

BMJ Open Cohort study of older adults receiving home-based primary care in South Korea: cohort profile

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ABSTRACT

Purpose The home-based primary care cohort was set up to identify the characteristics of Home-Based Primary Care (HBPC) users across three domains: health-related information, utility of healthcare service and care-related information.

Participants A total of 407 patients enrolled in five HBPC centres were recruited between January 2023 and March 2024. The baseline survey was conducted among 332 participants who provided informed consent for both study participation and home visits. The second wave of data collection is scheduled to take place 6 months after enrolment, while the third wave will be conducted 12 months post-enrolment. During each home visit, trained interviewers administered structured survey questionnaires. On completion of the 12-month follow-up period, the dataset will include survey data, intervention records from the five participating HBPC centres, home mortality status and institutionalisation risk linked to each participant.

Findings to date This study examines HBPC in Korea, integrating the Widely Integrated Services in Home model with the long-term care insurance system. Among participants, 30.1% lived alone, and 74.1% were homebound, showing similarities to findings from a US HBPC study. Analysing cohort data, this study evaluates the impact of HBPC on healthcare utilisation, aligning with international findings on reduced hospitalisations and costs. As the first HBPC effectiveness study in Korea, it highlights its role in enhancing care for homebound older adults and shaping national health policies.

Future plans Data on the number of interventions by profession, institutionalisation and hospitalisation status and duration, and death at home occurrence are being separately collected from five HBPC centres and will be included in the analysis. The analysis will examine associations between these variables to identify risk factors influencing institutionalisation. Additionally, this study plans to link the dataset with the National Health Insurance Service-Senior (NHIS-Senior) customised cohort for further analysis.

INTRODUCTION

Maintaining and promoting the health of older adults in blind spots of healthcare is crucial in public health. The number of older population (>65 years old) in South

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ To ensure consistent home-based primary care (HBPC) delivery across centres, the research team developed a standardised HBPC practice guideline and implemented a structured pre-study training programme.
- ⇒ A multidisciplinary research team including professionals in medicine, nursing, public health, social work and nutrition strengthened the study's practical and theoretical foundation.
- ⇒ High dropout rates due to mortality or institutionalisation may introduce survivor bias, although this reflects the natural course of a high-risk elderly population.
- ⇒ Limited geographical diversity of participating clinics (mostly urban) restricts the generalisability of findings to other regions.

Korea increased from 6.5 million in 2015 to 9.5 million in 2023, with their proportion of the total population rapidly rising from 12.8% to 18.4%. According to Statistics Korea, the proportion of the older population is expected to exceed 20% of the total population by 2025, indicating that South Korea will enter a super-aged society.¹

In 2008, South Korea introduced the long-term care insurance (LTCI) system for older adults to promote their health and well-being and to alleviate the burden on their families.² Despite 99.2% of long-term care beneficiaries having chronic diseases, 36.2% of those using medical institutions had family members visit the institutions on their behalf.³ It implies that physicians manage chronic diseases using medication alone without directly examining patients. However, as numerous studies have reported, non-pharmacological interventions, such as lifestyle modifications, play a crucial role in the management of chronic diseases.^{4–7}

According to the Board of Audit and Inspection of Korea, 11.9% of patients admitted to long-term care hospitals, despite

being eligible for discharge, remain hospitalised due to a lack of community care resources.⁸ Another study found that the readmission rate after discharge from long-term care hospitals was 51.1%, with the primary cause being the lack of available home care services in the community post-discharge.⁹ This indicates that long-term care beneficiaries at home experience difficulties accessing medical services and care due to lack of care resources, which eventually leads to institutionalisation or hospitalisation. The National Health Insurance Act was amended in 2018 to provide home-based primary care (HBPC) linked with long-term care services to support the ageing in place of long-term care beneficiaries. This initiative aims to improve medical equity by delivering essential medical services to beneficiaries who cannot visit clinics.¹⁰

Since 2022, the HBPC pilot programme, administered by the Ministry of Health and Welfare within the LTCI system, has been implemented with the goal of addressing unmet medical and care needs to support 'Ageing in Place' for long-term care recipients residing at home. The programme integrates home-based medical services with LTCI services to ensure comprehensive and coordinated care. The HBPC model involves a multidisciplinary team consisting of physicians, nurses and social workers, who visit patients to provide home medical care, nursing care and community-based support services. Specifically, physicians conduct home visits once per month, nurses provide home nursing twice per month and social workers engage in regular consultations to assess long-term care and social support needs, facilitating service coordination. The programme, which initially involved 28 participating institutions, expanded to 93 in 2024 and to 192 in 2025, delivering integrated home-based medical care in close collaboration with community care services.¹¹ Through this collaborative approach, the HBPC programme aims to enhance access to essential medical and care services, thereby promoting the well-being and autonomy of home-dwelling long-term care recipients.

