

STUDY PROTOCOL

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Evaluating quality and utilisation of primary care among older adults in Hong Kong: a mixed-methods study protocol

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Abstract

Background Hong Kong's rapidly ageing population poses significant challenges to the sustainability of its healthcare system. With over 75% of adults aged 65 and above experiencing at least one chronic condition, enhancing the accessibility and quality of primary care is critical. Despite policy efforts such as the Primary Healthcare Blueprint and District Health Centres (DHCs), significant structural and operational challenges persist, including low service engagement, fragmented multidisciplinary care coordination, and socioeconomic inequities in access, perceived service quality, and satisfaction. Building on evidence that socioeconomic factors would influence care access, this study examines how these disparities shape older adults' primary care experiences.

Methods This mixed-methods study investigates the quality and utilisation of primary care among older adults in Hong Kong. Phase 1 involves a quantitative survey using the Chinese version of the Primary Care Assessment Tool (PCAT-C), combined with validated measures of service quality, satisfaction, trust, and revisit intention. A geographically and socioeconomically stratified cluster sampling strategy will be used to collect 510 responses. Phase 2 consists of qualitative focus group discussions with at least 25 older adults and their caregivers to explore in-depth experiences and expectations regarding primary care.

Discussion Findings will provide a multidimensional understanding of primary care delivery and its impact on older adults' satisfaction and behavioural intentions. Early data suggest that while technical care remains difficult for patients to evaluate, non-clinical service quality, such as staff communication and system efficiency greatly influences perceived value. Socioeconomic disparities also affect care continuity and trust. This study will identify gaps in meeting the needs and expectations of older adults for primary care service and propose targeted interventions to enhance primary care accessibility and quality for older adults. Insights will inform policy adjustments to better support healthy ageing and reduce dependence on overstretched hospital services.

Keywords Primary care assessment tool, Perceived service quality, Satisfaction, trust, revisit intention, Hong kong older adults, Health policy

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Introduction

The ageing population presents significant challenges to the sustainability of the healthcare system in Hong Kong. Due to the prolonged life expectancies and low fertility rate, the ageing population of Hong Kong is estimated to increase from 31.2% in 2024 to 40.4% by 2046 [1]. Moreover, 75% of older adults aged 65 and above have heightened healthcare needs, with 75% experiencing at least one chronic condition, such as diabetes, heart disease, or chronic bronchitis [2]. These demographic shifts undermine the importance of strengthening primary healthcare not only in terms of access, but also in ensuring service quality, trust, and user satisfaction. As older adults become frequent users of the healthcare system, their perceptions of care, that is, how respected, supported, and informed they feel, will directly influence their willingness to return, adhere to treatment, and engage in preventive care. Understanding and improving these experiential factors is therefore critical to fostering sustainable, people-centred primary care in Hong Kong.

Primary care serves as the first point of contact for individuals and families in the management of all bodily and psychosocial conditions as well as the continuing and comprehensive services that play a significant role in the prevention, early identification, and management of chronic conditions, such as regular check-ups, health screenings and immunisations [3]. Preventive care for older adults consists of mental disorders assessment, periodic dental care, evaluations for hearing and visual impairment of functional disability, and chronic disease management [4]. In Hong Kong, these services are mainly delivered by general practitioners (GPs) or family doctors. As the primary point of contact, GPs' effective delivery of these comprehensive services is therefore fundamental to primary care. Successful primary care not only tackles immediate health problems, but also promotes early disease detection and maintenance of well-being as individuals age. It can prevent the deterioration of mild conditions and reduce the healthcare cost to individuals, families and the society [5].

Hong Kong's primary care system has undergone significant policy-driven transformations that aim at improving chronic disease management and care coordination, which is particularly relevant for the ageing populations. The Primary Healthcare Blueprint released in 2022 outlines a strategic roadmap for primary healthcare reform. The Blueprint emphasises the need for a community-based primary healthcare system, enhanced public-private partnership, a shift from treatment-oriented to prevention-focused care, and further reducing reliance on public healthcare facilities and hospital services. Another key initiative includes the establishment of District Health Centres (DHCs) network across all 18

districts in Hong Kong and the promotion of the "family doctor for all" concept.

