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Studies in Health Services

Research Dissemination Reports

醫護服務研究

研究成果報告

Elderly Care
長者護理

Primary Care
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Tobacco Control
控煙

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EDITORIAL

Dissemination reports are concise informative reports of health-related research supported by funds administered by the Food and Health Bureau. In this edition, 10 dissemination reports of recently completed health services research projects related to elderly care, primary care, and tobacco control are presented. In particular, three projects are highlighted owing to their potentially significant findings, impact on health care delivery and practice, and/or contribution to health policy formulation in Hong Kong.

In Hong Kong, nearly all elderly persons who have terminal illnesses receive end-of-life care and die in a hospital setting. As the elderly population continues to increase, there is a need to review this model of end-of-life health care for the elderly. Chu et al[1] conducted a comprehensive study of advance directives and community end-of-life care among 1600 Chinese in 140 homes for the elderly in Hong Kong. The investigators found that 88% of elders preferred to have their own advance directives. Further discussions taking into account practical, legal, and ethical considerations of end-of-life care are warranted.

Effective primary health care is essential for a high-quality, equitable, and cost-effective health care system. In Hong Kong, recent health care reform proposals emphasise the need for an effective primary care system, especially for chronic disease and preventive care. The family doctor model has been put forward as a possible solution. Mercer et al[2] explored the incentives and barriers to adopting this model from the viewpoint of patients with chronic disease. They found that many patients regard family doctors as a luxury and that cost, quality, perceived need, and choice are important barriers to adopting this model. Incentives to adopting a family doctor include financial subsidies and a long-term therapeutic relationship with a doctor. A family doctor system in Hong Kong for chronic disease management may be difficult to implement unless these barriers are addressed.

Exposure to second-hand smoke is harmful to health and causes death, disease, and disability. Comprehensive smoke-free legislation was implemented on 1 January 2007. Chan et al[3] studied whether smoking fathers smoked inside their homes owing to restrictions in non-smoking areas, and whether this led to an increase in second-hand smoke exposure to their spouse and children. Implementation of the smoke-free legislation showed no evidence of displacement of smoking from restricted smoking venues to the home, and there was actually a decline in the prevalence of fathers smoking at home and around children. Hence, second-hand smoke exposure at home was reduced. In particular, mothers responded positively to the legislation as reflected by a substantial increase in their actions to protect their children from second-hand smoke exposure and a moderate increase in advice to smoking fathers to quit. These results demonstrated the effectiveness of comprehensive smoke-free legislation in protecting non-smokers, particularly children, from second-hand smoke exposure. Other Asian countries with a high prevalence of smoking should consider adopting such a policy to improve health and save lives.

We hope you will enjoy this selection of research dissemination reports. Electronic copies can be downloaded from the Research Fund Secretariat website (**http://www.fhb.gov.hk/grants**). Researchers interested in the funds administered by the Food and Health Bureau may visit the website for detailed information about application procedures.

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References

1. Chu LW, McGhee SM, Luk JK, et al. Advance directive and preference of old age home residents for community model of end-of-life care in Hong Kong. Hong Kong Med J 2011;17(Suppl 3):13-5.
2. Mercer SW, Griffiths SM, Lam CL, et al. Incentives and barriers to adopting the family doctor model in Hong Kong: an in-depth qualitative study of the views, knowledge, and attitudes of patients. Hong Kong Med J 2011;17(Suppl 3):25-7.
3. Chan SS, Leung DY, Mak YW, Leung GM, Leung S, Lam TH. New anti-smoking legislation on second-hand smoke exposure of children in homes. Hong Kong Med J 2011;17(Suppl 3):38-42.

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Emergency department intervention for high-risk elders: identification strategy and randomised controlled trial to reduce hospitalisation and institutionalisation

Key Messages

1. A six-item self-reported screening questionnaire — Hong Kong identification of seniors at risk (HK-ISAR) — was developed for elders attending the emergency department (ED) deemed to be at increased risk of adverse health outcomes.
2. The HK-ISAR is the first validated screening tool for use in an ED setting in Hong Kong. It addressed health outcomes such as activities of daily living, dependence, history of hospitalisation, and polypharmacy.
3. Among the six questions in the HK-ISAR, attendance at a hospital ED during the past month was the most important predictor of poor subsequent health outcome.
4. The sensitivity and specificity of the HK-ISAR for predicting a poor health outcome was 68.3% and 49.4%, respectively, with an area under the receiver operating characteristic curve of 0.621.
5. A randomised controlled trial of a community-based structured interventional programme found no difference in the 6-month outcomes of patients screened positive (receiving the intervention) or negative (receiving usual care) according to the HK-ISAR.

