

How common are Chinese patients with multimorbidity involved in decision making and having a treatment plan? a cross-sectional study

Kam Pui Lee (✉ lkp032@cuhk.edu.hk)

Chinese University of Hong Kong <https://orcid.org/0000-0001-8267-9384>

Samuel Yeung Shan Wong

Chinese University of Hong Kong

Benjamin Hon Kei Yip

Chinese University of Hong Kong

Eliza Lai Yi Wong

Chinese University of Hong Kong

Dicken Chan

Chinese University of Hong Kong

Patsy Chau

Chinese University of Hong Kong

Lawrence Luk

Chinese University of Hong Kong

Eng-kiong Yeoh

Chinese University of Hong Kong

Research article

Keywords: shared decision making, treatment plan, multimorbidity

Posted Date: November 4th, 2019

DOI: <https://doi.org/10.21203/rs.2.16804/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Version of Record: A version of this preprint was published at International Journal of Clinical Practice on May 17th, 2021. See the published version at <https://doi.org/10.1111/ijcp.14286>.

Abstract

Background Creating a treatment plan (TP) through shared decision making (SDM) with healthcare professionals, is of paramount importance for patients with multimorbidity. This study aims to estimate the prevalence of SDM and TP in patients with multimorbidity, and study the association between SDM/TP with demographics and patients' confidence to manage their diseases. **Method** This cross-sectional study used an internationally recognized survey. 1,032 patients aged 60 or above with multimorbidity, were recruited from a specialist outpatient clinic, general outpatient clinic (GOPC) and a geriatric day hospital. The proportion of patients reported to have SDM and TP were estimated. Associations between the presence of SDM/TP and patients' demographic data, and the confidence level to manage their illnesses, were then studied using logistic regression. **Results** The prevalence of SDM and TP were 35.8% and 82.1%, respectively. The presence of TP was associated with receiving healthcare from the same doctor or in the same facilities, and being recruited from GOPC. Presence of SDM (OR 1.381, $p=0.054$) and TP (OR 2.195, $p<0.0001$) were associated with enhanced confidence in dealing with diseases. **Conclusion** Most people with multimorbidity had TP in Hong Kong, but fewer patients had SDM.

Practice implications: Ways to promote SDM in HK are needed.

Background

Multimorbidity (MM) is commonly defined as the 'co-existence of two or more chronic conditions, where neither is more central than the others'¹. MM is common especially in the older and socioeconomically deprived populations^{2,3}. A study involving a large database found that approximately 65% of patients older than 65 years old had MM³. MM is associated with mortality, disability, impaired quality of life, psychological distress, and increased health care utilization^{1,4-6}

Despite the fact that much is known about the consequences of MM, there remains a lack of evidence underpinning the management of MM, because randomized controlled trials typically exclude patients with MM and the resultant clinical guidelines are disease-focused and rarely deal with MM^{6,7}. Managing patients with MM by strictly following these guidelines can overburden patients with MM with too many visits to healthcare professionals, excessive and conflicting lifestyle advice and prescription of medications⁷⁻¹⁴. Therefore, instead of following clinical guidelines, the American Geriatric Society¹⁵ and The National Institute for Health and Care Excellence (NICE)¹⁶ recommended a shared decision process to individualize a treatment plan that is in accordance with patients' preferences and values, and this may minimize treatment burden and maximize quality of life. Shared decision making (SDM) is defined as 'an approach in which the clinician and patient go through all phases of the decision making process together and in which they share the preference for treatment and reach an agreement on treatment choice'; this is in contrast to the traditional medical model where doctors are solely responsible for prescribing the 'best' treatment to patients¹⁷. Creating treatment plans (TP) by SDM has been shown to enhance patients' sense of control over their illness, improve their symptoms, enhance their knowledge and reduce concerns towards illnesses; which in turn, can enhance adherence to medications and improve quality of life^{17,18}. While there were previous studies in Hong Kong investigating SDM in other patient populations, including do-not-resuscitate decisions in patients with chronic obstructive lung diseases and in surgical and medical patients^{19,20}, the prevalence of SDM and TP in patients with MM, who could benefit most from SDM in Hong Kong, was not previously known.

The primary aim of this study was to determine the proportion of patients with MM who reported having SDM and/or a TP. As a secondary objective, participants were asked how confident they were to manage their illnesses. The relationships between the presence of SDM and/or a TP and their confidence level to manage their illnesses, were delineated. We hypothesized that a high proportion of patients with MM had SDM and/or a TP, and having these could enhance their confidence in disease management.