Despite these efforts, findings from the monitoring and evaluation studies of Kwai Tsing and Sham Shui Po DHCs revealed several persistent challenges, including limited engagement among men and working individuals, and low participation in screening programme [6]. Besides, integration of social services within DHC operations has been insufficient, as the channels for referrals to other social services providers were undeveloped. In many cases, after basic medical check-ups or health assessments, users are simply given the contact information of external organisations, without structured follow-up. This has resulted in minimal medical-social collaboration, despite it being a key initiative advocated by the Blueprint. This weak linkage contributes to low participation in secondary and tertiary prevention programmes, especially when barriers such as inadequate subsidies for private-sector treatments exist. Furthermore, the lack of structured mechanisms for multidisciplinary care coordination, such as clear referral protocols, shared care plans, and communication between healthcare and social service providers, has limited the effectiveness of DHCs. This ambiguity around their role within the broader primary healthcare system, particularly in relation to private general practitioners and NGOs, continues to limit collaboration.

Addressing these structural and operational challenges is imperative to realise the vision articulated in the Blueprint of an integrated and accessible primary healthcare system. Evidence suggests that the access and utilisation of such primary healthcare services have not been fully optimised, hindering their ability to diminish the growing demands of already overwhelmed public hospitals with severely high patient loads and stretched capacity [7]. A recent study has found that quality primary care services in Hong Kong can be delivered through DHCs [8]. Specifically, the study identified key service quality attributes as core services, staffing, procedures and operations, and physical facilities. However, the study also found that the core clinical services did not significantly influence users' perceived value or satisfaction of DHCs due to patients' limited ability to evaluate the technical and professional aspects of clinical service delivery. The non-clinical dimensions, such as the quality of staffing, efficiency of procedures and modernity of facilities, were strongly associated with enhanced perceived value and satisfaction. Users were concerned about the difficulties of booking appointments and quick response to service needs.

The proposed study

Developed by The Johns Hopkins Primary Care Policy Center, the Primary Care Assessment Tool (PCAT) is an internationally validated measurement of the attainment

of primary care attributes and evaluation of the quality of primary care primarily from the patients' perspective [9]. Research using PCAT found that socioeconomic factors are critical determinants of patients' utilisation of primary health services and their perceptions of its quality [10]. Respondents with higher household incomes were twice as likely to report higher level of satisfaction on quality of primary care compared to the lowest-income groups [10]. These higher-income groups also demonstrated better utilisation of more comprehensive services. More recent evidence indicated that patients using private insurance are 80% more likely to experience better quality care than those who pay entirely out-of-pocket, even though out-of-pocket expenses may still apply to insured patients, but typically to a lesser extent. Conversely, poverty and social deprivation reduce access to a regular source of primary care, particularly in the private sector [11]. This particularly resonates with the situation of Hong Kong as primary healthcare is predominantly delivered by private providers, with limited government subsidies available through schemes such as the Elderly Health Care Voucher. While private-sector dominance offers choice and flexibility for those who can afford it, low-income and socioeconomically disadvantaged individuals are more likely to rely on public primary care services. However, public clinics often face long waiting times and limited continuity, contributing to lower satisfaction and perceived quality. This dual-track system has led to persistent inequities in access and care experiences, with private insurance or out-of-pocket payment being associated with higher perceived quality. Such socioeconomic disparities persist in care experiences, with higher-income populations in private clinics reporting more favourable perceptions of communication quality and care continuity compared to public sector users [11].

Patient trust is strengthened by continuity of care and has been demonstrated by initiatives like the Elderly Health Care Voucher Scheme, which fosters long-term patient-provider relationships and reduces acute care costs [12]. With every HK\$1.00 invested into primary care, HK\$8.40 is saved in costs of acute care. Revisit intention is primarily linked to satisfaction with medical and non-medical service quality, though trust alone shows an insignificantly direct effect [13]. For instance, 75% of patients make their decisions to revisit care providers based on treatment outcomes, while two-thirds emphasise adequate physical examinations during consultations. Furthermore, government subsidies were identified as a moderating factor that significantly boosted perceived value, thereby positively affecting behavioural intentions, particularly for older adults who were more affected by high out-of-pocket costs [8]. Given the rapidly ageing population in Hong Kong, these

findings underscore the need for a multidimensional evaluation of primary care quality that integrates operational efficiency and financial support mechanisms to address the specific requirements of older adults better.