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Introduction

Ageing populations are a problem of worldwide concern. In 2003, 12.5% of the population in Hong Kong was aged over 65 years. It is estimated that by 2033 the proportion of such elderly will increase to 25%.[1] An ageing population has a huge impact on the health care system, including emergency department (ED) service utilisation. Moreover, EDs are a common point of contact for geriatric patients. Elderly ED patients are at increased risk of hospital admissions, intensive-care unit admission, and return ED visits, compared to younger cohorts.[2,3] The ED plays an important role in identification of higher-risk elders.

Identification of seniors at risk (ISAR) was a six-question screening tool (derived from the original 27-item ISAR questionnaire) developed and validated in a Canadian population for ED administration for elderly patients. It predicts adverse health outcomes (death, long-term care admission, or functional decline), acute care hospital utilisation, and identifies patients with high utilisation of ED services during the 6-month period after the index ED visit.[4,5] Using a cut-off score of two or more of the six questions, the ISAR tool predicted adverse health outcomes and high rates of hospital utilisation with a sensitivity of 73% and a specificity of 51%; the area under the receiver operating characteristic (ROC) curve was 0.68.[4] Similar studies have not been performed in Hong Kong, despite the huge geriatric population expected in the future.

This study aimed to (1) derive a Hong Kong (HK) version of the ISAR, (2) validate it in the local population, (3) compare the performance of HK-ISAR with the original ISAR, and (4) use the validated HK-ISAR to identify high-risk elderly patients and study the effects of a structured ED intervention and targeted referral process on hospitalisation and institutionalisation over the next 6 months.

Methods

This multicentre study was conducted from July 2007 to October 2009 in two phases in three EDs in Hong Kong: the Prince of Wales Hospital, the Pamela Youde Nethersole Eastern Hospital, and the United Christian Hospital.

Phase 1

This was conducted between July 2007 and July 2008. Patients aged ≥65 years and who were about to be discharged from the ED were recruited. The original 27-item ISAR was completed. Patients were followed up by telephone interview 6 months after the ED visit. The composite primary outcome measure was to identify any of the following adverse outcomes: (1) institutionalisation, defined as admission to a nursing home or chronic/acute care hospital for ≥3 months, (2) admission to an acute care general hospital during the first month after the index ED visit, (3) early return visit or frequent ED visits (one return visit within one month or three or more visits during the 6 months following the index ED visit), and (4) death.

Multiple logistic regression analysis was performed on the 27 ISAR screening questions to identify the six most significant variables with the highest adjusted odds ratios (OR) to derive the HK-ISAR. This was then validated.

Phase 2

This was conducted between September 2008 and October 2009. High-risk elderly patients (identified using the validated HK-ISAR) who were to be discharged from the ED were recruited into a prospective randomised controlled clinical trial. Outcomes were compared in patients receiving an ED-based intervention (which specifically targeted and maximised timely referrals to community-based geriatric support and medical and social services) and those who received routine ED care. The ED-based intervention included a brief standardised assessment of functional status, mental state, and relevant social factors (using the Barthel index, short Geriatric Depression Scale, and Mini Mental State Examination). The focus was on identifying new and unresolved old problems that required medical intervention, a new or increased level of home care or community-based service. Referrals to a range of clinics and agencies were arranged according to the individual's needs and standardised cut-off points for the study instruments.

Results

Phase 1

Of 2130 patients screened, 1820 were eligible and successfully followed up (Table 1). The eligible patients were randomised into derivation and validation groups. The derivation group comprised 915 patients (50% male) with a mean age of 74.5 years (standard deviation [SD], 6.23 years). After entering all patients' responses into the model, 32 had not answered the questions clearly and were excluded. Six questions highly predictive of poor outcome were identified from the 27 ISAR items. They were (1) Before the illness or injury that brought you to the emergency department, did you have any health problems that required you to limit your activities? (OR, 1.604; 95% confidence interval [CI], 1.171-2.198); (2) Have you visited a hospital emergency department during the past month? (OR, 2.458; 95% CI 1.725-3.503); (3) Have you been hospitalised for one or more nights during the past 6 months? (OR, 2.242; 95% CI, 1.568-3.204); (4) Do you take more than two different medications every day? (OR, 1.534; 95% CI, 1.126-2.090); (5) In case of need, can you count on someone close to you? (OR, 1.711; 95% CI, 1.078-2.716); and (6) Do you usually have enough income to meet your daily needs? (OR, 1.446; 95% CI, 1.047-1.996)