Understanding the characteristics of HBPC users is essential for the effective selection of target recipients and for identifying their needs, thereby laying the groundwork for providing healthcare services tailored to their specific requirements. In South Korea, surveys targeting long-term care recipients or the oldest-older population include the National Survey of Older Koreans, The Long-Term Care Survey and the Korean Longitudinal Study of Aging. However, these surveys do not include information on HBPC recipients. Therefore, this study aims to establish a cohort of HBPC users among LTCI beneficiaries in South Korea and analyse their characteristics across three domains: health-related information, utility of healthcare services and care-related information. Through this analysis, the study seeks to enhance the understanding of the health and social characteristics of HBPC users and provide foundational data for policy interventions to improve their well-being.

COHORT DESCRIPTION

HBPC cohort (HBPC) is part of the patient-centred medical technology optimisation research conducted by Chung-Ang University. This is a closed cohort consisting of 407 long-term care beneficiaries receiving HBPC, recruited between December 2023 and March 2024. Participants were enrolled through five HBPC centres: Dolbom Clinic, My Neighbor Clinic, Mindlle Clinic, Dr Song Clinic and Gangwon Health Welfare Social Cooperative (Bal-Geum Clinic). The inclusion criteria are (1) individuals aged 65 and older, (2) individuals with complex chronic diseases and decreased ability to perform daily activities, resulting in complex medical and care needs, (3) individuals who have been approved as eligible for long-term care benefits, (4) individuals who registered with five clinics and have agreed to receive regular HBPC or health education services and (5) individuals who have received an explanation of the study and provided informed consent. We excluded participants who preferred assisted-living facilities services to home care services.

Patient recruitment

Participants will participate in three surveys over 12 months to measure variables periodically. One survey has been completed (March 2024), with the second survey planned for completion by September 2024 and the third by March 2025. Participants are individuals aged 65 or older, receiving home-based care and experiencing mobility difficulties. Surveys are conducted face-to-face by trained visiting surveyors. To ensure consistency in responses, the same surveyor is maintained throughout the study without replacement. To encourage survey completion, participants receive a voucher worth 30 000 KRW for each survey. All participants will sign a consent form before participating in the survey. The response rates for the surveys can be found in [table 1](#). For ethics, this study has received approval from the Institutional Review Board of Chung-Ang University Ethics Center (IRB no. 1041078–202206HR-156).

Follow-up information

After the baseline recruitment in 2023 and 2024, participants were recruited over a total period of 14 months, from January 2023 to March 2024. A total of 407 participants consented to participate in the study. However, 75 individuals were excluded due to refusal of the home visit survey and admission to facilities; a final total of 332 participants (81.5%) finished the first home visit survey. Participants completed a total of three home visit surveys over 12 months at 0, 6 and 12 months.

Data collection

In this study, various measurement tools and questions were used to assess the medical and care needs of long-term care beneficiaries who use HBPC comprehensively. Periodic surveys were categorised into four main sections: demographic information, health functional status, utility

Table 1 Response rates

	Sampled	First survey	Second survey	Third survey
N	407	332	238	204
My Neighbor	82 (20.2)	70 (21.1)	46 (19.3)	39 (19.2)
Bal-Geum	71 (17.4)	63 (19.0)	42 (17.7)	30 (14.8)
Dolbom	81 (19.9)	64 (19.3)	47 (19.7)	45 (22.2)
Mindlle	89 (21.9)	78 (23.5)	62 (26.1)	58 (28.5)
Dr Song	84 (20.6)	57 (17.1)	41 (17.2)	31 (15.3)
Response rate	NA	82%	58.50%	50.10%

NA, not available.

of healthcare service and care environment. These categories measured the status of both the beneficiaries and their primary caregivers, with each category containing relevant variables (table 2). While most measurements were based on validated tools (table 3), some additional questions were formulated by the research team. During the baseline recruitment, participants completed an interviewer-administered questionnaire, which took approximately 20–30 min. The questionnaire was provided in Korean and conducted in a format where participants responded to the interviewer's questions. Hospitalisation and duration were measured based on the past year, while consultation time and travel time to the hospital were assessed using the average consultation time. Depression was measured using the Korean version of the Geriatric Depression Scale-15 (GDS-15). When

collecting proxy responses for subjective measures such as GDS or self-rated health, proxies were instructed to answer from the perspective of the participant.