The study aims to provide insights for provision of quality primary care services to older adults which is one of the pressing issues brought about by the ageing population in Hong Kong. As the number of older adults grows, the demand for healthcare services surges, placing significant strain on the public healthcare system. By focusing on improving the overall quality and utilisation of primary care, the study aspires to reduce the dependence on acute hospital services, enhance the overall health and well-being of older adults, and ensure the long-term sustainability of Hong Kong's healthcare system. The study aims:

1. To assess the current state of experience and perception of primary care among older adults in Hong Kong using the Primary Care Assessment Tool (PCAT);
2. To explore the factors that influence the perceived service quality, satisfaction, trust, and revisit intention of primary care among older adults;
3. To identify the gaps and challenges in meeting the needs and expectations of older adults for primary care service.

Methods

This mixed-methods study consists of two phases: (1) quantitative survey gathering data regarding the experiences and perceptions of primary care among older adults, and (2) qualitative focus group discussion to gain an in-depth understanding of the factors influencing older adults' perceptions of service quality, satisfaction, and trust in both public and private primary care services.

Phase 1 - Quantitative study by questionnaire survey

Eligibility criteria

The study population will include Hong Kong permanent residents aged 60 or above, who can read Chinese or speak Cantonese, and who have usual sources of care when he/she is sick or needs health advice (including Accident and Emergency). Those who are diagnosed with dementia or cognitive impairment, and severe vision impairments will be excluded from the study.

Sample size calculation

For sample size calculation, it should be 10 times the maximum number of measuring items pointing at the constructs in the partial least square path model [14]. There are 51 question items measuring 11 constructs in

the questionnaire, the target sample size of this study will be 510 (51×10).

Recruitment

A cluster sampling focused on the geographical and socio-demographic factors will be adopted for the quantitative study. Cluster sampling is a widely utilised sampling technique for recruiting subjects from diverse geographical areas [15]. For the current study, the clusters are defined by 18 districts in Hong Kong and the median monthly household income according to Census and Statistics Department [16]. These clusters represent high- economic districts (e.g. Central and Western, and Tsuen Wan), middle-income districts (e.g. Sha Tin and Yau Tsim Mong), and low-income districts (e.g. Kwai Tsing and Sham Shui Po). To ensure representation across different socioeconomic groups, an equal number of participants will be recruited from each economic cluster. The questionnaire will take 15 to 20 min to complete. Participation is voluntary, and informed consent will be obtained.

The quantitative questionnaire survey will be conducted both online and through field surveys. The invitation message, along with questionnaire link will be sent to individuals and groups with connection to the investigators, colleagues and the research centre. As the study aims to obtain proportionate number of participants from each economic level, the research team will keep checking the distribution to balance the representation of participants. The research team will also visit the elderly community centres and private clinics in the field survey.

Measurement

The research study employs the Primary Care Assessment Tool (PCAT) as a guide for developing a more comprehensive primary care service to offer higher perceived service quality and experience to older adults. The questionnaire consists of two main sections (Table 1). The first main section is the validated Primary Care Assessment Tool Chinese Version (PCAT-C), contains seven domains with 37 items, covering first contact utilisation and first contact accessibility, ongoing care, coordination, comprehensiveness, family centeredness, community orientation [17]. First contact utilisation refers to the extent to which the source of care is used for various types of problems. First contact accessibility is used to measure access to the (usual) source of care. Ongoing care measures the continuing use of a regular source of primary care and the relationship between the source of care and the user. Coordination of care measures the recognition of prior and existing medical records and health needs. Comprehensiveness measures the services provided or received in primary care. Family-centeredness measures the involvement of family members in primary care.

Community orientation measures the provision of community care by providers.

The second main section consists of 14 items, including four constructs about perceived service quality, satisfaction, trust, and revisit intention. Perceived service quality refers to an individual's experience and impression of the healthcare services [18]. Satisfaction is about patients' satisfaction with the healthcare services and providers. Patients' trust refers to patients' confidence in the healthcare providers as being capable and reliable in meeting their health needs [19]. Patients should feel comfortable and relaxed with the practitioners and staff of health facilities. Revisit intention indicates whether a customer will return to and consult the same doctor or not [18, 20]. For perceived service quality, 5 items are adopted from a study [21]. 3 items each are used to assess satisfaction and trust respectively [22]. The last 3 items measuring revisit intention are adopted [23, 24]. Five-point Likert-scale (1 = Definitely not, 2 = Probably not; 3 = Not sure; 4 = Probably; 5 = Definitely; or 1 = Strongly disagree, 2 = Disagree; 3 = Not sure; 4 = Agree; 5 = Strongly agree) will be used in the questionnaire.

