

Developing and testing scales for home support service continuity (HSSC): Cross-sectional studies in Canada and UK

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ABSTRACT

Objectives Ensuring the continuity of home support services has become increasingly important due to challenges arising from ageing demographics and healthcare staffing shortages. However, there is a lack of validated measurements specifically designed for assessing service continuity in this context. The primary objective of this study is to develop and validate scales that capture the multidimensional nature of home support service continuity (HSSC), incorporating informational continuity, management continuity and relational continuity as its underlying components. Subsequently, these scales are employed to measure the overall level of continuity experienced within home support services and investigate its association with service quality.

Methods This study used a cross-sectional survey design with convenience sampling. Direct caregivers in the UK were recruited through the Prolific UK online platform, while direct caregivers in British Columbia, Canada were recruited through local health authorities and home support agencies. A total of 550 direct caregivers completed the online survey following the approved ethics protocol. Structural equation modelling was employed to evaluate HSSC and its underlying components. Furthermore, the study investigated the influence of HSSC on service quality within these two samples.

Results The quantitative tests confirmed that HSSC comprises three first-order continuity components. These components showed significant loadings on HSSC in the Canadian sample (N=367) ($\lambda_{\text{informational}}=0.81$, $\lambda_{\text{management}}=0.93$, $\lambda_{\text{relational}}=0.38$) at $p<0.01$ level. This finding was further supported in the UK sample (N=183) ($\lambda_{\text{informational}}=0.87$, $\lambda_{\text{management}}=0.90$, $\lambda_{\text{relational}}=0.93$) at $p<0.01$ level. In both samples, the overall HSSC showed a positive correlation with service quality (path coefficient for the Canadian sample: $b_{\text{HSSC_employee perceived service quality (EPSQ)}}=0.22$, $p<0.01$; the UK sample: $b_{\text{HSSC_EPSQ}}=0.70$, $p<0.01$).

Conclusions The results support the conceptualisation of HSSC as a second-order latent construct. The newly developed and validated scales for the three first-order constructs identify specific items that could be targeted to improve HSSC and service quality.

INTRODUCTION

Global trends of ageing demographics and staffing shortages in healthcare systems are

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study conceptualised home support service continuity (HSSC) as a second-order latent construct and developed scales for its informational, relational and management components (ie, first-order constructs) to measure HSSC using structural equation modelling.
- ⇒ Cross-sectional survey data were collected from UK and British Columbia, Canada using a convenience sampling method.
- ⇒ Structural equation modelling simultaneously examined the informational, relational and management components of HSSC, yielding fit statistics that support the proposed conceptual structure.
- ⇒ The study relied on voluntary participation and self-reports from the direct caregivers, thus limited by recall and participation motivation.
- ⇒ Generalisation of the study findings to cultural and health systems significantly different from those in UK and British Columbia, Canada will benefit from additional testing.

increasingly challenging the provision of home support services.¹ Direct caregivers, also known as community health workers or healthcare aids in various jurisdictions, provide home support services to individuals in need of personal assistance with everyday tasks such as bathing due to disability or age-related frailty. As populations age, the demand for home support services is on the rise, while the capacity for family caregiving is shrinking,² leading to an increased need for formal care provided by direct caregivers.³ However, the shortage of direct caregivers has been observed in many countries and is projected to worsen.⁴ These challenges have raised concerns among policymakers, researchers and the healthcare community, with continuity of care being the top priority.⁵ This study aims to address this concern by examining the concept of home support service continuity (HSSC) and its

components, thereby aiding direct caregivers in achieving a higher level of overall continuity.

Continuity of care has been extensively studied in clinical care settings, such as primary, secondary, acute and end-of-life care.^{6–11} It refers to the degree to which a series of healthcare events is experienced as coherent and connected and consistent with the patient's medical needs and personal context.¹² Continuity thus emphasises a person-centred approach to health services, aiming to reduce care fragmentation.^{6 13–15} Previous research has shed light on the distinct attributes of home support services, encompassing factors such as the home environment and the involvement of multiple stakeholders.^{16–18} However, a notable gap exists in terms of measures explicitly tailored to evaluate the continuity of home support services while accounting for these distinctive characteristics.

Home support services differ from clinical care in significant ways. First, they take place at a client's home, rather than medical facilities. Working in someone's home not only directly affects the service relationship¹⁹ but also requires work-related travel and complex scheduling, which can contribute to care fragmentation.¹⁶ Second, direct care addresses personal needs such as hygiene, meals, mobility and social connections. The service delivery must be sensitive to the client's preferences and the intimate nature of the services. Research has shown that consistent assignment of the same direct caregiver to the client is crucial for a positive service experience, as it allows for familiarity and meaningful relationships to develop.^{20 21} Lastly, direct caregivers must possess the skills to handle demanding personal care tasks and communicate effectively to work efficiently in different clients' homes, multiple times a week, over an extended period.^{22 23} Therefore, there is a need for a conceptualisation of continuity that accounts for the unique characteristics of home support services.