Participant characteristics

The demographic information at each survey time point is presented in tables 4–6. The characteristics of the participants were classified into three categories: demographic information, health-related information, utility of healthcare services and care-related information.

In the first category (table 4), demographic information, the participants' mean age was 84 ± 7.3 years, and 71.7% were female. Among the participants, 30.1% were living alone. Regarding educational attainment, 39.8% had no formal education, 36.7% had completed middle school or below and 22.6% had completed high school or

Table 2 Categories of variables

Category	Measured variables
Demographic information	Sex, age, marital status, education, income, household type and type of social security insurance
Health-related information	Expressive abilities, understanding, aids (vision, hearing and denture), ADL, IADL, Physical Functioning Scale, cognition (KDSQ-P), chronic diseases (34+ etc), number of prescription drugs, urinary incontinence, sleep disorder, behavioural and psychological symptoms of dementia (BPSD), fall, catheter or tube, symptom assessment (ESAS-R), depression (GDS-15), disability, nutritional status (methods of food intake, decrease of food intake, decrease in body weight, level of mobility, shortened MNA (Mini Nutritional Assessment), smoke, functional status (COOP/WONCA), self-rated health and Clinical Frailty Scale
Utility of healthcare service	Hospitalisation (acute hospital, long-term care hospital, nursing home, emergency room), number of prescribed medication, number of regular doctor, consultation time, home healthcare, accompanying person, travel time to hospital, proxy prescription, personal healthcare expenditures and burden and satisfaction of healthcare service
Care-related information	Primary caregiver (relation with beneficiaries, sex, age), cost of care and burden, social support network (PANT), caregiver burden (stress experienced by family members of patients), long-term care service grade, type of home care service, time spent with paid caregiver/family members, satisfaction for caregiving time, going-out (frequency of going-out alone and need for assistance), home ownership, residential satisfaction, food security and preferred housing type in case of health deterioration

KDSQ-P, Prescreening Korean Dementia Screening Questionnaires
COOP/WONCA, The Dartmouth COOP Functional Health Assessment charts/WONCA

PANT, The Practitioner Assessment of Network Type Instrument
ADL, activities of daily living; ESAS-R, Edmonton Symptom Assessment System Revised; GDS-15, Geriatric Depression Scale-15; IADL, instrumental activities of daily living.

Table 3 Specific constructs measured by validated instruments

Category	Measure scale	Definition	Reference
Health-related information	MNA (shortened version of the Mini Nutritional Assessment)	The early detection of malnutrition is feasible.	Hwa Kyung Park, Bo Kyoung Lim, Sung Hee Choi, Hye Ryeon Lee, & Do Sang Lee. (2009). Verification of the Appropriateness When a Shortened Version of the Mini Nutritional Assessment (MNA) Is Applied for Determining the Malnutrition State of Elderly Patients. <i>Annals of Clinical Nutrition and Metabolism</i> , 2 (1), 13–18.
Health-related information	Clinical Frailty Scale (Korean ver.)	The degree of frailty in older adults can be categorised into nine distinct levels.	Ko, R. E., Moon, S. M., Kang, D., Cho, J., Chung, C. R., Lee, Y., ... & Suh, G. Y. (2021). Translation and validation of the Korean version of the clinical frailty scale in older patients. <i>BMC Geriatrics</i> , 21, 1–8.
Health-related information	ESAS-R	▶ MD Anderson Cancer Center uses 24 hours as the time. ▶ ESAS-R stands for Edmonton Symptom Assessment System Revised. It is a tool that helps assess how severe a patient's symptoms are, and how those symptoms change over time.	Hui, D., & Bruera, E. (2017). The Edmonton Symptom Assessment System 25 years later: past, present and future developments. <i>Journal of Pain and Symptom Management</i> , 53(3), 630–643.
Health-related information	COOP/WONCA	▶ In primary care to assess a patient's physical, emotional and social well-being. ▶ The COOP-WONCA charts, which comprise six single-item scales, have mainly been used to determine functional ability in chronically ill patients.	Van Weel, C. (1993). Functional status in primary care: COOP/WONCA charts. <i>Disability and Rehabilitation</i> , 15(2), 96–101.
Health-related information	GDS-15	▶ A score of 6≥ indicates the presence of depressive symptoms. ▶ The 5-item Hoyl GDS had superior validity over the D'Ath GDS-4 and Van Marwijk GDS-4. The GDS5/15 may be an effective alternative screening tool.	Park, H. S., Deung Jung, Y. J., Lee, C. I., Oh, J. E., Hong, S. H., & Cho, C. Y. (2006). Comparing Various Short-Form Geriatric Depression Scales in Elderly Patients. <i>Journal of the Korean Academy of Family Medicine</i> , 27(5), 364–369.
Health-related information	KDSQ-P	▶ The cut-off point 4 was chosen by the Korean Ministry for Health, Welfare and Family. Affairs has low sensitivity. But considering the side effects of screening for dementia, the score of 4 is suitable as the best cut-off point for detecting a person who needs a screening test for dementia.	Jeon, Y., Yun, K., & Kim, Y. (2010). Validation of KDSQ-P as selecting elderly for KDSQ-C. <i>Korean J Health Promot</i> , 10(2), 45–52.
Health-related information	Physical Functioning Scale	A Korean physical function assessment tool for community-dwelling older adults.	LEE, Y. H., LEE, K. J., HAN, G. S., YOON, S. J., LEE, Y. K., KIM, C. H., & KIM, J. L. (2002). The development of physical functioning scale for community-dwelling older persons. <i>Korean Journal of Preventive Medicine</i> , 359–374.