Table 1. Baseline characteristics of recruited patients

Characteristic	No. (%) of patients	
No. of male:female	910:910	
Age (years)		
65-74	975 (53.6))	
75-84	727 (39.9)	
≥85	118 (6.5)	
No. of co-morbidities		
0	297 (16.3	
1	418 (23.0)	
2	409 (22.5)	
3	329 (18.1)	
>4	367 (20.2)	
Median Barthel index score	11.5	
Median Geriatric Depression Scale score	7.5	
Short version of identification of seniors at risk (C-ISAR) score		
0	230 (12.6)	
1	520 (28.6)	
2	564 (31.0)	
3	312 (17.1)	
4	136 (7.5)	
5	50 (2.7)	
6	8 (0.4)	
Adverse outcomes	Present	Absent
Institutionalisation	11 (0.8)	1809 (99.2)
Admission to acute care general hospital	506 (27.8)	1314 (72.2)
Early or frequent emergency department visit	392 (21.5)	1428 (78.5)
Death	55 (3.0)	1765 (97)
Primary composite outcome	698 (38.4)	1120 (61.6)
Canadian ISAR score of those with adverse outcomes		
0	62 (8.9)	
1	165 (23.6)	
2	229 (32.8)	
3	138 (19.8)	
4	71 (10.2)	
5	28 (4.0)	
6	5 (0.7)	

Using the cut-off of two or more out of 6 possible positive answers, the sensitivity and specificity of HK-ISAR for predicting poor outcomes were 68.3% and 49.4%, respectively, with an area under the ROC curve of 0.621. The validation group comprised 905 patients, of which 25 were excluded because of missing data. This yielded a sensitivity and specificity of HK-ISAR for predicting poor outcome of 76.1% and 33.3%, respectively, with an area under the ROC curve of 0.592.

The Hong Kong version of ISAR comprised six questions that differed slightly from the short version of the original ISAR (C-ISAR). Evaluation of the ability of C-ISAR to identify high-risk patients in the Hong Kong Chinese population was performed.

Of the 1820 patients recruited, 698 (38.3%) had two or more positive responses to the C-ISAR. The C-ISAR correctly identified 471 (67.5%) of the 698 positive cases, and 523 (46.6%) of the 1122 negative cases (Fisher's exact test, P<0.0001), yielding a correct classification rate of 994/1820 (54.6%). The HK-ISAR correctly identified 535 (77%) of the 698 positive cases, and 366 (33%) of the 1121 negative cases (Fisher's exact test, P<0.0001), yielding a correct classification rate of 910/1820 (49.5%). In the Hong Kong population, the HK-ISAR identified 9% more seniors at risk than the C-ISAR.

Phase 2

At their index visit, 1279 patients were randomised into the control group (333 males and 309 females; mean age, 75 [SD, 6.8] years) and the intervention group (277 males and 360 females; mean age 76.3 [SD, 6.8] years) [Table 2]. In all, 224 controls and 255 patients in the intervention group had a positive composite outcome (P=0.299). There was no significant difference between the groups for institutionalisation (7 [1.1%] vs 6 [0.9%], P=0.791), admission to an acute care general hospital (174 [27.1%] vs 198 [31.1%], P=0.117), early return or frequent ED visits (120 [18.7%] vs 124 [19.5%], P=0.724), or death (12 vs 12, P=0.985). Use of the HK-ISAR and structured interventional programme made no difference to the 6-month outcomes.