Methods

This cross-sectional study utilized an internationally recognized survey (see below). 1,032 patients were recruited, who (i) were aged 60 or above, and (ii) who self-reported to have at least three chronic conditions (appendix 1). Patients were recruited at one General outpatient clinics (GOPCs), one geriatric specialist outpatient clinic (SOPC) and/or geriatric day hospital (GDH) in each of the seven HA clusters, from June 2016 to July 2017. We included patients only older than 60 years old because MM is most common in the older population. Besides, all patients in GDH and SOPC were older than 60 years old. While Hong Kong has a dual healthcare system where patients can choose to obtain healthcare from both private and the public sector, the vast majority of patients with chronic diseases were seen under the Hospital Authority system, where the current study was conducted²¹.

The questions used in the current research were extracted from the International Health Policy Survey of Older Adults, which was used previously in multinational research involving 11 countries and more than 15,000 participants²². The instrument consists of questions to estimate or understand health care costs and access, doctor-patient relationships, health promotion, management of chronic conditions, and caregiving²². The survey has been used in various other large-scale research projects²³. Questions about (i) whether participants had a SDM and TP, and (ii) whether they had a regular doctor/organization for their chronic disease, were extracted. The survey was translated and validated by iterative forward-backward translation, and cognitive debriefing interviews in Hong Kong²⁴. After the questionnaire was piloted, a few questions were added by the expert panel, which consisted of three clinical and social experts involved in the care of elderly, each possessing at least 10 years working experience. These

additional questions were aimed to fine-tune the instrument to fit the local cultural context. Demographics including number of chronic illnesses, sex, education level, marital status, family income, financial income sources (social allowance Comprehensive Social Security Assistance (CSSA) signifies disadvantages financially), regular healthcare provider for participants' chronic illness and whether the participant had health insurance, were collected. Written consent were obtained from all participants before their participation of the project.

Statistical analysis

The demographic characteristics of the study participants were summarized as count and percentage. The outcomes were collected by 4-option items in the questionnaire, and were simplified into 2 levels (Always/Often and Sometimes/Rare/Never) to facilitate their analysis and interpretation of the results. The proportion of patients who were involved in components of SDM and TP, as well as confidence in managing their chronic conditions, were presented. Logistic regression was constructed to study the relationship between various demographic data and the presence of shared decision making process, treatment plan and confidence in managing chronic disease. Variables set at p-value < 0.1 in the initial univariate analyses, were entered into the forward stepwise multivariate model to determine the most significant associations. The associations between the presence of shared decision process and treatment plan and patients' confidence in managing chronic disease, were also studied using logistic regression. Odds ratio (OR) and 95% confidence interval (CI) were estimated to clarify the strength of association, and the significance is considered a two-sided P < 0.05. Statistical analyses were conducted using IBM SPSS Statistics 21.

The percentages of missing data for three primary outcomes were lower than 6%. Missing data was assumed to be missing at random (MAR), therefore our analysis was based on complete cases only. No characteristics differences were found between subjects with and without missing values.

Sample size

Due to a lack of previous similar studies, at a precision of 3.1% and a presumed prevalence of 50% of patients with MM who received shared decision making (which required the largest possible sample size), the required sample was determined to be 1,000 participants. Therefore, our sample size was considered adequate.

Results

Participants

The number of patients approached was 2,331 and the number of patients participated and completed the questionnaire was 1,032. The response rate was 44.3%. More than one-third of our participants were older than 80 years old. Around half of them were male (53.5%) and most participants received some level of education (80.9%), were married (67.4%), had family income below \$6,000 (61.7%), had three to four diseases (60.9%) and no health insurance (90.9%). Around 17% were receiving comprehensive social security assistance (CSSA). The vast majority (92.2%) reported that they had a regular health care facility to visit, but only 28.3% reported that they had a regular doctor (Table1).

The percentage of missing data for primary outcomes: "Deciding a treatment according to your will and get you involved" was $(952-897)/952=5.7\%$; "Do you have a treatment plan for your chronic conditions" was $(1032-1025)/1032=0.6\%$; "How confident are you that you can control and manage your health problems" was $(1032-1019)/1032=1.3\%$.

Proportion of presence of shared decision making and a treatment plan (table 1)

Only 35.8% of participants reported that their TPs were decided according to their own preferences or were involved in making it but 82.1% of participants reported the presence of a TP.