Continued

Table 3 Continued

Category	Measure scale	Definition	Reference
Health-related information	K-ADL (Korean-Activities of daily living), K-IADL (Korean-Instrumental activities of daily living)	These scales are used to describe the tasks older adults need to do to live independently.	Won, C. W., Yang, K. Y., Rho, Y. G., Kim, S. Y., Lee, E. J., Yoon, J. L., ... & Lee, Y. S. (2002). The development of Korean activities of daily living (K-ADL) and Korean instrumental activities of daily living (K-IADL) scale. <i>Journal of the Korean Geriatrics Society</i> , 6 (2), 107–120.
Care-related information	Stress experienced by family members of patients	Care burden of family as a caregiver (potentially stressful situation versus associated with situation)	Leff, B., Burton, L., Mader, S. L., Naughton, B., Burl, J., Koehn, D.,... & Burton, J. R. (2008). Comparison of stress experienced by family members of patients treated in hospital at home with that of those receiving traditional acute hospital care. <i>Journal of the American Geriatrics Society</i> , 56(1), 117–123.
Care-related information	PANT	Type of social network	Kim, N.S., <i>et al</i> (2018). Development of Strategy on Senior Friendly Healthcare for Healthy Ageing.
Care-related information	US-HFSS Household Food Security	Food security	The second year of the eighth National Health and Nutrition Examination Survey 2020 https://ageconsearch.umn.edu/record/337157/?v=pdf

higher. In terms of monthly income, 55.4% earned less than 1 000 000 KRW, 40.4% earned between 1 000 000 and 3 000 000 KRW and 4.2% earned 3 000 000 KRW or more. Additionally, 33.1% of participants owned their residence. Regarding marital status, 67.8% were widowed, divorced or separated, while 30.4% lived with their spouse.

In the second category, health-related information, participants' health statuses were assessed (table 5). For both ADL (activities of daily living) and IADL (instrumental activities of daily living), the moderate dependence group was the most prevalent, comprising 56.9% and 71.1% of participants, respectively, followed by the severe dependence group, which accounted for 37.1% and 28.9%, respectively. For clinical frailty, 66.3% of participants required occasional assistance, while 33.7% were highly frail and dependent on others. A significant proportion of participants (72%) reported symptoms of urinary incontinence. For depressive symptoms, 20.2% of participants experienced mild depressive symptoms, while 74.7% reported severe depressive symptoms. In cognitive screening, 82.5% of participants were identified as having impaired cognitive function, though only 53.3% had a formal dementia diagnosis. In terms of chronic conditions, 48.5% of participants reported having 0–4 chronic diseases, 50% had 5–9 chronic diseases and 1.5% had 10 or more chronic diseases.

In the third category, utility of healthcare services and care-related information, participants' caregiving environments and healthcare utilisation were assessed (table 6). Over the past year, 26.8% of participants used acute hospitals, 5.7% used long-term care hospitals and

24.1% visited emergency rooms. Regarding care-related variables, 74.1% of participants remained confined at home, 16% went out 2–4 days per week and 9.9% went out almost daily. Among participants, 36.1% had only one caregiver, including official care providers such as visiting care workers. The primary caregivers were adult children (44.6%), official caregivers (25.3%) and spouses (22.9%). Participants' long-term care service grades were distributed as follows: grade 1 (9.4%), grade 2 (16.3%), grade 3 (34.3%), grade 4 (33.7%) and grade 5 (3.3%). Additionally, 83.7% of participants were receiving visiting or home nursing care services.