Table 2. Baseline characteristics of patients in randomised controlled trial

Characteristic	No. (%) of patients		P value
	Control	Intervention	
No. of male:female	333:309	277:360	0.003
Age (years)			0.005
65-74	326 (50.8)	266 (41.8)	
75-84	251 (39.1)	298 (46.8)	
≥85	65 (10.1)	73 (11.5)	
No. of co-morbidities at recruitment			0.0001
0	158 (24.6)	85 (13.3)	
1	170 (26.5)	155 (24.3)	
2	134 (20.9)	180 (28.3)	
3	100 (15.6)	115 (18.1)	
>3	80 (12.5)	102 (16.0)	
No. of co-morbidities at follow-up			0.0001
0	133 (20.7)	64 (10.0)	
1	150 (23.4)	122 (19.2)	
2	125 (19.5)	182 (28.6)	
3	124 (19.3)	114 (17.9)	
>3	100 (15.6)	144 (22.6)	
Median Barthel Index score			
At recruitment	18.54	18.46	0.149
At follow-up	18.89	18.85	0.121
Median Geriatric Depression Scale score			
At recruitment	5.30	5.06	0.178
At follow-up	6.48	4.45	0.0001
Hong Kong identification of seniors at risk (HK-ISAR) score at recruitment			0.0001
0	-	-	
1	-	-	
2	213 (33.2)	309 (48.5)	
3	251 (39.1)	194 (30.5)	
4	131 (20.4)	91 (14.3)	
5	41 (6.4)	38(6.0)	
6	6 (0.9)	5 (0.8)	
HK-ISAR score at follow-up			0.0001
0	7 (1.1)	3 (0.5)	
1	43 (6.7)	63 (9.9)	
2	144 (22.4)	181 (28.4)	
3	226 (35.2)	159 (25.0)	
4	82 (12.8)	89 (14.0)	
5	29 (4.5)	17 (2.7)	
6	-	5 (0.8)	

Discussion

This study resulted in the development of a six-item self-reported screening questionnaire (HK-ISAR) for elders attending the ED to identify those at increased risk of adverse health outcomes. It is the first validated screening tool for use in an ED setting in Hong Kong. The HK-ISAR is a brief, general screening tool, suitable for an ED setting to enable clinical resources for the care of elders to be rapidly deployed and focused on patients with unmet care needs currently or in the near future. The items included in the HK-ISAR are well-known risk factors for adverse health outcomes among elders. They include activities of daily living, dependence, history of hospitalisation, and polypharmacy. The HK-ISAR has similar sensitivity and specificity to the original Canadian short version (C-ISAR) but is more applicable to the local population; it identified 9% more seniors at risk. Among the six questions in the HK-ISAR, attendance at a hospital ED during the past month is the most important predictor of subsequent poor health outcome. The C-ISAR does not include this item as one of the screening questions. This indicates a difference in the Hong Kong and Canadian geriatric populations in terms of utilisation of ED services. The ED is an important contact point for the high-risk elderly with high utilisation of health care resources, for whom effective interventions are necessary. The intervention was community based, with referrals to a range of clinics and agencies according to individual patient needs and standardised cut-off points used for the study instruments. All the referrals were arranged within 6 months of the ED visits but made no difference to the 6-month outcomes. A main reason for failure of intervention was lack of a coordinated effort among the referred parties. Nevertheless, the HK-ISAR is a useful first step to be implemented in the ED to trigger subsequent interventions in high-risk elders. Further study is necessary to explore other strategies to reduce the occurrence of adverse health outcomes.

Acknowledgements

References

1. Census and Statistics Development, Hong Kong Special Administration Region. Available at: http://www.censtatd.gov.hk. Accessed 12 December 2006.
2. Singal BM, Hedges JR, Rousseau EW, et al. Geriatric patient emergency visits. Part I: comparison of visits by geriatric and younger patients. Ann Emerg Med 1992;21:802-7.
3. Strange GR, Chen EH. Use of emergency departments by elder patients: a five-year follow-up study. Acad Emerg Med 1998;5:1157-62.
4. McCusker J, Bellavance F, Cardin S, Belzile E, Verdon J. Prediction of hospital utilization among elderly patients during the 6 months after an emergency department visit. Ann Emerg Med 2000;36:438-45.
5. McCusker J, Bellavance F, Cardin S, Trepanier S, Verdon J, Ardman O. Detection of older people at increased risk of adverse health outcomes after an emergency visit: the ISAR screening tool. J Am Geriatr Soc 1999;47:1229-37

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Key Messages

1. Psychological factors play the most significant role in contributing to long-term care choices. Older people's positive attitude towards community care services (CCS) and strong structural solidarity of the family are two key factors.
2. Stronger family structural solidarity is associated with the use of CCS, whereas family structural solidarity tends to be confined to nuclear families rather than intergenerational families, which implies that spouse and children caregivers have different needs. Caregiver support services targeting the elderly couple's families and children as caregivers should be differentiated and more specifically targeted.
3. In general, CCS serve frail elders with acute rehabilitation needs, who are more likely to be cared for by family members and/or domestic helpers, whereas residential care services serve frail elders with a higher level of cognitive impairment.

