supplements#		L13	User and caregiver require a mediator*
	D4	User stopped taking medication at his/her own discretion#		L14	Need for coordination between family members*
	D5	User visits the hospital less than once a month		L15	Modifications required so that user can spend rest of his/her life with family#
	D6	Oxygen equipment is not managed adequately#		L16	It is necessary to discuss where the user will spend his/her life going forward#
	D7	Stoma is not managed adequately	Instructive support	M1	User requires general recuperative guidance
	D8	User unable to bathe unassisted		M2	Caregiving guidance is required
	D9	User soils him/herself		M3	It is necessary to advise and guide another service provider
	D10	User is reclusive		M4	Consultation about care#
	D11	User does not listen to the advice of the service provider			
	D12	User does not accept the advice of the principal doctor			
	D13	Unable to deal with symptoms when they arise#			
	D14	User does not adequately understand the services he/she receives			
	D15	User does not access day services			
	D16	User is mentally unstable#			
	D17	Caregiver is overwhelmed by user’s condition/caregiving			
	D18	Progress of the disease is causing psychological confusion#			
Daily life functions requiring assistance	E1	User requires assistance to maintain hygiene, such as bathing help			

	E2	User has difficulty walking
	E3	User is bedbound
	E4	User's swallowing function is deteriorating
	E5	User's general ADL is declining
	E6	User requires support for mealtimes
	E7	Caregiver's caregiving burden is onerous
	E8	It is necessary to modify the bedside environment
	E9	It is difficult for the user to visit the hospital
Controlling symptoms	F1	Blood sugar control
	F2	Pain control
	F3	Bowel movement control
	F4	Hydration control
Anticipating symptoms	G1	Sometimes respond to symptoms when they arise
	G2	The user's condition is likely to deteriorate
	G3	User's condition will change because of his/her unstable condition
	G4	Symptoms warrant a medical decision

The support that I am providing			Facilitating service provision		
Relationship with the principal doctor	N1	It is necessary to work with the principal doctor to determine how to handle the user#	Confidence in service provision	T1	The nurse creates an environment, in which other services can be provided with peace of mind
	N2	I struggle to describe the user's condition to the principal doctor		T2	The home-visit nurse exchanges information with other service providers about the user's physical or mental condition*

	N3	I struggle to work with the principal doctor	Nursing skills	U1	The nurse provides efficient and effective support
	N4	Principal doctor contacts me about the user's condition		U2	The nurse and in-home caregiver differ in terms of their attention and skills
Advice from others	O1	Principal doctor provides advice#		U3	The nurse carefully monitors even the finer details of the user's bodily condition
	O2	Family members make requests to healthcare or social services worker#			
	O3	The station providing the user's in-home caregiving service issues advice#			
Access to information	P1	The home-visit nurse provides me with information#			
	P2	Caregiver and I understand the user's condition*			
	P3	Home-visit medical checkups fail to determine the user's physical or mental condition			
	P4	I can actively access the user's information			
Advice from nurse	Q1	Home-visit nurse provides advice about delivering in-home caregiving services to the user			
	Q2	The nurse advises me about what services are necessary to accurately target the user's condition*			
	Q3	The nurse advises me about how to deliver the services in order to accurately target the user's condition*			
Medical Knowledge	R1	I am worried that I lack the medical knowledge necessary to assist the user			

	R2	I am worried about being seen to lack medical knowledge
	R3	I am concerned about not understanding the user's physical or mental changes
	R4	I am concerned about the recent mental or physical changes I observe in the user when I visit him/her
	R5	It is difficult to spot bodily changes in the user*
	R6	I lack medical knowledge*
	R7	I struggle to communicate with medical staff owing to my lack of medical knowledge*
	R8	I don't understand the user's condition*
	R9	I don't understand the user's prognosis
	R10	I cannot make judgments about the user's condition*
Confidence in support	S1	I am confident that I can support the user's medical needs
	S2	I feel assured*
	S3	It is doubtful that the user's health can be managed only by hospital checkups
	S4	Using home-visit nursing services would make me feel more confident
	S5	The home-visit nursing station is easy to contact*
	S6	I can discuss with the home-visit nurse about supporting the user

*Threshold coefficient at ≥ 0.8.
[#]Factor loading threshold at $\leqq 0.4$.