Data analysis

The interaction effects among the constructs will be analysed using partial least squares-structural equation modelling (PLS-SEM). The SmartPLS 4.0 statistical software will test the reflective measurement model and structural model. Reliability (using the value of Cronbach's alpha and combining reliability greater than 0.7 and 0.708 to check the internal consistency) and validity (including convergent and discriminant validity) of the measurement instruments will be assessed. The outer loadings should be greater than 0.6 to check the convergent validity. For checking discriminant validity, the Average Variance Extracted (AVE) of each construct should be greater than 0.5 [14], as well as the value of Fornell Larcker criterion and heterotrait-monotrait (HTMT) ratio will be assessed. Data analysis and collection will be conducted concurrently to determine the response rate, the number of surveys collected, and participant feedback. The responses and results from the questionnaires help the research team prepare for the focus group discussion questions in Phase 2.

Phase 2 - Qualitative study: focus group discussion and in-depth interviews

Sampling and recruitment

A purposive sampling approach will be used for the Phase 2 focus group discussions. To ensure a balance between diversity and meaningful interaction, each focus group will consist of 4 to 12 participants, a size that facilitates the sharing of individual perspectives while maintaining group diversity [25, 26]. Published study suggest that

Table 1 Items of the questionnaire

Constructs	Items	Sources
Accessibility (A)		(Yang et al., 2013)
A ₁	When your general practitioner (GP) / family doctor's clinic is open and you get sick, would you be able to see your doctor the same day?	
A ₂	Do you get advice over the phone when your GP / family doctor's clinic is open?	
A ₃	Do you get advice over the phone when your GP / family doctor's clinic is closed?	
A ₄	Does your GP / family doctor see you on the same day when the clinic is closed?	
A ₅	Is your waiting time more than 30 min?	
Utilisation (U)		(Yang et al., 2013)
U ₁	When you need a regular general checkup, do you go to your GP / family doctor before going somewhere else?	
U ₂	When you have a new health problem, do you go to see your GP / family doctor before going somewhere else?	
Ongoing care (OC)		(Yang et al., 2013)
OC ₁	When you go to see your GP / family doctor, do you see the same doctor each time?	
OC ₂	Are your questions answered in the ways that you understand?	
OC ₃	Do you talk to the doctor who knows you best if you have questions?	
OC ₄	Does your GP / family doctor give you enough time and make you feel comfortable talking about your concerns?	
OC ₅	Does your GP / family doctor suggest you to use Health Care Voucher to pay for your medical fee?	
OC ₆	Does your GP / family doctor know all the medications you are taking?	
OC ₇	Could you change your GP / family doctor if needed?	
OC ₈	Do you follow-up with treatment and taking medicine?	
Coordination (COO)		(Yang et al., 2013)
COO ₁	Does your GP / family doctor discuss with you about different places, recommend a better place and illustrate the reasons to get help for your problem?	
COO ₂	Does your GP / family doctor write down any information for the specialist about the reason for the visit?	
COO ₃	Does your GP / family doctor talk with you about what has happened at the visit and know the result of your visit to the specialist?	
COO ₄	Does your GP / family doctor help you to make appointment to see a specialist?	
Comprehensiveness (COM)		(Yang et al., 2013)
COM ₁	Does your GP / family doctor give you advice about diet and enough sleep?	
COM ₂	Does your GP / family doctor give you advice about home safety, like getting air circulation or in storing medicine?	
COM ₃	Do you consult your GP / family doctor about pressure at work and interpersonal conflicts?	
COM ₄	Does your GP / family doctor give you advice about handling family conflicts?	
COM ₅	Does your GP / family doctor give you advice about exercise?	
COM ₆	Do you have tests for your cholesterol level regularly?	
COM ₇	Do you have your blood pressure checked regularly?	
COM ₈	Do you have care for women's health or men's health?	
COM ₉	Do you have regular check-up?	
COM ₁₀	Does your GP / family doctor advice you about joining the Colorectal Cancer Screening Programme?	
COM ₁₁	Does your GP / family doctor advice you about joining the Vaccination Scheme?	
Family centeredness (FC)		(Yang et al., 2013)
FC ₁	Does your GP / family doctor ask about your ideas about planning treatment for you or your family members?	
FC ₂	Does your GP / family doctor introduce to you and your family the types of medicines you could possibly get and ask about your ideas before giving a prescription?	
FC ₃	Does your GP / family doctor ask about illness or problems that might run in your family?	
FC ₄	Does your GP / family doctor meet with members of your family if needed?	
Community orientation (CO)		(Yang et al., 2013)
CO ₁	Does your GP / family doctor ever make home visits?	
CO ₂	Does your GP / family doctor know about important health problems of your community?	
CO ₃	Does your GP / family doctor make a survey of patients to see whether needs were met?	
CO ₄	Does your GP / family doctor conduct survey of your community to find out health problems?	
Perceived service quality (PSQ)		(Pighin et al., 2022)
PSQ ₁	The GP / family doctor I usually go to give me detailed information about my illnesses.	
PSQ ₂	The GP / family doctor I usually go to give me complete information about my illnesses.	
PSQ ₃	The GP / family doctor that I usually attend always solve my health problems.	
PSQ ₄	The GP / family doctor that I usually attend give me security regarding my health.	
PSQ ₅	The GP / family doctor I usually go to have a good infrastructure.	
Satisfaction (SAT)		(Han & Hyun, 2015)
SAT ₁	Overall, I am very satisfied with my experience at this GP / family doctor.	
SAT ₂	My decision to visit this GP / family doctor for healthcare services was a wise one.	
SAT ₃	Overall, compared to other GP / family doctor in various places, I am satisfied with this GP / family doctor.	
Trust (T)		(Han & Hyun, 2015)
T ₁	I have confidence that this GP / family doctor provides the best deal.	
T ₂	I feel I can trust this GP / family doctor.	
T ₃	I think that medical quality and services at this GP / family doctor are of high integrity.	
Revisit intention (RI)		(Kijima et al., 2021; Swain & Kar, 2018)
RI ₁	Do you want to continue consulting the same GP / family doctor from now on?	
RI ₂	Do you consult your GP / family doctor first when you develop a new health problem?	
RI ₃	Do you willing to refer this GP / family doctor to friends or relatives for treatment in case of any illness?	