The proportion of presence of important components to shared decision making varied: 91.2% of participants believed that their doctors know their medical information; 72.2% felt that the consultation time was enough; 27.8% reported that their doctors encourage questions; 74.8% reported that explanation was easily understandable; 22.8% participants recalled that their doctor once discussed with them about their priorities and goals; and 27.4% reported that alternative treatments were discussed. Most participants (72.4%) felt the TP, when present, helped them to manage their chronic conditions. (appendix 2)

Factors associated with the presence of shared decision making and a treatment plan

The presence of the SDM process was not associated with any demographic data, including age, sex, marital status, the presence of health insurance or a regular doctor, number of diseases and where they received their follow-up (table 2), thus the multivariate model for SDM was not applicable. In the univariate model, the presence of a TP was more likely if the participants reported a regular doctor/facilities (OR=2.203; $p=0.004$), if the patient was recruited in GOPCs (SOPC: OR=0.538, $p=0.009$; GDH: OR=0.554, $p=0.001$) and if the patient received education up to secondary school level (OR 1.569; $p=0.049$); conversely, treatment plan was less common in participants aged 80-84 (OR=0.429; $p=0.010$) (table 2). In the forward logistic model, only having follow-up by a regular doctor or in a regular facilities (OR=1.980; $p=0.013$) and being recruited in a GOPC (SOPC: OR=0.608, $p=0.041$; GDH: OR=0.585, $p=0.003$) remained significant predictors for the presence of a treatment plan (table 3). Again, the number of diseases did not affect the presence of shared decision making or a presence of treatment plan. (table 2)

Similar analysis was conducted for other components of the SDM process. In the multivariate models, participants whose monthly family income more than \$30,000 were more likely to be offered alternative treatments (OR=2.718, $p=0.008$), those with monthly family income between \$0-\$6000 were more likely to be discussed with their goals or priorities (OR=3.196, $p=0.001$) and given instructions about symptoms and further care (OR=2.012, $p=0.004$), as well as those with monthly family income was \$6000-\$17999 (OR=2.398, $p=0.025$; OR=2.124, $p=0.007$); patients who had more than 6 chronic diseases were more likely to be given clear instructions about symptoms and care (OR=2.121, $p=0.007$), but less likely to have things explained to them in an easy to understand manner (OR=0.439, $p<0.0001$); patients with regular doctors were more likely to report that the doctor know important medical information (OR=2.406; $p=0.021$) and that they were encouraged to ask questions (OR=1.387, $p=0.037$); participants who were recruited in GDH were more likely to be encouraged to ask questions (OR=1.440, OR=0.022), but less likely to have the doctor know important medical information (OR=0.138, $p<0.0001$), spend enough time with them (OR=0.585, $p=0.013$), explain things clearly (OR=0.628, $p=0.008$), and they had less confidence about their own treatment plan (OR=0.491, $p<0.0001$).

Association between presence of shared decision making/treatment plan and patients' confidence to manage disease

Overall, a quarter of participants (25%) felt not confident enough to manage their health problems (Table 1). Lack of confidence was associated with larger number of diseases being a female, low education attainment, being recruited from SOPC or GDH, and lack of health insurance (Table 2). In the forward stepwise multivariate model, lower educations, having more than 6 chronic diseases, and being recruited from SOPC or GDH remained significant predictors for lower confidence to manage health problems (table 3). The presence of a treatment plan enhanced patients' confidence to handle their illnesses (OR=2.503; 95%CI: 1.715, 3.653) in the multivariate logistic regression model (Table 4); the presence of a shared decision making process also enhanced patients' confidence (OR=1.298), however it was not statistically significant ($p=0.126$).

Discussion

This is one of the first studies that explores the prevalence of SDM and presence of TP in Chinese patients with multimorbidity, which showed that the presence of SDM and/or TP were associated with enhanced patients' confidence to manage their illnesses. Previous similar studies involved Chinese patients with breast cancer and found inconclusive results. One study revealed that 70% of patients were allowed to decide their preferred surgery²⁵; but a second study mentioned that the level of shared decision making in which these patients were engaged was low, according to a validated scale using direct observations of the actual consultations²⁶. In the current study, the majority (82.1%) of participants were aware of a TP, but only around one-third of participants recalled having an SDM process in which their priorities and preferences were taken into consideration to build the TP. It was likely that TPs were prescribed by doctors rather than as a product of discussion with patients. Nevertheless, both the presence of shared decision making (OR 1.381, $p=0.054$) and treatment plan (OR 2.195, $p<0.0001$) appeared to enhance participants' confidence to manage their illnesses. Participants who were recruited from primary care clinics (GOPC) were more likely to have a treatment plan (especially those reported having a regular doctor/having follow-up in a regular facility) and were more confident to handle their diseases, even after being controlled for the number of diseases. This may be because primary care doctors were trained to provide continuous and comprehensive patient care, and therefore are more likely to formulate a TP that patients can recall²⁷.