Supplementary Table S2. *Results of the factor analysis of contributions to the decision to commence home-visit nursing*

	Factor			
	I	II	III	IV
E1 User requires assistance to maintain hygiene, such as bathing help	0.899	-0.167	-0.105	-0.066
E2 User has difficulty walking	0.885	-0.007	-0.148	-0.107
E8 It is necessary to modify the bedside environment	0.839	0.022	-0.145	-0.209
D2 User has cognitive dementia	0.822	-0.104	0.256	-0.217
D9 User soils him/herself	0.806	-0.052	-0.026	-0.202
D10 User is reclusive	0.781	-0.040	-0.051	-0.127
E7 Caregiver's caregiving burden is onerous	0.763	-0.007	-0.206	0.124
D8 User is unable to bathe unassisted	0.745	-0.052	0.042	-0.094
D14 User does not adequately understand the services he/she receives	0.736	-0.065	-0.062	0.066
E5 User's general ADL is declining	0.732	-0.194	-0.027	0.119
D1 User's eyesight has declined	0.727	-0.050	0.232	-0.199
D11 User does not listen to the advice of the service provider	0.697	-0.037	0.006	0.037
L5 It is necessary to modify the environment	0.669	0.147	-0.186	-0.051
D15 User does not access day services	0.645	-0.020	0.057	-0.077
L3 Caregiver's caregiving skills are poor	0.631	0.116	-0.087	0.113
E6 User requires support for mealtimes	0.629	-0.033	-0.037	0.139
C5 User is at risk of falling	0.628	-0.088	0.035	0.027
C9 User has worsening back pain	0.611	0.023	0.170	0.055
C2 User exhibits problem behavior associated with advancing cognitive dementia	0.603	-0.203	0.306	-0.037
L4 User lives alone	0.596	0.089	0.070	0.018
C10 User unable to walk and is at risk of becoming bedbound	0.584	-0.113	0.216	0.075
D5 User visits hospital less than once a month	0.569	-0.021	0.268	-0.048
L7 User and caregiver disagree about recuperative life	0.528	0.172	0.169	-0.025
L8 User has shifted from medical insurance to LTC insurance	0.523	0.150	0.116	-0.028
C11 User has persistent diarrhea	0.504	0.005	0.323	0.074
H1 User is continuing to undergo rehabilitation	0.501	0.199	-0.039	-0.034
L11 User was transferred to me from another care manager	0.492	0.289	-0.283	-0.036
L1 User and his/her spouse live alone together	0.492	0.158	-0.127	0.223
F4 Hydration control	0.488	-0.112	0.044	0.389
L12 User only uses home-visit caregiving services	0.484	0.309	-0.186	-0.119
D17 Caregiver is overwhelmed by user's condition/caregiving	0.484	0.023	-0.052	0.363
L2 User's everyday life requires supervision	0.461	0.124	-0.094	0.280

E9 It is difficult for the user to visit the hospital	0.458	0.128	-0.124	0.040
D12 User does not accept the advice of the principal doctor	0.449	0.040	0.136	0.096
F3 Bowel movement control	0.436	-0.035	0.124	0.296
E3 User is bedbound	0.430	-0.030	0.211	0.139
L10 User is unable to access in-home care services	0.404	0.289	-0.079	0.049
R3 I am concerned about not understanding the user's physical or mental changes	0.016	0.930	0.054	-0.296
R1 I am worried that I lack the medical knowledge necessary to assist the user	-0.120	0.917	0.098	-0.218
R2 I am worried about being seen to lack medical knowledge	0.043	0.884	0.079	-0.280
S1 I am confident that I can support the user's medical needs	-0.158	0.870	0.071	0.040
R9 I do not understand the user's prognosis	0.035	0.864	0.097	-0.276
R4 I am concerned about the recent mental or physical changes I observe in the user when I visit him/her	0.109	0.829	0.011	-0.133
S3 It is doubtful that the user's health can be managed only by hospital checkups	-0.089	0.808	0.059	-0.018
S4 Using home-visit nursing services would make me feel more confident	0.020	0.783	-0.016	0.041
N3 I struggle to work with the principal doctor	0.006	0.690	-0.029	0.099
Q1 Home-visit nurse provides advice about delivering in-home caregiving services to the user	-0.016	0.673	0.048	0.139
N2 I struggle to describe the user's condition to the principal doctor	0.086	0.628	-0.073	0.003
S6 I can discuss with the home-visit nurse about supporting the user	-0.156	0.621	0.045	0.188
T1 The nurse creates an environment, in which other services can be provided with peace of mind	-0.082	0.607	0.043	0.235
N4 Principal doctor contacts me about the user's condition	0.082	0.602	0.020	0.035
U1 The nurse provides efficient and effective support	-0.068	0.529	0.076	0.234
P3 Home-visit medical checkups fail to determine the user's physical or mental condition	0.146	0.519	-0.008	0.231
P4 I can actively access the user's information	-0.053	0.508	0.016	0.367
U3 The nurse carefully monitors even the finer details of the user's bodily condition	-0.038	0.414	0.188	0.244
U2 The nurse and in-home caregiver differ in terms of their attention and skills	0.061	0.410	0.162	0.156
A4 User currently has an indwelling urethral catheter	0.002	0.139	0.865	-0.148
A3 User has a gastrostomy	0.018	0.139	0.840	-0.244
A5 User requires mucus clearance	-0.051	0.134	0.816	-0.063