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STUDIES IN HEALTH SERVICES

Factors affecting long-term care use in Hong Kong

Introduction

The growing elderly population in Hong Kong has increased the demand for long-term care (LTC) services and supplies. Strategies have been developed to meet these challenges by balancing residential care and community care for the frail elderly, particularly to community care services (CCS) that help elderly people to live independently in the community. This not only helps the elderly to achieve ageing in place, but also improves cost-effectiveness in allocating financial resources.[1] To achieve a sustainable LTC policy in Hong Kong, the strategies must respond to factors affecting individual choices among various community or residential LTC services, such as changing demography, social norms in terms of elderly care, gender and cultural traditions, and the current development of the welfare regime.

This study was based on the revised expanded model of Andersen's Health Service Utilisation.[2] The original model proposed that people who choose to utilise certain health care services are affected by three factors: (1) predisposing factors (eg demographic variables), (2) enabling factors (eg financial concerns, availability of a caregiver, and coping strategies of both the caregiver and care recipient), and (3) needs factors (health status, dependency level, caregiver's burden, and care-giving intensity).[2] This model is widely adopted to explore factors that affect LTC services and their utilisation by the Hong Kong elderly. In addition, psychological factors, such as attitude towards LTC arrangements, knowledge about such services, utilisation of such services, family solidarity (eg consensus solidarity, structural solidarity, and affectional solidarity), and a sense of control (eg self-efficacy), should also be included.[3]

This study aimed to investigate the characteristics of elderly people with LTC needs who opt for CCS (eg integrated home care services, enhanced home and community care services) or residential care services (RCS) [eg care and attention homes for the elderly, and nursing homes), and to focus on the four factors.

Methods

This study was conducted from June 2007 to February 2009 and adopted a multi-stage, cross-sectional survey design, supplemented by qualitative in-depth interviews. The study was approved by the Survey and Behavioural Research Ethics Committee of The Chinese University of Hong Kong.

In the questionnaire survey, a cluster sampling method was used. A total of 59 agencies agreed to participate, and 435 dyads were interviewed by trained interviewers using standardised questionnaires. For older people who had difficulties communicating, proxy interviews were conducted with their family members. Among the 435 dyads, 67% and 33% of the elderly were about to receive RCS and CCS, respectively. Sociodemographics of the elderly and the caregivers are listed in Tables 1 and 2. Eight of the dyads underwent an in-depth interview based on a semi-structured questionnaire and purposeful sampling.

The questionnaire consisted of questions related to predisposing factors, needs factors, enabling factors, psychological factors, and LTC options. All were measured using validated Chinese version scales. Four of the research team members independently translated those scales that lacked a Chinese version

(eg affectional solidarity scale, and filial piety scale), and a consensus on the translation was reached. A person fluent in both Chinese and English, but unfamiliar with the scales, then back-translated them. Satisfactory reliabilities for measurement instruments were noted. The dependent variable—whether the respondent opted for RCS or CCS—was recorded at the time of the interview. Respondents were asked to report all the independent variables retrospectively.

Results

Hierarchical logistic regression was used to study the odds for respondents who opted for CCS. Only independent factors with P values of <0.1 in bivariate group comparisons were entered in the logistic regression. Four models were tested: model 1 entered predisposing factors only; model 2 entered predisposing and needs factors; model 3 entered predisposing, needs, and enabling factors; and model 4 entered predisposing, needs, enabling, and psychological factors (Table 3).

In model 1, age and marital status were significant factors. The CCS respondents were more likely to be younger and married. In model 2, CCS respondents were more likely to have less cognitive impairment, a shorter duration of disability in instrumental activities of daily living (IADL), and a higher level of caregiving burden. In model 3, the CCS respondents were more likely to have a lower level of social support, receive care from domestic helpers, be cared for by a spouse, have perceived financial implications after choosing LTC services, and receive an old age allowance or disability allowance. In model 4, CCS respondents were more likely to have a higher level of cognitive impairment, a lower level of social support, more positive attitude towards CCS, prefer CCS more and RCS less, have a caregiver living in the same household, and have an economically inactive caregiver.

More CCS than RCS respondents (26% vs 18%) expected a 60% to 100% probability of changing LTC arrangements in 5 years' time, whereas less CCS than RCS respondents (38% vs 58%) expected no probability of changing LTC arrangements.