FINDING TO DATE

This HBPC study provides team-based, comprehensive care grounded in the HBPC model proposed by the U.S. Agency for Healthcare Research and Quality.¹² Additionally, the WHO's Integrated Care for Older People (ICOPE) report outlines key characteristics for service delivery models for older adults.¹³ These include person-centred assessments and integrated care plans, strengthening governance and accountability systems, multidisciplinary providers and formal links with social care and support services. Based on these principles, a cooperative framework with the LTCI system was established to deliver periodic integrated home care services (home care, home nursing, home rehabilitation and home medical care). As a result, the WISH (Widely Integrated Services in Home) model, a Korean integrated care framework encompassing macro-levels, meso-levels

Table 4 Demographic information

	First survey (n=332)	Second survey (n=238)	Third survey (n=204)
Age (mean±SD)	84.3 (7.3)	84.1 (7.6)	83.6 (7.3)
Sex			
Male	95 (28.3)	62 (26.1)	54 (26.5)
Female	237 (71.7)	176 (73.9)	150 (73.5)
Household type			
Living others	232 (69.9)	151 (63.5)	128 (62.8)
Living alone	100 (30.1)	87 (36.5)	76 (37.2)
Education level			
Uneducated	135 (40.7)	98 (41.2)	81 (39.7)
≤Middle school	122 (36.7)	93 (39.1)	79 (38.7)
≥High school	75 (22.6)	47 (19.8)	44 (21.6)
Type of social security insurance			
Recipients of the National Basic Livelihood Security	127 (38.3)	98 (41.2)	77 (37.7)
Medicaid	6 (1.8)	1 (0.4)	1 (0.5)
NHI	199 (59.9)	139 (58.4)	126 (61.8)
Monthly income (10000 KRW)			
<100	184 (55.4)	152 (63.9)	159 (77.9)
100–300	134 (40.4)	80 (33.6)	45 (22.1)
≥300	14 (4.2)	6 (2.5)	0 (0)
Home ownership			
Home ownership	110 (33.1)	70 (29.4)	61 (29.9)
No ownership	222 (66.9)	168 (70.6)	143 (70.1)
Marital status			
Never married	6 (1.8)	3 (1.3)	1 (0.5)
Married	101 (30.4)	67 (28.1)	57 (27.9)
Others (previously, separated, bereaved, etc)	225 (67.8)	168 (70.6)	146 (71.6)

and micro-levels, was developed. This study identified several characteristics of participants requiring HBPC through cohort data.¹⁴

Among the participants in this study, 30.1% lived alone, and 74.1% were homebound. According to the 2022 Long-Term Care Survey, 40.2% of home care service users lived alone, while 79.2% were homebound.³ A study conducted in the United States reported that among 375 individuals receiving home-based medical care, the prevalence of living alone was 56%, which was higher than that of the participants in this study, while the homebound rate was similar at 75%.¹⁵ These findings indicate that individuals receiving HBPC tend to have a high homebound prevalence. This is likely because homebound older adults with mobility impairments require HBPC as they find it difficult to leave their homes independently. Since one of the primary objectives of HBPC is to address unmet healthcare needs among individuals with mobility limitations, it can be inferred that it is being appropriately delivered to fulfil these needs.

In Korea, recipients of the LTCI service have an average of 3.5 chronic diseases, and 23.7% have five or

more multimorbid conditions. In contrast, 51.5% of participants in this HBPC had five or more chronic diseases, indicating a substantially higher level of clinical complexity than the general LTCI population. Moreover, while only 3.9% and 9.4% of all LTCI beneficiaries are classified as Grade 1 and Grade 2, respectively, the proportions among participants in this study were 9.4% and 16.3%, confirming that HBPC participants represented a higher-risk group with greater care dependency. These findings suggest that individuals with more severe conditions among LTCI recipients were more likely to prefer HBPC services.