We conceptualise HSSC as a service experience that is responsive to a client's needs, runs smoothly and requires no special effort for the client to maintain. This conceptualisation aligns with the existing literature, which recognises continuity as a complex phenomenon comprising multiple dimensions, including relational, management and informational.¹² Previous research has suggested a respectful caregiver–client relationship, coordinated care team actions and effective information sharing among the stakeholders as important factors for HSSC.^{16 24–28} Accordingly, we propose three hypotheses to test our conceptualisation of HSSC as a second-order latent construct:

H1: Informational continuity is an indicator of the higher-order phenomenon of HSSC.

H2: Management continuity is an indicator of the higher-order phenomenon of HSSC.

H3: Relational continuity is an indicator of the higher-order phenomenon of HSSC.

Informational continuity refers to the use of information on past events and personal circumstances to ensure that current care is appropriate for each individual.¹² As

information connects past health events with current and future ones, the informational component of HSSC is diverse, distributed and dynamic. First, the shared information includes both medical and personal aspects. For example, when addressing a bathing task, the client's physical condition (a medical assessment) and their preferred bathing time (a personal preference) are considered. Personal preferences may change as the client's health status and needs evolve. Second, since home support services are provided in the client's home, client information is distributed. For instance, the family may inform the schedulers about the client's hospital visit, while the most recent direct caregiver has up-to-date information regarding the client's service preferences. It is crucial to share information among the care team to ensure responsiveness to the client's needs. Finally, effective information flow and communication with the client, such as verbal explanations of service procedure and documented care plan, are critical for enabling their active participation in completing home support tasks.^{28 29} We operationalise informational continuity as the degree to which a client's medical and personal information can follow their needs throughout the care pathway, including over time and among the care team.¹²

Management continuity refers to a consistent and coherent approach to managing a client's health condition that is responsive to their changing needs.¹² It reflects the degree to which both the direct caregiver and the client perceive that the home support organisation internally coordinates efforts to maintain an ongoing and consistent approach to serving the client at home. Home support services involve teamwork. First, regular visits over an extended service period often require more than one direct caregiver to assist the client. Adequate management processes, such as training, must be in place to ensure that up-to-date medical information and the client's personal preferences are consistently shared among the direct caregivers. Second, care transitions are not uncommon with in-home support, as clients may be admitted to the hospital due to emergencies. The nursing staff must coordinate with the client, their family, the scheduler and direct caregivers to ensure a smooth postdischarge experience and the resumption of home support services. We operationalise management continuity as the level of coordination and management support necessary to ensure timely knowledge sharing, consistent communication and coherent service delivery by the direct caregivers.

Relational continuity refers to the degree to which a client believes that their health status, concerns, personal value and preferences are taken into consideration over an extended period of receiving home support service. This belief arises from mutual respect that fosters trust and interpersonal relationships during home support services. Moreover, previous research suggests that consistent assignment of a direct caregiver facilitates relational continuity.^{7 20 21 24} This consistent assignment allows for the development of a trusting personal bond, which is

crucial for a direct caregiver to perform intimate activities of daily living in the client's home^{19 30 31} and handle unexpected crises.^{16 23}

Strong empirical evidence suggests that continuity of care improves health outcomes and patient satisfaction.^{32–34} Furthermore, a lack of continuity is associated with poorer care outcomes.³⁵ Therefore, a primary outcome of HSSC is service quality, which we operationalise as employee perceived service quality,³⁶ aligning with our study's focus on direct caregivers. Additionally, previous research indicates a high correlation between employee perceived service quality and other performance indicators, such as customer evaluations.^{37 38} This approach is consistent with prior research that uses employee perceived service quality to understand the overall service outcome.³⁸ Moreover, employing employee perceived service quality underscores the crucial role of direct caregivers in providing quality care.³⁹ Our conceptualisation of HSSC revolves around the attitude and aptitude of direct caregivers in delivering high-quality services. The three components of HSSC work in tandem through the efforts of the direct caregivers. Specifically, direct caregivers need to establish a strong relational bond with the client to understand their personal preferences, values and health concerns. Subsequently, the client's preferences and other health information must be effectively communicated among the care team to coordinate services. Direct caregiver must also incorporate up-to-date information into their service delivery. These collective efforts can result in a high level of HSSC, requiring minimal effort from the client and their family while consistently providing a personalised experience over time. Therefore, we hypothesise that:

H4: HSSC is positively related to employee-perceived service quality.