SDM was reported only infrequently in our sample, despite its internationally-recognized importance in patients with multimorbidity^{15,16}. The prevalence of SDM in MM in other countries was under-reported and the current study is one of the first that reported the prevalence of SDM and TD in patients with MM. However, shared decision making remained underutilized in many populations (e.g., without MM) internationally; for example, a study found that around only half of the seriously ill patients who wished to refuse resuscitation, had a 'do-not-resuscitate' order, and healthcare professionals were found to have a poor understanding of these preferences²⁸.

Yet, SDM might improve patients' outcomes. A Cochrane review of randomized controlled trials supported that the involvement of patients through using decisional aids, could improve their knowledge and reduce internal conflicts within decision making²⁹. A cohort study in women with breast cancer also suggested that shared decision making enhanced patients' quality of life³⁰. Evidence also suggested that shared decision making may reduce the financial burden of healthcare systems, because when provided with choices, participants often opted for more conservative, rather than intensive and expensive treatments²⁹. However, despite shared decision making being recommended in managing patients with multimorbidity by international guidelines^{15,16}, there remains a relative lack of research showing that SDM can directly impact on patients' physical health.

In addition, it is not known how SDM can be promoted. A systematic review suggested that the major barriers to SDM included time constraints, patients' characteristics and nature of diseases³¹. While decisional aids were suggested to help patients make informed decisions, the relevance of these aids to patients with multimorbidity was uncertain because these decisional aids were usually disease-focused and were only available for a limited spectrum of diseases³². The use of decisional aids in Chinese contexts is especially understudied²⁹. Doctors can be reluctant to use decisional aids during consultation because they can lengthen the consultation time by 2.6 minutes²⁹, while the average consultation time in GOPC is around 5-7 minutes in Hong Kong³³. Furthermore, many patients, especially Chinese, may not want to be involved in the decision making process³⁴; doctors may be reluctant to involve patients in making decisions if they perceive patients to be unwilling to make a decision, or if the patients were not educated enough to engage in such a discussion³¹. Previous research showed that older Chinese people are less willing to make health-related decisions and the presence of SDM depended also on patients' education level^{25,26}. The latest Cochrane Review also suggested that there is a lack of evidence of ways to encourage clinicians to involve patients in making decisions³⁵. Research on interventions to promote SDM in our patients with MM is therefore needed; such trials can then provide evidence on health benefits and cost-effectiveness, if any, of shared decision making.

The current study recruited more than a thousand patients with multimorbidity from both primary and specialist clinics from all areas of Hong Kong, and represented one of the largest studies in a Chinese population. However, a few weaknesses must be mentioned. Firstly, the study only recruited older patients from the public sector, where most patients with chronic diseases in Hong Kong receive regular care. The extent of the applicability of the results for younger patients and patients in the private sector is not known. Additionally, as a questionnaire study, the results were prone to reporting bias. It is possible that patients could not recall being involved in the SDM process, even if they had been. Future studies may include auditing consultation notes or video-taping doctors' performance. However, we argue that a treatment plan/shared decision process is only meaningful if the patient can recall them. Furthermore, as a limitation shared with most cross-sectional studies, casual relationships could not be established. For example, while it is most likely that patients with treatment plans could deal with their diseases more effectively, it is also possible that patients who are confident and are motivated in their disease management, can better recall their treatment plan. Finally, the study could not explain the barriers or motivating factors for using shared decision making from the clinicians' perspective, nor the relevant training needs of the clinicians – and this could be included in future studies.

Conclusions

In conclusion, most patients with multimorbidity in Hong Kong had a treatment plan, but fewer had been involved in making health-related decisions. Treatment plans and shared decision processes appeared to help patients to manage their diseases. Going forward, research is needed on interventions that promote shared decision making in patients with multimorbidity.

Abbreviations

TP: Treatment Plan

SDM: Shared Decision Making

GOPC: General Outpatient Clinic

MM: Multimorbidity

NICE: National Institute for Health and Care Excellence

SOPC: Specialist Outpatient Clinic

GDH: Geriatric Day Hospital

CSSA: Comprehensive Social Security Assistance

OR: Odds ratio

CI: Confidence Interval

Declarations

[Ethics approval and consent to participate:](#)

Hong Kong East Cluster Clinical and Research Ethics Committee (CREC Ref. No.: HKEC-2016-018)

Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (IRB Reference Number: UW 16-087)

Kowloon Central/ East Cluster Clinical and Research Ethics Committee (KC/KE-16-0030/ER-3 & KC/KE-16-0029/ER-3)

Kowloon West Cluster Clinical and Research Ethics Committee (KWC-REC reference: KW/EX-16-096(100-02))

New Territories West Cluster Clinical and Research Ethics Committee (CREC Ref. No.: NTWC/CREC/16026)

The Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (CREC Ref. No: 2015.359)

All the above 6 Ethics committees are affiliated to the Hong Kong Hospital Authority.