This study also analysed changes in the utilisation of acute-care hospitals, long-term care hospitals and emergency rooms before and after the initiation of HBPC services. The findings revealed an overall decline in healthcare service utilisation during the HBPC period compared with the pre-HBPC period. During the 12-month follow-up, 204 out of the initial 332 participants survived, resulting in a survival rate of 61.5%. Among survivors, the mean age slightly decreased from 84.3 to 83.6 years, and the proportion of participants with severe

Table 5 Health-related information

	First survey (n=332)	Second survey (n=238)	Third survey (n=204)
ADL			
Total independence	20 (6.0)	11 (4.6)	13 (6.4)
Moderate dependence	189 (56.9)	159 (66.8)	137 (67.1)
Severe dependence	123 (37.1)	68 (28.6)	54 (26.5)
IADL			
Total independence	0 (0)	0 (0)	0 (0)
Moderate dependence	116 (34.9)	92 (38.7)	81 (39.7)
Severe dependence	216 (65.1)	146 (61.3)	123 (60.3)
Clinical Frail Scale			
<7	220 (66.3)	188 (79.0)	171 (83.8)
≥7	112 (33.7)	50 (21.0)	33 (16.2)
Urinary incontinence			
No incontinence	110 (33.1)	78 (32.8)	65 (31.9)
Yes incontinence	222 (66.9)	160 (67.2)	139 (68.1)
Depressive symptoms (GDS-15)			
None (0–5)	17 (5.1)	10 (4.2)	9 (4.4)
Mild (6–9)	67 (20.2)	45 (18.9)	39 (19.1)
Severe (10+)	248 (74.7)	183 (76.9)	156 (76.5)
Cognitive function (KDSQ-P)			
Intact	58 (17.5)	20 (9.0)	13 (6.8)
Impaired	274 (82.5)	202 (91.0)	179 (93.2)
Dementia			
No	155 (46.7)	103 (43.3)	92 (45.1)
Yes	177 (53.3)	135 (56.7)	112 (54.9)
Number of chronic disease			
0–4	161 (48.5)	102 (42.8)	92 (45.1)
5–9	166 (50.0)	132 (55.5)	109 (53.4)
>9	5 (1.5)	4 (1.7)	3 (1.5)

ADL, activities of daily living; GDS-15, Geriatric Depression Scale-15; IADL, instrumental activities of daily living.

dependence in both ADL and IADL declined. Notably, the proportion of frail individuals, as assessed by the Frailty Scale, decreased from 33.7% to 16.2%, indicating an overall improvement in functional and health-related indicators. However, a comparison of baseline characteristics between survivors and dropouts (table 7) demonstrated significant health-status differences between the two groups even prior to HBPC initiation. Therefore, the relatively high attrition rate should not be interpreted as evidence of HBPC ineffectiveness, nor should the observed improvements in health indicators among survivors be regarded as causal effects of the intervention. Attrition in this study likely reflects the advanced age and severity level of many participants, with most dropouts attributed to health deterioration or death.

In this context, previous HBPC studies have typically employed outcome indicators such as emergency-room visits, institutional admissions, medical-cost reduction, home-death rates, service satisfaction and caregiver

burden to assess programme effectiveness (Kimmey *et al*¹⁶, 2024; Totten *et al*, 2016¹²) For example, in a case-control study, HBPC participants had 17% lower Medicare expenditures and 23% fewer subspecialist visits than controls.¹⁷ Likewise, a systematic review of HBPC effectiveness from 2010 to 2020 reported consistent benefits in patient satisfaction, quality of care, hospital and nursing-home admissions, emergency-room visits and cost reduction.¹⁸

Based on these findings, future analyses will further investigate the longitudinal associations between HBPC participation, including service frequency, nursing visits and physician home visits, and patterns of healthcare utilisation. By leveraging data from the first through third waves of the cohort, this study aims to conduct the first comprehensive evaluation of HBPC effectiveness in Korea and to elucidate the policy relevance and practical implications of HBPC within the country's integrated health and long-term care system.