METHODS

Our research process entailed scale development, survey study and structural equation modelling analysis. We employed a cross-sectional primary survey design to assess the newly developed scales for the three components of HSSC. Each of the components is measured by 4–6 items

adapted for the home support service context using existing scales.⁸

Patient and public involvement

Home support clients and their families were involved in the observation studies.

Scale development informed by literature and qualitative research

To develop the three first-order continuity constructs of informational continuity, management continuity and relational continuity, we employed an iterative process that integrated findings from the literature and qualitative research. Given that existing continuity scales in the literature⁸ focus on clinical care and are not specific to the home support service setting, we conducted qualitative research activities in British Columbia, Canada over a 4-year period (refer to [table 1](#)). The objective of these activities was to contextualise and augment current knowledge by acquiring comprehensive insights into the complexities of home support service delivery and management. We specifically focused on home support service organisations that provide at-home services to support clients' activities of daily living, including both private-pay and publicly funded agencies (total=12). The primary population served by these organisations consisted of older adults living in the community. Our research involved conducting interviews with individuals and primarily engaging in observation studies in group settings.

The home support service setting differs from conventional clinical and hospital setting in three key aspects. First, direct caregivers, unlike clinicians who are considered highly skilled professionals, are often categorised as low-skill non-professionals. In many jurisdictions, regulations require direct caregivers to be supervised by a licensed nurse when assigned medically related tasks. This distinction in perceived professional expertise and autonomy²³ influences the relationships that direct caregivers develop with their coworkers, clients and clients' families, which differ from those experienced by clinicians. Second, the service environment is the client's home, which fundamentally contrasts with clinical facilities. For

Table 1 Qualitative research activity summary (February 2018–February 2022)

Qualitative studies	Direct caregiver (Individual)	Care team (Group)	Client (Individual)	Client and family (Group)	Management (Individual and group)	Scheduler (Individual)	Total count
Case study					2		2
Interview	5		1		9		15
Participant observation		2		1	1		4
Direct observation+interview	1				1	2	4
Direct observation	1	1					2
Ethnography			1				1

example, information storage, retrieval and sharing must adapt to this distributed service environment. Third, direct caregivers assist clients with daily living activities such as bathing, eating and dressing, of which necessitate paying close attention to the client's changing needs and personal preferences rather than primarily addressing medical needs. These qualitative research findings affirm the need for a home support context-specific conceptualisation of HSSC,^{12 40} with the three dimensions of continuity of care proposed by Haggerty *et al*¹² serving as the foundational elements of HSSC.

We adapted Haggerty's scales for informational continuity, management continuity and relational continuity in the clinical setting⁸ to create a set of 16 reflective items tailored to the home support service context. These newly developed scales used a seven-point Likert scale (1=strongly disagree, 7=strongly agree) to measure the latent constructs in online supplementary File S1 for measurement scales. In our study, the unit of analysis focused on the relationship between a direct caregiver (ie, the survey participant) and their key client. Participants were asked to reflect on the specific relationship they formed with their key client and provide assessments for each item in the measurement scales based on this focal relationship. Using a consistent unit of analysis offers the advantage of minimising measurement errors for the latent constructs.

Survey study

Pilot testing

To enhance the overall quality of our research and increase the likelihood of obtaining accurate and meaningful results, we conducted a pilot test as part of the research design. We recruited a pilot sample of 100 participants from the UK using the Prolific UK (<https://www.prolific.co/>), a highly regarded online research platform trusted by over 25 000 researchers from more than 3000 institutions and companies, including Oxford University, European Commission and Google. The pilot test validated the measurement structure for each scale and demonstrated face validity. Additionally, we sought feedback from three home support service experts who reviewed the initial questionnaire and provided valuable input. Based on their feedback and the results of the pilot test, we carefully reviewed the measurement scales once again and made slight adjustment to the wording of certain items. The revised questionnaire was then used as the final instrument.

Population and samples

Convenience sampling was used to gather voluntary responses from direct caregivers assisting community-dwelling clients in the UK and British Columbia, Canada. These two countries share the English language but have distinct healthcare systems. For example, the UK employs a centralised National Health Service, while Canada decentralises healthcare to regional authorities within each province. Data from the UK was collected through

the national-level Prolific online platform, while Canadian data were obtained from direct caregivers in British Columbia. To validate our findings, we conducted a post-check. According to Streiner and Kottner⁴¹, a minimum threshold of 200 responses is required to test the reliability of a multivariate construct. We collected 367 responses from the Canadian sample and 183 responses from the UK sample, resulting in an overall sample size of 550 responses.