Written consent were obtained from all participants before their participation of the project.

Consent for publication: Not applicable

Availability of data and materials: 'The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.'

Competing Interest: The authors declare that they have no competing interests

Funding: The work described in this paper was fully supported by a commissioned grant from the Health and Medical Research Fund of the Food and Health Bureau of the Government of the Hong Kong Special Administrative Region (Project Reference: Elderly Care – CUHK). The Funding body has no role in any part of the study.

Authors' contributions:

KPL, SYSW, BHKY, ELYW, DC and EKY were responsible for the literature review section. They also contributed to creating and organizing the figures, as well as the design for the above study. In addition, they were involved in data analysis, data interpretation, and writing the manuscript. While PC and LL were also involved in the data collection and data analysis.

All authors read and approved the final version of the manuscript.

Acknowledgements: Sincere thanks to all involved Hospital Authority staff for their logistic supports. And also thanks to all participants for their participation of this study.

References

1. Boyd CM, Fortin M. Future of multimorbidity research: How should understanding of multimorbidity inform health system design? Vol. 33, Public Health Reviews. 2011. p. 451–74.
2. Wang HHX, Wang JJ, Lawson KD, Wong SYS, Wong MCS, Li FJ, Wang PX, Zhou ZH, Zhu CY, Yeong YQ, Griffiths SM, Mercer SW. Relationships of multimorbidity and income with hospital admissions in 3 health care systems. *Ann Fam Med*. 2015;13(2):164–7.
3. Barnett K, Mbchb N, Phd G, Phd W, Guthrie B, Barnett K, Mercer SW, Norbury M, Watt G, Wyke S. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *www.thelancet.com Lancet*. 2012;380:37–43.
4. Nunes BP, Flores TR, Mielke GI, Thumé E, Facchini LA. Multimorbidity and mortality in older adults: A systematic review and meta-analysis. Vol. 67, *Archives of Gerontology and Geriatrics*. 2016. p. 130–8.
5. Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, Meinow B, Fratiglioni L. Aging with multimorbidity: A systematic review of the literature. Vol. 10, *Ageing Research Reviews*. 2011. p. 430–9.
6. Wallace E, Salisbury C, Guthrie B, Lewis C, Fahey T, Smith SM. Managing patients with multimorbidity in primary care. *BMJ [Internet]*. 2015;350(3):h176. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25646760>
7. Guthrie B, Thompson A, Dumbreck S, Flynn A, Alderson P, Nairn M, Treweek S, Payne K. Better guidelines for better care: accounting for multimorbidity in clinical guidelines – structured examination of exemplar guidelines and health economic modelling [Internet]. Better guidelines for better care: accounting for multimorbidity in clinical guidelines – structured examination of exemplar guidelines and health economic modelling. 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28459515>
8. Roland M, Paddison C. Better management of patients with multimorbidity. *Bmj [Internet]*. 2013;346(7908):21–2. Available from: http://www.researchgate.net/publication/236615048_Better_management_of_patients_with_multimorbidity/file/3deec522742014a9c1.pdf
9. Guthrie B, Makubate B, Hernandez-Santiago V, Dreischulte T. The rising tide of polypharmacy and drug-drug interactions: population database analysis 1995-2010. *BMC Med [Internet]*. 2015;13:74. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4417329&tool=pmcentrez&rendertype=abstract>
10. Weng M-C, Tsai C-F, Sheu K-L, Lee Y-T, Lee H-C, Tzeng S-L, Ueng K-C, Chen C-C, Chen S-C. The impact of number of drugs prescribed on the risk of potentially inappropriate medication among outpatient older adults with chronic diseases. *QJM*. 2013;106(11).