Table 6 Utility of healthcare service and care-related information

	First survey (n=332)	Second survey (n=238)	Third survey (n=204)
Hospitalisation of acute hospital	(12 months)	(6 months)	(6 months)
Yes	89 (26.8)	28 (11.8)	20 (9.8)
No	243 (73.2)	210 (88.2)	184 (90.2)
Hospitalisation of LTC hospital	(12 months)	(6 months)	(6 months)
Yes	19 (5.7)	2 (0.8)	4 (2.0)
No	313 (94.3)	236 (99.2)	200 (98.0)
Visit of emergency room	(12 months)	(6 months)	(6 months)
Yes	80 (24.1)	17 (7.1)	13 (6.4)
No	252 (75.9)	221 (92.9)	191 (93.6)
Days of going out per week			
5–7 days	33 (9.9)	24 (10.1)	27 (13.2)
2–4 days	53 (16.0)	58 (24.4)	54 (26.5)
0–1 days (homebound)	246 (74.1)	156 (65.5)	123 (60.3)
Number of caregiver			
1	120 (36.1)	88 (37.0)	69 (33.8)
>1	212 (63.9)	150 (63.0)	135 (66.2)
Primary caregiver			
Spouse	76 (22.9)	50 (15.1)	38 (11.4)
Adult children	148 (44.6)	95 (28.6)	85 (25.6)
Official caregiver	84 (25.3)	78 (23.5)	67 (20.2)
Others	24 (7.2)	109 (32.8)	142 (42.8)
Long-term care service grade			
1	31 (9.4)	15 (6.3)	10 (4.9)
2	54 (16.3)	44 (18.5)	45 (22.1)
3	114 (34.3)	91 (38.3)	74 (36.3)
4	112 (33.7)	81 (34.0)	70 (34.3)
5	21 (6.3)	7 (2.9)	5 (2.4)
Home-care service			
Yes	278 (83.7)	217 (91.2)	186 (91.6)
No	54 (16.3)	21 (8.8)	17 (8.4)

LTC, long-term care.

STRENGTHS AND LIMITATIONS

Numerous studies have been conducted on long-term care beneficiaries. However, a main strength of this study is that this is the first to specifically examine the characteristics of beneficiaries who use HBPC in Korea. Furthermore, unlike a cross-sectional study, this study adopts a cohort design with follow-up.^{19–22}

The second is that the research team consists of diverse professionals, adopting a multidisciplinary approach in public health. The principal investigator, Professor Chang-O Kim, is a physician and the director of a clinic that provides HBPC, granting him substantial insight into HBPC and its recipients. Additionally, the team consists of members with specialisations in nursing, social work, public health and nutrition. By assembling a team of healthcare professionals from

diverse fields, the research group not only possesses theoretical knowledge but also practical experience, enabling effective communication and collaboration with the five clinics.

The third is that this study lies in its systematic approach to ensuring the quality and consistency of HBPC services. HBPC centres in this study are located in different regions. To ensure consistent quality of HBPC across centres, the research team developed a standardised HBPC practice guideline.²³ Based on this guideline, a comprehensive training programme was implemented from November 2022 to August 2023, consisting of 11 offline sessions totalling 33 hours. A total of 10 registered nurses and 5 social workers affiliated with the five HBPC centres completed this training programme.

Table 7 Comparison of participants who completed the study (non-dropout) versus those who had died or were institutionalised or left the study (dropout)

	Non-dropout (n=204)	Dropout (n=128)	P
Demographic information			
Age (mean±SD)	83.6 (7.3)	85.6 (7.1)	0.017
Sex			
Male	54 (26.5)	41 (32.0)	0.275
Female	150 (73.5)	87 (68.0)	
Household type			
Living others	132 (64.7)	100 (78.1)	0.009
Living alone	72 (35.3)	28 (21.9)	
Education level			
Uneducated	84 (41.2)	51 (39.8)	0.700
≤Middle school	77 (37.7)	45 (35.2)	
≥High school	43 (21.1)	32 (25.0)	
Type of social security insurance			
Recipients of the National Basic Livelihood Security	83 (40.7)	44 (34.4)	0.218
Medicaid	2 (1.0)	4 (3.1)	
NHI	119 (58.3)	80 (62.5)	
Monthly income (10000 KRW)			
<100	124 (60.8)	60 (46.9)	0.045
100–300	72 (35.3)	62 (48.4)	
≥300	8 (3.9)	6 (4.7)	
Home ownership			
Home ownership	61 (29.9)	49 (38.3)	0.114
No ownership	143 (70.1)	79 (61.7)	
Marital status			
Never married	3 (1.5)	3 (2.4)	0.722
Married	60 (29.4)	41 (32.0)	
Others (previously, separated, bereaved, etc)	141 (69.1)	84 (65.6)	
Health-related information			
ADL			
Total independence	15 (7.4)	5 (3.9)	<0.001
Moderate dependence	131 (64.2)	58 (45.3)	
Severe dependence	58 (28.4)	65 (50.8)	
IADL			
Total independence	NA	NA	
Moderate dependence	79 (38.7)	37 (28.9)	0.068
Severe dependence	125 (61.3)	91 (71.1)	
Clinical Frail Scale			
<7	152 (74.5)	68 (53.1)	<0.001
≥7	52 (25.5)	60 (46.9)	
Urinary incontinence			
No incontinence	79 (38.7)	31 (24.2)	0.006
Yes incontinence	125 (61.3)	97 (75.8)	
Depressive symptoms (GDS-15)			
None (0–5)	8 (3.9)	9 (7.0)	0.190