Survey eligibility criteria included participants who: (1) reported being at least 18 years old, (2) provided electronic written consent and (3) identified as direct caregivers with a good understanding of home support services. We implemented multiple best-practice measures to ensure data quality in our web-based survey study. These measures included flagging non-unique IP addresses and identifying and rejecting responses completed in less than 8 min. No duplicated responses were found based on these procedures. From the sample of 790 responses, participants with incomplete survey responses of 90% or below (n=213) or incomplete data on the latent outcome variable (n=27) were excluded, resulting in a final sample size of 550 direct caregivers.

UK sample: Between 15 February 2022 and 10 March 2022, we conducted a cross-sectional survey (N=183) to collect a sample of individuals with home support experience on the Prolific online platform in the UK. We implemented two filter questions to ensure the participants had experienced with home support. Survey invitations were emailed to active members of the platform.

Canadian (British Columbia) sample: Between 15 January 2022 and 15 May 2022, we conducted a cross-sectional survey and collected a sample of direct caregivers (N=367) in British Columbia, Canada. The online consent form and survey links were distributed to direct caregivers with the assistance of local health authorities and home support agencies. Operational approvals from local health authorities were obtained.

Participants were asked to provide their gender (male vs female), age range (18–25/26–30/31–35/36–40/41–45/46–50/51–55/56–60/>60 years old), and cultural background (Anglos across the continents/Latins/Northern Europeans/Central Eastern Europeans/East Asians/South Asians/Arabs of the Middle-East/First Nation/Mixed Ethnicity). Additionally, they reported the type of care they provided (individual model vs cluster model), their weekly working hours for the organisation (<10, 11–20/21–30/31–40/41–50/>50 hours per week), and their tenure in the home support profession (<10, 11–20, 21–30/31–40/41–50/>50 years).

To ensure respondents focused on the unit of analysis (ie, the relationship developed with their key client) while answering the survey questions, we requested background information about their key clients. Each participant provided details on their key client's gender (male vs female), age range (<50/51–60/61–70/71–80/81–90/>90 years old) and cultural background (Anglos across the continents/Latins/Northern Europeans/

Central Eastern Europeans/East Asians/South Asians/Arabs of the Middle-East/First Nation/Mixed Ethnicity).

Measures

First-order continuity constructs: informational, management and relational continuity

Informational continuity is assessed using a six-item construct that measures the continuous delivery of information between coworkers and the participant. Participants evaluate the extent to which their coworker and themselves help the client understand home support procedures, encourage the client to set goals related to home support, assist in achieving the client's goals, possess knowledge of the most recent care history, have access to the up-to-date care plan and are aware of any changes in the client's situation.

Management continuity refers to a consistent and coherent approach employed to respond to the client's changing needs. This construct is measured using six items. Specifically, participants evaluate the extent to which their coworker and themselves possess the knowledge necessary to fulfil their responsibilities, rely on each other for help in serving the client, seamlessly transition to deliver service, have a clear understanding of each other's roles in providing home support to the client, provide consistent information to the client about their home support and work well together to serve the client.

Relational continuity in care refers to the ongoing relationship between the direct caregiver (participant) and their client. This construct consists of four items that assess the extent to which the client and the direct caregiver take into account the client's home support health assessment, address the client's key health concerns, consider the client's preferences for home support services and respect the client's personal values.

HSSC as a second-order construct

This study aims to establish HSSC as a second-order construct, with the three first-order constructs serving as indicators of HSSC. In essence, the first-order constructs are the foundational elements that comprise the more complex second-order construct. Our hypotheses, aligning with Haggerty *et al.*,¹² propose that informational continuity, management continuity and relational continuity act as indicators of HSSC. Second-order factor analysis is employed to determine how these three components collectively reflect the overall HSSC.

Service quality

We have adopted an existing four-item scale for assessing employee perceived service quality.³⁶ Employee perceived service quality refers to an employee's personal evaluations of the service quality they provide to customers. Research suggests a close relationship between employee perceived service quality and other performance indicators, including customer evaluation.³⁸ The four items in the scale are as follows: 'My overall service is excellent' 'I give a service of very high quality,' 'I have high standards

for my service' and 'I deliver superior service in every way'.³⁶ Given that the unit of analysis in our study is the relationship between the direct caregiver and their key client, we ask respondents to first consider their relationship with their key client before assessing the measurement scale.