11. Stoehr Pharm GP, Lu S-YM, Lavery LM, Vander Bilt MPH J, Saxton Ph JA, Chang Ph C-CH, Ganguli MPH MM. Factors Associated with Adherence to Medication Regimens in Older Primary Care Patients: The Steel Valley Seniors Survey. *Am J Geriatr Pharmacother.* 6:255–63.
12. Gallacher K, May CR, Montori VM. Understanding patients' experiences of treatment burden in chronic heart failure using normalization process theory. *Ann Fam Med.* 2011;9(3):235–43.
13. Hughes LD, McMurdo MET, Guthrie B. Guidelines for people not for diseases: The challenges of applying UK clinical guidelines to people with multimorbidity. *Age Ageing.* 2013;42(1):62–9.
14. Dumbreck S, Flynn A, Nairn M, Wilson M, Treweek S, Mercer SW, Alderson P, Thompson A, Payne K, Guthrie B. Drug-disease and drug-drug interactions: systematic examination of recommendations in 12 UK national clinical guidelines. *BMJ [Internet].* 2015;350(mar11_2):h949. Available from: <http://www.bmj.com/content/350/bmj.h949>
15. Ickowicz E. Guiding principles for the care of older adults with multimorbidity: An approach for clinicians: American Geriatrics Society expert panel on the care of older adults with multimorbidity. *Journal of the American Geriatrics Society.* 2012.
16. Farmer C, Fenu E, O'Flynn N, Guthrie B. Clinical assessment and management of multimorbidity: summary of NICE guidance. *BMJ [Internet].* 2016 Sep 21 [cited 2017 Aug 24];j4843. Available from: <http://www.bmj.com/lookup/doi/10.1136/bmj.i4843>
17. Joosten EAG, DeFuentes-Merillas L, De Weert GH, Sensky T, Van Der Staak CPF, De Jong CAJ. Systematic review of the effects of shared decision making on patient satisfaction, treatment adherence and health status. *Psychother Psychosom.* 2008;
18. Aubree Shay L, Lafata JE. Where is the evidence? a systematic review of shared decision making and patient outcomes. *Medical Decision Making.* 2015.
19. Pang SMC, Tse CY, Chan KS, Chung BPM, Leung AKA, Leung EMF, Ko SKK. An empirical analysis of the decision making of limiting life-sustaining treatment for patients with advanced chronic obstructive pulmonary disease in Hong Kong, China. *J Crit Care.* 2004;
20. Henderson A, Shum D. Decision making preferences towards surgical intervention in a Hong Kong Chinese population. *Int Nurs Rev.* 2003;
21. Census and Statistic Department of Hong Kong Special Administrative Region. thematic household survey report 58 [Internet]. 2015 [cited 2017 Jan 10]. Available from: <https://www.google.com.hk/search?q=thematic+household+survey+report+58&aq=thematic+household+survey+report+58&aq=chrome..69i57.7151j0j8&sourceid=chrome&ie=UTF-8>
22. Osborn R, Moulds D, Squires D, Doty MM, Anderson C. International survey of older adults finds shortcomings in access, coordination, and patient-centered care. *Health Aff.* 2014;33(12):2247–55.
23. Sarnak DO, Ryan J. How High-Need Patients Experiences the Health Care System in Nine Countries. Issue Brief (Commonw Fund) [Internet]. 2016;1:1–14. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26809154>
24. Wong SYS, Zou D, Chung RY, Sit RW, Zhang D, Chan D, Yeoh EK, Woo JW. Regular Source of Care for the Elderly: A Cross-National Comparative Study of Hong Kong With 11 Developed Countries. *Journal of the American Medical Directors Association.* 2017;
25. Lam W, Fielding R, Chan M, Chow L, Ho E. Participation and satisfaction with surgical treatment decision making in breast cancer among Chinese women. *Breast Cancer Res Treat.* 2003;
26. Lam WWT, Kwok M, Chan M, Hung WK, Ying M, Or A, Kwong A, Suen D, Yoon S, Fielding R. Does the use of shared decision making consultation behaviors increase treatment decision making satisfaction among Chinese women facing decision for breast cancer surgery? *Patient Educ Couns.* 2014;
27. Bazemore A, Petterson S, Peterson LE, Phillips RL. More comprehensive care among family physicians is associated with lower costs and fewer hospitalizations. *Ann Fam Med.* 2015;
28. Covinsky KE, Fuller JD, Yaffe K, Johnston CB, Hamel MB, Lynn J, Teno JM, Phillips RS. Communication and decision making in seriously ill patients: Findings of the support project. *J Am Geriatr Soc.* 2000;
29. Stacey D, Légaré F, Lewis K, Barry MJ, Bennett CL, Eden KB, Holmes-Rovner M, Llewellyn-Thomas H, Lyddiatt A, Thomson R, Trevena L. Decision aids for people facing health treatment or screening decisions. *Cochrane Database of Systematic Reviews.* 2017.
30. Hack TF, Degner LF, Watson P, Sinha L. Do patients benefit from participating in medical decision making? Longitudinal follow-up of women with breast cancer. *Psychooncology.* 2006;
31. Légaré F, Ratté S, Gravel K, Graham ID. Barriers and facilitators to implementing shared decision making in clinical practice: Update of a systematic review of health professionals' perceptions. *Patient Education and Counseling.* 2008.
32. Stiggelbout AM, Van Der Weijden T, De Wit MPT, Frosch D, Légaré F, Montori VM, Trevena L, Elwyn G. Shared decision making: Really putting patients at the centre of healthcare. *BMJ (Online).* 2012.
33. Aharonson-Daniel L, Paul RJ, Hedley a J. Management of queues in out-patient departments: the use of computer simulation. *J Manag Med [Internet].* 1996;10(6):50–8, 3. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10538033>
34. Levinson W, Kao A, Kuby A, Thisted RA. Not all patients want to participate in decision making. *J Gen Intern Med.* 2005;
35. Légaré F, Adekpedjou R, Stacey D, Turcotte S, Kryworuchko J, Graham ID, Lyddiatt A, Politi MC, Thomson R, Elwyn G, Donner-Banzhoff N. Interventions for increasing the use of shared decision making by healthcare professionals. *Cochrane database Syst Rev.* 2018;