90% of thematic content can be captured with three to six focus groups, and that four groups are generally sufficient to achieve data saturation [27]. Therefore, five focus group discussions will be conducted, each comprising 10 participants. These sessions will involve at least 25 older adults along with their family members or caregivers. In total, 50 participants will be recruited for this phase of the study. Twenty-five older adults who participated in Phase 1 will be invited to join focus groups based on their willingness to participate further, their ability to share their experiences. To ensure the sample includes a range

of socio-demographic backgrounds (e.g., age, gender, district, and income level), these participants will be identified during the Phase 1 survey, with an opt-in question to assess interest in a follow-up qualitative session. In addition, their family members or caregivers will be invited if they are involved in the older adult's primary care experiences and express willingness to participate. Older adults will be asked to nominate a caregiver or family member who actively supports them in their healthcare decisions or accompanies them to medical appointments. Caregivers will be contacted through the older adult. We will

then provide them with study information and invite them to join the same focus group discussion. There will be five focus groups, each consisting of approximately 10 participants (including older adults and caregivers). Each session will last 1.5 to 2 h.

Measurement

The findings obtained from Phase 1 will help design the guiding questions used in the focus group discussion. Semi-structured interviews will be employed. Questions regarding the expectations of primary care service will also be asked, such as “What are your expectations of GOPCs, DHCs/EHCs?”. In addition, some guiding questions will be taken for reference from the qualitative study on community-based primary health care for older adults [28], like “What are some of the words you would use to describe ‘quality of care?’” “What are the barriers or challenges that prevent you from accessing or using primary care services? How can they be overcome or improved?” and “What are your expectations or preferences for primary care services in Hong Kong? What kind of services or supports do you need or want as an older adult?”.