Analysis

To quantitatively examine HSSC and its connection to service quality, we analyse two samples of direct caregivers from the UK and British Columbia, Canada. Following the guideline provided by Shook *et al.*,⁴² we separately conduct structural equation modelling (SEM) analyses on the Canadian sample (N=367) and the UK sample (N=183). SEM comprises a set of statistical techniques used to measure and analyse the relationships between observed and latent variables.⁴³ SEM not only examines linear relationships among variables but also simultaneously accounts for errors of scales in measuring the latent construct. Consequently, SEM allows for a more rigorous and objective factor analysis by reporting a set of fit indices for validity assessment. In our study, SEM proves particularly useful as it enables us to test the second-order HSSC using the three components as first-order indicators. Subsequently, we can examine the relationship between the second-order HSSC and perceived service quality with one integrated model.

RESULTS

Sample characteristics

In the UK Sample, 40% of direct caregivers are male and 60% are female, providing care to 47.09% male clients and 52.91% female clients. The majority of direct caregivers fall within the age range of 18–25 years (36%), followed by 26–30 years (20.57%), and 31–35 years (20%). The clients they serve are mainly between 71–80 years (24.14%) and 61–70 years old (20.11%). The individual model, where one direct caregiver is responsible for one individual client, represents 50.54% of the caregivers, while the cluster model, where a team of direct caregivers serves a small group of clients, accounts for 49.46%. The predominant cultural background among UK direct caregivers is Anglos (43.45%), and the main cultural background of their clients is also Anglos (49.41%). In terms of working hours, the majority of UK direct caregivers work between 11 and 20 hours (25.29%) or 31 and 40 hours (31.03%) per week.

In the Canadian sample, the majority of direct caregivers are female (86.92%), providing care predominantly to female clients (64.16%). Direct caregivers span various age brackets, while the majority of their clients are over 80 years old (with 35.89% falling in the 81–90 years age group and 38.63% being over 90 years old). The individual model is primarily used by Canadian direct caregivers (59.81%). The main cultural backgrounds among Canadian direct caregivers are East Asians (33.63%) and Anglos (32.74%). As for their clients, the majority are

Table 2 Mean, SD and correlations of UK sample and Canadian sample

	Mean		SD		Informational continuity	Management continuity	Relational continuity	EPSQ
	UK	CAN	UK	CAN				
Informational continuity	5.53	5.52	0.59	0.72	1.00	0.65	0.25	0.12
Management continuity	5.76	5.83	0.81	0.89	0.65	1.00	0.31	0.19
Relational continuity	6.01	5.94	0.83	0.98	0.69	0.72	1.00	0.30
EPSQ	5.97	6.35	0.80	0.60	0.45	0.63	0.56	1.00

UK sample correlations are at the lower left side of the matrix; Canadian sample correlations are at the upper right side of the matrix; Mean, SD and correlations of the Canadian sample are highlighted in grey.
EPSQ, employee perceived service quality.

Anglos (37.78%) and mixed ethnicity (24.44%). In terms of working hours, the majority of Canadian direct caregivers work 31–40 hours (52.86%).

Test the scales using the two samples

Table 2 presents the mean values, SEs and correlations of the four main constructs (informational continuity, management continuity, relational continuity and employee perceived service quality) for both the UK sample and the Canadian sample. All correlations are highly significant at $p < 0.05$ level. In the UK sample, the correlations range from 0.45 to 0.72, while in the Canadian sample, the correlations range from 0.12 to 0.65. The correlation between the informational continuity and service quality is the lowest in the Canadian sample ($r = 0.12$). To assess both the measurement model and path model, we employ the elliptical reweighted least squares procedure of the EQS program V.6.1.⁴⁴ This procedure is preferred because it accommodates the characteristics of both samples and provides a more accurate analysis

than the maximum likelihood when normal distribution cannot be assumed. The use of elliptical distributions allows for unconstrained analysis in terms of kurtosis, enhancing the appropriateness of the analysis.

Confirmatory factor analysis (CFA): We employ a CFA test to check both the reliability and validity of our four latent constructs in both samples. All Cronbach's reliability alphas are good (all $\alpha > 0.82$, range = 0.82–0.90 in the UK sample; all $\alpha > 0.83$, range = 0.82–0.90 in the Canadian sample). All scales load significantly on the latent constructs accordingly, indicating good convergent and discriminant validities.⁴² Figures 1 and 2 present the factor loadings of all items in the UK and Canadian samples.