Tables

Table 1. Proportion of Demographic Characteristics, Shared Decision Making and Treatment Plan (N=1032)

Characteristics	N	%
Age group		
60-64	123	11.9
65-69	176	17.1
70-74	176	17.1
75-79	194	18.8
80-84	207	20.1
85 and above	156	15.1
Gender		
Male	552	53.5
Female	480	46.5
Education		
No formal education	196	19.1
Primary	392	38.2
Secondary	359	35.0
Tertiary or above	80	7.8
Marital status		
Married/Cohabiting	690	67.4
Widowed/Separated/Divorced/ Single/Not married	334	32.6
Family income		
No income	106	18.0
<\$6,000	258	43.7
\$6,000-\$17,999	122	20.7
\$18,000-\$29,999	52	8.8
≥\$30,000	52	8.8
Social security recipient		
No	860	83.3
Yes	172	16.7
Health insurance		
No	927	90.9
Yes	93	9.1
Number of chronic diseases		
3-4	628	60.9
5-6	285	27.6
>6	119	11.5
Regular doctor		
No	736	71.7
Yes	291	28.3
Regular healthcare facility		
No	79	7.8
Yes	940	92.2
Regular doctor or healthcare facility		
No	71	6.9
Yes	952	93.1
Source of recruitment		
GOPC	530	51.4
SOPC	141	13.7
GDH	361	35.0
Shared Decision Making and Treatment Plan		
Deciding a treatment according to your will and get you involved		
Sometimes/Rarely/Never	576	64.2
Always/Often	321	35.8
Do you have a treatment plan for your chronic conditions		
No	183	17.9
Yes	842	82.1
How confident are you that you can control and manage your health problems		
Not very confident/Not at all	255	25.0
Very confident/Confident	764	75.0

Table 2. Univariate association between characteristics and Shared Decision Making/Chronic Disease Planning Items by Logistic Regression