Findings based on in-depth interviews were consistent with those based on the questionnaire survey. Needs factors, enabling factors, and psychological factors played significant roles in LTC utilisation.

Table 1. Sociodemographics of the elderly (n=435)

Variable	No. (%) of the elderly
Gender	
Male	160 (37)
Female	275 (63)
Mean±SD age (years)	81.06±7.52
Respondent type	
Elderly	159 (37)
Proxy	276 (63)
Education level	
No education	194 (45)
Primary school	161 (37)
Junior secondary or above	79 (18)
Religion	
No religion	134 (31)
Chinese traditional belief	155 (36)
Formal religion	146 (33)
Employment	
Full/Part time	4 (1)
Retired	340 (78)
Homemaker	91 (21)
Marital status	
Currently not married	242 (56)
Currently married	193 (44)
Residential care services	
Care and attention homes for the elderly	260 (60)
Nursing homes	30 (7)
Community care services	
Enhanced home and community care services	97 (22)
Integrated home care services	48 (11)
Mean±SD duration of service received (years)	1.30±0.57

Table 2. Sociodemographics of the caregivers (n=435)

Variable	No. (%) of caregivers
Gender	
Male	142 (33)
Female	293 (67)
Age (years)	
≤40	41 (9)
41-50	126 (29)
51-60	134 (31)
≥61	134 (31)
Relationship with the care recipient	
Spouses	100 (23)
Children and in-laws	279 (64)
Grandchildren	12 (3)
Other relatives	26 (6)
Friends	5 (1)
Others*	13 (3)
Education level	
Below primary	32 (7)
Primary	118 (27)
F1-F3	85 (20)
F4-F7/TI	119 (27)
Tertiary (non-degree/degree)	81 (19)
Religion	
No religion	184 (42)
Chinese traditional belief	91 (21)
Formal religion	160 (37)
Employment	
Full/part time	220 (51)
Retired	117 (27)
Homemaker	78 (18)
Others†	20 (4)
Marital status	
Currently not married	103 (24)
Currently married	332 (76)
Mean±SD duration of care provided (years)	5.51±6.62

* People from the same hometown or employees

† Unemployed, students, or resigned from a job to take on the caregiver role

Table 3. Regression analysis on community care service (CCS) respondents

Variable	Odds ratio			
	Model 1	Model 2	Model 3	Model 4
Predisposing factors				
Age	0.967*	0.988	0.996	0.959
Gender of the elderly (Female=1)	1.098	0.671	0.431*	0.720
Marital status of the elderly (Married=1)	0.341‡	0.417†	0.711	0.456
Needs factors				
Activities of daily living (ADL)	-	0.983	0.995	1.000
Instrumental ADL	-	1.092	1.058	1.040
Cognitive impairment	-	0.786‡	0.781‡	0.685‡
Duration of disability in IADL (months)	-	0.992†	0.992*	0.990
Hospitalisation in the previous 6 months (No=1)				
1 week	-	2.669	3.173	2.608
1 month	-	1.494	1.458	1.018
≥2 months	-	1.983	2.088	1.173
Bed-bound in the previous 6 months (No=1)				
1 week	-	0.236	0.187	0.673
1 month	-	0.514	0.518	0.807
≥2 months	-	1.414	1.227	1.156
Caregiver burden	-	1.017*	1.015	1.012
Enabling factors				
Social support network	-	-	0.947‡	0.961*
Living alone	-	-	0.943	3.297
Receiving care from a domestic helper	-	-	3.250†	2.372
Care arrangement before receiving CCS or residential care services (RCS) [self care=1]				
Spouse care	-	-	2.229†	0.100
Children care	-	-	0.502	0.153
Others	-	-	0.456	0.223
No. of financial sources	-	-	1.464	0.964
Perceived financial implications	-	-	0.518	0.452
Source of financial support				
Comprehensive Social Security Assistance	-	-	2.053	1.464
Old age allowance or disability allowance	-	-	3.244*	4.964†
Self-rated health of caregivers	-	-	1.103	1.373
Psychological factors				
Positive attitude towards CCS	-	-	-	1.206†
Preference of long-term care arrangements				
Domestic helper	-	-	-	1.019
CCS	-	-	-	1.505*
RCS	-	-	-	0.355‡
Knowledge about long-term care services	-	-	-	0.982
Use of CCS	-	-	-	0.536
Family structural solidarity: geographic proximity				
Same household (different household=1)	-	-	-	7.036‡
Family structural solidarity: opportunity structure				
Economically active caregiver (economically inactive=1)	-	-	-	0.372*
R^2	0.0879	0.2469	0.3497	0.5209

* $P<0.05$
† $P<0.01$
‡ $P<0.001$

Discussion

Model 4 explained 52% of the variance, and thus all the included factors explained more than half of the phenomenon. Psychological factors contributed the largest proportion (17%) of the explanation, in which a positive attitude towards CCS and family structural solidarity significantly contributed to choosing LTC.