Test the hypotheses using the two samples

We perform a second-order CFA for HSSC by bringing three first-order continuity latent constructs under a common higher-level latent construct (ie, HSSC). The second-order factor analysis yields a broader picture of the HSSC phenomenon that is not revealed by any first-order

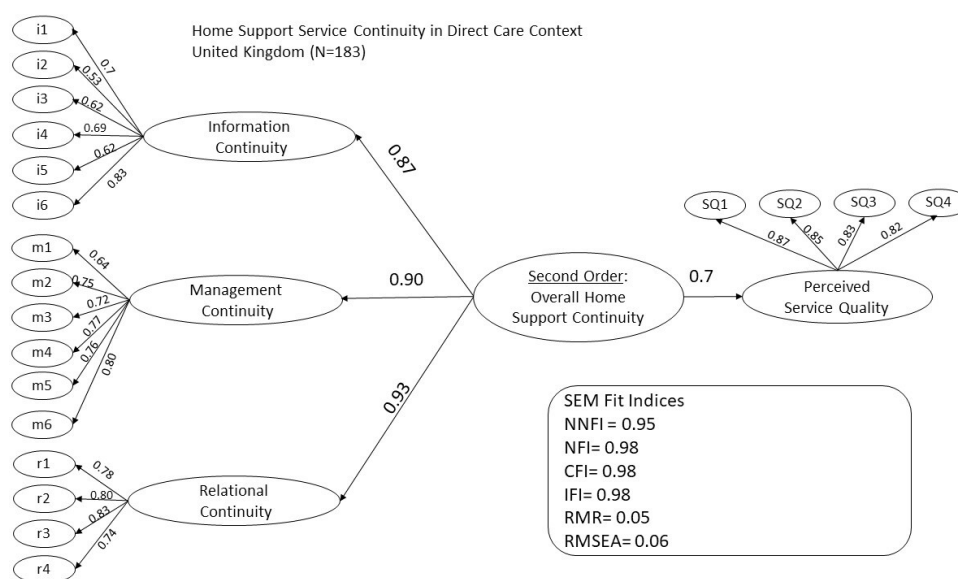


Figure 1 SEM path model analysis results in the UK sample. CFI, confirmatory factor analysis; NFI, Normed Fit Index; NNFI, Non-Normed Fit Index; IFI, Incremental Fit Index; RMR, root mean-square residual; RMSEA, root mean-square error approximation; SEM, structural equation modelling.

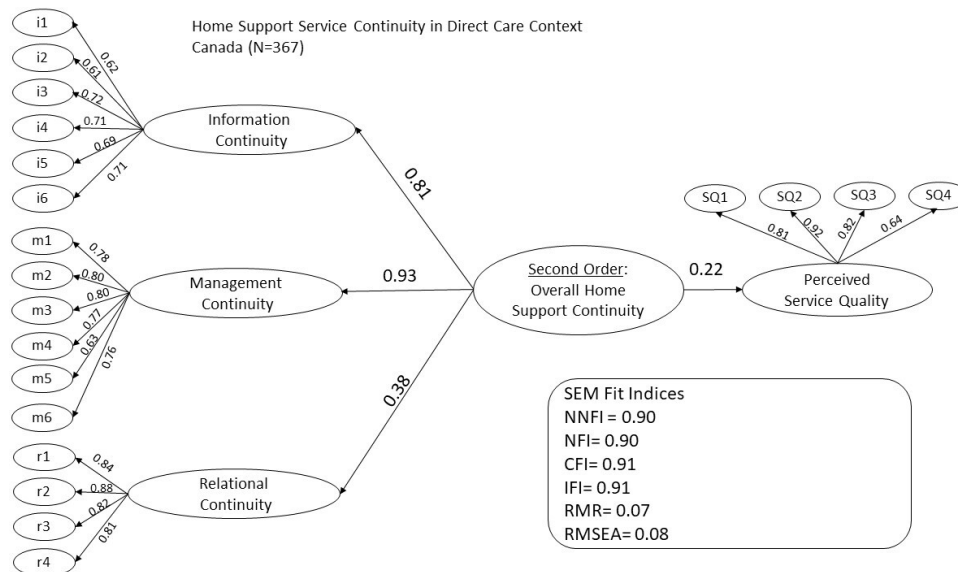


Figure 2 SEM path model analysis results in the British Columbia, Canada sample. CFI, confirmatory factor analysis; NFI, Normed Fit Index; NNFI, Non-Normed Fit Index; IFI, Incremental Fit Index; RMR, root mean-square residual; RMSEA, root mean-square error approximation; SEM, structural equational modelling.

factor analysis alone. The advantage of second-order factor analysis is that the second-order factor model can provide a more parsimonious and interpretable model, compared with the first-order model. As shown in figure 1 for the UK sample, three first-order continuity load significantly on HSSC ($\lambda_{\text{informational}}=0.87$, $\lambda_{\text{management}}=0.90$, $\lambda_{\text{relational}}=0.93$) at $p<0.01$ level. All three hypotheses are replicated in the Canadian sample ($\lambda_{\text{informational}}=0.81$, $\lambda_{\text{management}}=0.93$, $\lambda_{\text{relational}}=0.38$) and are significant at $p<0.01$ level (see figure 2). These results support H1, H2 and H3, indicating that the HSSC second-order factor is valid in both the UK and Canadian contexts. HSSC as a higher-order construct is reflected by three components: (1) information regarding the patient is shared consistently among direct caregivers (ie, informational continuity); (2) direct caregivers achieve a consensus and communicate to the patient in the same language (ie, management continuity) and (3) direct caregivers consistently take into account the client's key concerns and preferences (ie, relational continuity).