Variables	Deciding a treatment according to your will and get you involved		Do you have a treatment plan for your chronic conditions		How confident are you that you can control and manage your health problems	
	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value
Age group						
60-64	ref	-	ref	-	ref	-
65-69	1.393 (0.836, 2.322)	0.203	0.550 (0.280, 1.079)	0.082	1.605 (0.940, 2.739)	0.083
70-74	1.409 (0.845, 2.349)	0.189	0.743 (0.371, 1.489)	0.402	1.509 (0.889, 2.563)	0.128
75-79	0.966 (0.583, 1.602)	0.894	0.656 (0.335, 1.287)	0.220	1.358 (0.813, 2.268)	0.242
80-84	0.874 (0.524, 1.458)	0.606	0.429 (0.226, 0.817)	0.010	1.036 (0.633, 1.696)	0.889
85 and above	1.159 (0.686, 1.958)	0.581	0.536 (0.270, 1.063)	0.074	1.133 (0.668, 1.923)	0.643
Gender						
Male	ref	-	ref	-	ref	-
Female	1.054 (0.802, 1.387)	0.704	0.881 (0.640, 1.213)	0.437	0.746 (0.561, 0.990)	0.042
Education						
No formal education	ref	-	ref	-	ref	-
Primary	0.961 (0.655, 1.412)	0.841	1.255 (0.818, 1.926)	0.299	1.494 (1.029, 2.169)	0.035
Secondary	1.069 (0.728, 1.570)	0.734	1.569 (1.002, 2.459)	0.049	1.996 (1.350, 2.953)	0.001
Tertiary or above	0.895 (0.492, 1.629)	0.717	1.017 (0.539, 1.920)	0.958	2.990 (1.513, 5.909)	0.002
Marital status						
Married/Cohabiting	ref	-	ref	-	ref	-
Widowed/Separated/Divorced/ Single/Not married	1.026 (0.766, 1.372)	0.865	1.111 (0.786, 1.571)	0.552	0.753 (0.560, 1.014)	0.062
Family income						
No income	ref	-	ref	-	ref	-
<\$6,000	1.374 (0.805, 2.344)	0.244	1.072 (0.599, 1.918)	0.815	0.707 (0.414, 1.208)	0.205
\$6,000-\$17,999	1.034 (0.555, 1.924)	0.917	1.541 (0.753, 3.154)	0.237	0.880 (0.472, 1.642)	0.688
\$18,000-\$29,999	1.388 (0.663, 2.906)	0.384	2.140 (0.754, 6.073)	0.153	0.741 (0.343, 1.600)	0.446
≥\$30,000	1.299 (0.600, 2.814)	0.507	1.744 (0.654, 4.652)	0.266	1.473 (0.607, 3.573)	0.392
Social security recipient						
No	ref	-	ref	-	ref	-
Yes	0.818 (0.564, 1.185)	0.287	1.077 (0.697, 1.666)	0.738	0.922 (0.634, 1.340)	0.669
Health insurance						
No	ref	-	ref	-	ref	-
Yes	1.159 (0.713, 1.886)	0.551	1.346 (0.731, 2.477)	0.340	2.330 (1.248, 4.352)	0.008
Number of chronic disease						
3-4	ref	-	ref	-	ref	-
5-6	0.982 (0.708, 1.334)	0.861	0.819 (0.574, 1.168)	0.270	0.899 (0.647, 1.249)	0.527
>6	1.375 (0.903, 2.092)	0.138	1.261 (0.725, 2.193)	0.412	0.550 (0.361, 0.836)	0.005
Regular Doctor/Facility						
No	-	-	ref	-	ref	-
Yes	-	-	2.203 (1.295, 3.746)	0.004	1.107 (0.641, 1.911)	0.715
Type of clinic						
GOPC	ref	-	ref	-	ref	-
SOPC	1.157 (0.761, 1.759)	0.494	0.538 (0.338, 0.857)	0.009	0.616 (0.398, 0.954)	0.030
GDH	0.782 (0.577, 1.060)	0.113	0.554 (0.389, 0.788)	0.001	0.418 (0.306, 0.570)	<0.0001

Table 3. Forward Stepwise Multivariate Model of Characteristics and Shared Decision Making/Chronic Disease Planning Items

Significant Variables	Do you have a treatment plan for your chronic conditions		How confident are you that you can control and manage your health problems		
	OR (95%CI)	P-value	OR (95%CI)	P-value	
Education					
No formal education			ref	-	
Primary			1.358 (0.920, 2.003)	0.123	
Secondary			1.707 (1.134, 2.571)	0.010	
Tertiary or above			2.927 (1.430, 5.992)	0.003	
Number of chronic disease					
3-4			ref	-	
5-6			0.953 (0.676, 1.342)	0.781	
>6			0.569 (0.365, 0.885)	0.012	
Regular Doctor/Facility					
No			ref	-	
Yes	1.980 (1.155, 3.395)	0.013			
Type of clinic					
GOPC			ref	-	
SOPC	0.608 (0.377, 0.979)	0.041	0.605 (0.384, 0.953)	0.030	
GDH	0.585 (0.410, 0.835)	0.003	0.485 (0.351, 0.670)	<0.0001	

The 4-option items are simplified into 2 levels: Always/Often and Sometimes/Rare or Never;

Multivariate models include variables which p<0.10 in the univariate analysis.

The item 'Deciding a treatment according to your will and get you involved' was not shown here due to no significant variables in the univariate analysis.

Table 4. Logistic Regression for Shared Decision Making/Chronic Disease Planning Items and Patient's Confidence

Variables	How confident are you that you can control and manage your health problems				
	Univariate *		Multivariate ^		
	OR (95%CI)	P-value	OR (95%CI)	P-value	
Deciding a treatment according to your will and get you involved					
Sometimes/Rare or Never	ref	-	ref	-	
Always/Often	1.381 (0.994, 1.918)	0.054	1.298 (0.929, 1.812)	0.126	
Do you have a treatment plan for your chronic conditions					
No	ref	-	ref	-	
Yes	2.195 (1.559, 3.092)	<0.0001	2.503 (1.715, 3.653)	<0.0001	

* The relationship between the presence of SDM or TP and patients' confidence to manage illnesses.

^ ORs of SDM and TP were mutually adjusted

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [MMAppendix.docx](#)