Continued

Table 7 Continued

	Non-dropout (n=204)	Dropout (n=128)	P
Mild (6-9)	37 (18.2)	30 (23.4)	
Severe (10+)	159 (77.9)	89 (69.5)	
Cognitive function (KDSQ-P)			
Intact	36 (17.7)	22 (17.2)	0.915
Impaired	168 (82.3)	106 (82.8)	
Dementia			
No	96 (47.1)	59 (46.1)	0.864
Yes	108 (52.9)	69 (53.9)	
Number of chronic disease			
0~4	94 (46.1)	67 (52.3)	0.528
5~9	107 (52.4)	59 (46.1)	
>9	3 (1.5)	2 (1.6)	
Utility of healthcare service and care-related information			
Hospitalisation of acute hospital			
Yes	47 (23.0)	41 (32.0)	0.071
No	157 (77.0)	87 (68.0)	
Hospitalisation of LTC hospital			
Yes	10 (4.9)	9 (7.0)	0.416
No	194 (95.1)	119 (93.0)	
Visit of emergency room			
Yes	41 (20.1)	39 (30.5)	0.032
No	163 (79.9)	89 (69.5)	
Days of going out per week			
5~7 days	21 (10.3)	12 (9.4)	0.521
2~4 days	36 (17.6)	17 (13.3)	
0~1 days (homebound)	147 (72.1)	99 (77.3)	
Number of caregiver			
1	77 (37.8)	43 (33.6)	0.443
>1	127 (62.2)	85 (66.4)	
Primary caregiver			
Spouse	44 (21.6)	32 (25.0)	<0.001
Adult children	87 (42.6)	61 (47.7)	
Official caregiver	65 (31.9)	19 (14.8)	
Others	8 (3.9)	16 (12.5)	
Long-term care service grade			
1	8 (3.9)	23 (18.0)	<0.001
2	34 (16.7)	20 (15.6)	
3	66 (32.3)	48 (37.5)	
4	83 (40.7)	29 (22.7)	
5	13 (6.4)	8 (6.2)	
Home-care service			
Yes	180 (88.2)	98 (76.6)	0.005
No	24 (11.8)	30 (23.4)	

KDSQ-P, Prescreening Korean Dementia Screening Questionnaires

ADL, activities of daily living; GDS-15, Geriatric Depression Scale-15; IADL, instrumental activities of daily living; LTC, long-term care.

However, this study has limitations. The first limitation is that the study population consists of elderly and high-risk groups who have been assigned long-term care grades, which may lead to a relatively large reduction in the number of participants in the second and third waves. The high dropout rate presents a potential risk of survivor bias in the characteristics of the study population. Nevertheless, considering that the study population is elderly, the high dropout rate due to mortality or admission to long-term care facilities may indicate that the selection of the study population was appropriate. In reality, a previous study reported that the dropout rate due to death reached 40% over a 2-year period.¹⁷ The second limitation is that the medical clinics currently participating in the home healthcare pilot programme in Korea are concentrated in densely populated urban areas. As a result, it is difficult to achieve a balanced distribution of participants across different regions, making generalisation challenging. Since home healthcare is provided not in a hospital environment but in the homes of patients in the community, the regional characteristics of where participants reside may significantly influence the outcomes of the study.

COLLABORATION

We have collected patient data from five HBPC centres in Korea and are currently conducting a comparative study by linking anonymised data from the HBPC cohort with customised datasets from the National Health Insurance Service (NHIS), particularly focusing on beneficiaries of the LTCI programme.

The data of the Korean HBPC are not open access but can be shared under conditions of formal collaboration and institutional agreement. Collaborative research projects are encouraged. For more detailed information regarding the Korean HBPC cohort, please contact the corresponding author.

Contributors S-NJ is the guarantor. JL, BC and C-OK conceptualised the study, coordinated the research process and drafted the manuscript. JL conducted the literature review and contributed to data collection and analysis. YS, EC, JC and S-NJ participated in developing the study design and manuscript revision. All authors read and approved the final manuscript.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Institutional Review Board of Chung-Ang University Ethics Center (IRB no. 1041078-202206-HR-156). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The data of the Korean HBPC are not open access but can be shared under conditions of

formal collaboration and institutional agreement. Collaborative research projects are encouraged. For more detailed information regarding the Korean HBPC cohort, please contact the corresponding author.

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