Then, we test the path from HSSC to employee perceived service quality (H4). The path coefficients are significant for the UK sample ($b_{\text{HSSC_employee perceived service quality (EPSQ)}}=0.70$, $p<0.01$) and the Canadian sample ($b_{\text{HSSC_EPSQ}}=0.22$, $p<0.01$), indicating that the model is valid in both countries. This result confirmed our claim that HSSC is a key success factor for home support services.

The models in both samples indicate a good fit: In the UK sample, Bentler-Bonett Non-Normed Fit Index (NNFI)=0.95, Bentler-Bonett NFI=0.98, Comparative Fit Index (CFI)=0.98, Bollen's Incremental Fit Index (IFI)=0.98, standardised root mean-square residual (RMR)=0.05, root mean-square error approximation (RMSEA)=0.06; In the Canadian Sample, NNFI=0.96,

NFI=0.97, CFI=0.98, IFI=0.98, Standardised RMR=0.06, RMSEA=0.04.

Robustness test

Following the steps recommended by Zhao *et al*,⁴⁵ we run a bootstrapping test (replication=100 times) on the SEM model. The bootstrapping programme replicates the same SEM model in the randomly generated samples and calculates indirect effect coefficients as well as Sobel z scores. The bootstrapping results of our study 1 model support the significant direct effect of H1–H3 (ie, the loadings of three first-order constructs on HSSC) and H4 (ie, the effect of HSSC on service quality) across both samples. Such a test ensures the robustness of the statistical inference and interpretation.

Compare samples

We conducted cross-group SEM inequality test on the two samples to test whether H1–H4 have equivalent path coefficients across the UK and Canadian samples. Table 3 reports the results of the cross-group inequality test. After constraining the loading of informational continuity on HSSC (H1) being equal across the UK and Canadian samples, χ^2 difference is 0.75 ($p=0.39$), meaning that we cannot detect a significant difference in informational continuity's loading on HSSC across these two samples. However, we detect significant differences across two samples regarding H2, H3 and H4. The loading of management continuity on HSSC is higher in the Canadian sample than in the UK ($\chi^2=31.51$, $p=0.00$); while the loading of relational continuity on HSSC is higher in the UK sample than in the Canadian sample ($\chi^2=7.19$, $p=0.01$). Overall HSSC effect is higher in the UK sample than in the Canadian sample ($\chi^2=34.81$, $p=0.00$). The postestimation



Table 3 Inequality test across the UK and Canadian samples

Paths	Path coefficient in the UK sample	Path coefficient in the canadian sample	χ^2	df	P value
Informational continuity	0.87	0.81	0.75	1.00	0.39
Management continuity	0.90	0.93	31.51	1.00	0.00
Relational continuity	0.93	0.38	7.19	1.00	0.01
HSSC → service quality	0.70	0.22	34.86	1.00	0.00

HSSC, home support service continuity.

Lagrange multiplier test does not indicate any significant respecification needs.

DISCUSSION

The continuity of home support services is of increasing importance as the population ages and family caregiving capacity diminishes. Our study addresses this issue by developing scales that consider the unique characteristics of providing home support services, enabling context-appropriate measurement and management. Building on the principles proposed by Haggerty *et al*,^{8 12} our study presents an exploratory conceptual model that outlines how three underlying dimensions influence HSSC and service quality. By deconstructing the complex concept of HSSC into its constituent elements, namely first-order constructs, we provide a framework that allows for targeted improvement of HSSC and service quality by focusing on individual items within these constructs.

Our first contribution lies in the conceptualisation of HSSC. Hypotheses 1–3 propose that HSSC is reflected by three interconnected dimensions: (1) information sharing within the care team regarding client preferences and care needs, as well as information sharing with the client regarding the care goals and instructions; (2) consistent and unified management practices among direct caregivers and (3) client–direct caregiver relationships that prioritise the client’s key concerns and preferences. Our HSSC conceptual framework complements existing continuity indices and client-based scales by shedding light on the service provision process that leads to these continuity outcomes. By capturing the perspectives of the direct caregivers and leveraging their front-line observations in home support services, our study provides valuable insights. Government entities and home support agencies can use the newly developed scales to assess the level of HSSC and identify centres of excellence. Moreover, as home support plays a pivotal role in community care and has the potential to alleviate the strain on the healthcare systems, the actionable solutions for HSSC improvement derived from this study make a positive contribution to community-based healthcare as a whole.