Data analysis

The team members will host the focus group discussions and take notes of the conversation with the participants. The research assistant will audio-record the discussions and accomplish verbatim transcription into Cantonese for data analysis. Audio recordings will be anonymised, stored securely, and accessible only to the research team. At least two investigators will validate the transcription before data entry. By using the Qualitative Analysis Guide of Leuven [29], data analysis will be processed to inform potential adjustments during data collection. The first process of data analysis will involve preparing the coding stage. A narrative report will be written, and the essence of the informants’ experiences and opinions will be articulated. The investigators will develop the conceptual schemes from the narrative report. Thereafter, they will discuss and validate the conceptual schemes by re-reading the informants’ experiences and opinions to determine whether the conceptual schemes can connect the data (transcripts). The research team will address and resolve discrepancies during regular meetings throughout the project. The second process of data analysis will be conducted using Qualitative Data Analysis (QDA) Miner 5 of Provalis Prosuite (Version 6.0.16) to identify key themes and insights from the focus group discussions. This qualitative software will facilitate coding, generation of categories and development of themes. Two investigators will conduct the initial coding of the transcriptions independently and consult a third investigator

in the event of any disagreements regarding the identified themes.

Themes, categories, and codes will be analysed and interpreted with all definitions documented in a comprehensive code book. Investigators will discuss these to ensure consistency and reliability. Code saturation will be assessed by reviewing each group’s code development process and the transcripts [30]. Data analysis will continue until saturation is reached, which indicates that no new themes or codes emerge from the analysis. The results will provide an in-depth examination of the informants’ experiences, perceptions, and opinions regarding primary care, mainly focusing on perceived service quality, satisfaction, trust, and revisit intention.

Triangulation of quantitative and qualitative findings

Triangulation refers to the use of multiple methods to study a phenomenon [31]. The project’s triangulation of quantitative and qualitative findings will confirm results, yield more comprehensive data, enhance validity, and deepen the understanding of perceived service quality, satisfaction, trust, and revisit intentions related to primary care for older adults.

Any potentially conflicting findings will be discussed and resolved by team members.

Discussion

The evaluation of primary care quality and utilisation among older adults in Hong Kong is critical, given the rapidly ageing population and the escalating demand for comprehensive, accessible, and high-quality healthcare services. Effective primary care like continuous and coordinated care is essential in addressing the complex health needs of older adults, who often present with multiple chronic conditions. The findings from this study will enhance our understanding of how perceived service quality influences older adults’ satisfaction and their likelihood of revisiting primary care services. The findings will align with global priorities aimed at promoting healthy ageing and alleviating the burden on acute healthcare services. Research indicates that the quality of primary care significantly influences patient outcomes and satisfaction levels. The study aims to support the goals of the Hong Kong Primary Healthcare Blueprint, which aims to enhance service delivery through community-based care and improved coordination among healthcare providers.

The mixed-methods approach of the study is important to capture the complexity of older adults’ experiences with primary care services in Hong Kong. While quantitative methods provide generalisable insights into primary care attributes, such as accessibility, coordination, comprehensiveness, and patient-centeredness, they may not fully understand the emotional and contextual

dimensions that form patient perceptions and behaviour. By integrating qualitative focus group discussions, this study addresses the limitations of using only the numerical indicators. This also enables the collection of rich insights that reveal how older adults and their caregivers interpret and engage with primary care services.

This mixed-methods design helps us understand not just how much trust older adults have in primary care, but also what personal, relational, and system-level factors influence that trust. The underlying perceptions in service quality, satisfaction, and revisit intention can also be explored. The PCAT used in the quantitative phase offers a validated framework for assessing the core domains of primary care. More importantly, qualitative data help interpret how these domains are experienced in a real-world setting. This comprehensive approach not only strengthens the validity of the research but also offer actionable insights that are grounded from lived experiences. Therefore, this study can provide valuable evidence to inform health policy and optimise primary care delivery models to the needs of ageing population in Hong Kong.

In conclusion, the study addresses a critical gap in understanding the quality and utilisation of primary care among older adults in Hong Kong by using a mixed-methods approach. By identifying key determinants of service quality, satisfaction, trust, and revisit intention, the findings will provide valuable evidence to inform health policy and optimise primary care delivery models. The research highlights socioeconomic disparities and contributes insights that will support healthier aging in the community. Ultimately, this comprehensive study provides actionable knowledge to improve primary care delivery for Hong Kong's rapidly growing older population.

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Authors' contributions

BYFF, TKCN, WKC, WCWW, ZL, MML and SSPH conceived the study, formulated the hypothesis and led the proposal and protocol development. BYFF and TKCN contributed to the study design and the development of the proposal with input from all co-authors. All authors read and approved the final manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The study conforms to the Declaration of Helsinki. The proposed study has obtained the approval from the College of Professional and Continuing

Education Research Committee (RC/ETH/H/398). All participants who agree to participate in the study will sign and return a consent form before participating in each phase of the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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