A9 User is on nasogastric intubation	-0.100	0.144	0.804	-0.021
A10 It is necessary to manage and maintain medical equipment	-0.177	-0.075	0.773	0.169
A11 It is necessary to change pressure ulcer dressings	-0.127	0.006	0.771	0.112
A2 User is undergoing oxygen therapy	0.138	0.060	0.755	-0.202
A7 User requires bladder irrigation	-0.216	0.037	0.754	0.187
A1 User has a stoma	0.213	0.102	0.708	-0.327
A8 User requires diaper changing	0.006	0.132	0.702	-0.022
A6 User requires enema, bowel cleansing, etc.	0.053	0.005	0.696	0.171
C7 User has pressure ulcers	-0.050	0.023	0.628	0.201
B2 User is in the terminal stage	-0.125	-0.081	0.479	0.239
D7 Stoma is not managed adequately	0.082	-0.070	0.443	0.253
C13 Difficult to provide health management	0.162	-0.230	0.437	0.374
C3 Difficult to provide alimentary therapy	0.352	0.011	0.405	0.035
C14 Difficult to provide medication management	0.087	-0.199	0.384	0.357
B1 User has been discharged from a medical facility	0.318	-0.019	0.365	-0.047
J2 It is necessary to identify abnormalities early and to prevent the situation from deteriorating	-0.064	-0.084	-0.163	0.822
I4 The nurse should visit when condition changes	-0.171	-0.012	0.113	0.767
G3 User’s condition will change because of his/her unstable disease	-0.005	-0.018	-0.149	0.747
G2 The user’s condition is likely to deteriorate	-0.038	-0.119	-0.093	0.746
I1 It is necessary to prepare for acute changes or other emergencies	-0.205	0.008	0.103	0.703
G4 Symptoms warrant a medical decision	-0.183	0.062	0.018	0.697
J1 It is necessary to regularly monitor symptoms	0.020	-0.139	-0.025	0.690
K9 Family members want to care for the user for the rest of his/her life	-0.110	0.083	0.092	0.658
I2 Respond to emergencies before commencing home-visit nursing	-0.180	0.006	0.241	0.630
G1 Sometimes respond to symptoms when they arise	0.175	0.006	-0.154	0.607
F2 Pain control	0.079	-0.143	0.147	0.568
C15 User’s symptoms and general condition require supervision	0.069	-0.178	0.304	0.562
K4 Caregiver requires support for his/her anxiety	0.078	0.286	-0.091	0.559
K6 User requires support to come to terms with his/her condition	0.060	0.267	-0.001	0.538
F1 Blood sugar control	0.056	-0.028	0.254	0.476
K10 User/caregiver requires support to maintain a positive outlook	0.152	0.322	-0.100	0.466
K5 User/caregiver requires continual briefings about condition	0.104	0.265	0.083	0.449
E4 User’s swallowing function is deteriorating	0.185	-0.080	0.185	0.436

K2 User requires support for his/her anxiety	0.107	0.346	-0.049	0.435
M3 It is necessary to advise and guide another service provider	0.298	0.222	-0.182	0.386
M2 Caregiving guidance is required	0.317	0.121	-0.135	0.380
M1 User requires general recuperative guidance	0.084	0.180	0.015	0.361
Factor correlation matrix	Ⅰ	Ⅱ	Ⅲ	Ⅳ
Ⅰ User's daily life condition and the support he/she requires for daily living				
Ⅱ Strengthening the medical support for the user	0.410			
Ⅲ Scheduling medical treatment/management or recuperation	0.269	0.253		
Ⅳ Preparing for mental and physical changes in the user and preventing the situation from deteriorating maximum likelihood method, promax method	0.458	0.435	0.497	