Our second contribution is empirical in nature, involving the testing of measurement scales in two separate samples. These context-specific scales for home support capture the essence of the three first-order latent constructs. The CFA conducted on the second-order construct supports the validity of the HSSC model. Through our bivariate analysis, we discover that the correlations between informational continuity and service quality are the lowest in both the UK and Canadian samples ($r_{UK}=0.45$, $r_{Canada}=0.12$), suggesting that informational continuity may have a lesser impact on service quality compared with the other two continuity factors. Interestingly, our cross-group SEM results indicate that relational continuity is higher in the UK compared with Canada. Consequently, the path coefficient of HSSC on service quality is significantly higher in the UK sample. The cross-group SEM findings, combined with the bivariate correlation analysis, suggest that: (1) while the procedural aspect of informational continuity (eg, providing task-related information, encouraging clients to set goals, knowing the most recent care history and up-to-date care plan) is necessary, it alone is not sufficient and (2) the human emotional aspect of direct caregivers addressing clients’ needs (ie, relational continuity) significantly enhances service quality. Recent industry trends focusing on increasing budgets and technological advancements in healthcare, such as management information systems and artificial intelligence, may unintentionally overemphasise the role of technology while neglecting the importance of human emotional support. Our follow-up interviews with experts validated these concerns. Home support organisation leaders highlighted the significance of emotional support and trust, considering the informational aspect as supportive but placing greater emphasis on emotional support.

Our third contribution pertains to the observed cross-country differences. The inequality test results presented in table 3 indicate that: (1) the impact of relational continuity on service quality is stronger in the UK sample compared with the Canadian sample and (2) the effect of management continuity on service quality is stronger in the Canadian sample. To interpret these inequality

results, we conducted a knowledge mobility seminar and postcheck with the experts. First, a higher percentage of the participants (49.46%) in the UK sample compared with the British Columbia, Canada sample (40.19%) are involved in a cluster care model (see online supplementary file S1). Qualitative evidence from our study suggests that the cluster care model, which provides the clients with a team of direct caregivers who can support each other as needed, may benefit relational continuity. Second, the UK employs a community-centred service management model, where potential clients are advised to directly contact their local councils. These local councils are responsible for assessing service needs and allocating resources. The close connections between elected local councils and their constituents may contribute to a higher degree of relational continuity. In contrast, home support service management and resource allocation in British Columbia, Canada are decentralised to regional health authorities. While this health authority-led approach ensures strong management continuity, it may lack the flexibility and intimacy required for relational continuity.

Limitations and future research directions

While our cross-country quantitative survey study provides a valuable foundation for future research on HSSC, it is important to acknowledge the limitations that apply. These limitations include the inability to establish causal relationships, potential recall bias among the participants, and the potential impact of participant motivation on the obtained results. Although we have made efforts to address some of these concerns by testing the conceptual model in two samples from different countries, further testing and exploration are necessary. First, Canada is a vast country with variations in care provision across provinces and territories. Conducting additional tests of the newly developed scales in other provinces and territories can shed light on how different provincial approaches to home support service provision influence the dimensions of informational, management, relational continuity and HSSC. Furthermore, the evidence from our study indicates that relational continuity holds greater importance for service quality compared with informational continuity. Future studies can build on this finding to explore the factors driving high levels of relational continuity and the reasons why the relational dimension of HSSC outweighs the informational dimension. Researchers can also investigate institutional factors across the UK and Canada, such as home support policies and management systems, to examine why these two countries exhibit different strengths and weaknesses in HSSC. This understanding can inform the development of community care policy. Importantly, future research can use the foundation we have established to investigate each first-order continuity in more depth. This involves exploring the unique antecedents and consequences of relational continuity, which has been shown to have a significant impact on service quality. By delving into these

specific dimensions, we can uncover additional insights and contribute to a more comprehensive understanding of HSSC.

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Patient consent for publication Not applicable.

Ethics approval Our research project (#18-1161) obtained approval from the Human Research Ethics Board at the University of Victoria. The survey design adhered to the principles outlined in the Declaration of Helsinki. Informed voluntary consent was strictly followed for all participants. On initial contact, potential participants were provided with an informed consent document. This document explained the purpose of the research, voluntary participation (with the freedom to withdraw at any time), potential minimal inconvenience and risks, benefits, anonymity and confidentiality, data storage and disposal procedures, dissemination of results for research purposes and contact information for reaching the researchers with any questions. Each respondent provided written consent electronically, indicating their understanding of the information in the consent form and their opportunity to ask questions before proceeding with the survey.

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