The positive attitude towards the CCS led to a preference for being taken care of by CCS and not by the RCS. From a rational behavioural planning perspective, an individual's attitude towards behaviour reflected his/her personal risk profile, which included health status, availability of sources

of support, and availability of domestic helpers at the time of the interview.

Family structural solidarity indicated that the caregiver and the care receiver lived in the same household, and that the caregiver was economically inactive, which was associated with opting to CCS. Both factors could enhance the availability of support from caregivers. In a Hong Kong study, how far apart elderly parents and adult children lived was associated with the feasibility of caregiving to elderly parents.[4]

No significant association was shown between consensual solidarity (ie inclination to family tradition

and filial piety) and utilisation of CCS. This suggests that attitude towards family tradition and filial piety is somewhat de-linked with attitude towards concrete behaviours (eg LTC arrangements). Older people in Hong Kong still agree with virtues associated with cultural traditions, such as intergenerational exchange and filial piety. However, they also consider reality for their LTC arrangements. Hong Kong people tend to link family tradition and filial piety with providing financial support to older parents, but delink family tradition with behaviours that would demand that children sacrifice their own life choices.[5]

Regarding the association between knowledge and utilisation of LTC services, RCS respondents had a better knowledge of LTC services. In addition, more RCS than CCS respondents have been using LTC services, as LTC knowledge is closely linked to utilisation. Only very limited knowledge was obtained by non-users. This reflects the service gap between community support services for elders without LTC needs and LTC services.

With regard to enabling factors, there were two observations. First, the relationship between the caregiver and the care recipient is very important. The CCS respondents were more likely to be supported by spouses and/or domestic helpers than children. When psychological and enabling factors were considered together, CCS respondents were more likely to be in 'older couple families' — a spouse who was economically inactive and lived in the same household. Among older couples, partners depend on each other and they are good companions, but seem to have limited social support from others. Lack of social support among the older couples' families puts them at a great disadvantage to cope with life events such as illness, accidents, etc. Children seemed not to give as much support as the spouses of the elderly in keeping such frail older parents in the community. Among 35 CCS respondents who had domestic helpers, only 11% were taken care of by a spouse. Children caregivers seem to depend on multiple sources of caregiving: from formal to informal, from paid to unpaid. This can be explained by declining of intergenerational bonds and a transition to affection-oriented choices among adult Chinese children.[4,5] This also reflected the ability of children to allocate extra resources to provide personal care to frail parents. These changing attitudes and the potential resources needed by adult children to take care of their frail parents deserve attention.

The second observation was that CCS respondents were more likely to have more sources of financial support and fewer perceived financial implications in deciding LTC arrangements. They were also less likely to depend on Comprehensive Social Security Assistance Scheme, and were more likely to receive old age allowance or disability allowance. The existing LTC policy in Hong Kong may influence personal and/or family decisions with regard to LTC arrangements. Those who have comparatively more financial support are more likely to stay in the community.

Those who have comparatively inadequate financial support are more likely to move to residential facilities. The residential care facilities in Hong Kong are subsidised by the government. In the 2008-09 welfare budget, around HK$6000, HK$8000 and HK$12 000 per head per month were subsidised to private homes participating in the Enhanced Bought Place Scheme, Care and Attention Homes for the Elderly, and nursing home residences, respectively. The subsidy led to low shared responsibility in terms of co-payment by the elders and their families. By no means can this universalist approach to RCS fulfill the care needs of frail elders. However, one of the unintended consequences could be economic-driven institutionalisation. For the long run, policies for supporting CCS should be revamped by enhancing incentives for frail elders and their family members.

Based on group comparison analyses of needs factors, RCS respondents were more likely to have higher levels of activities of daily living (ADL) difficulties and cognitive impairment, whereas CCS respondents were more likely to have higher levels of IADL disability, longer hospital stay, and longer duration being bed-bound in the previous 6 months. This suggested that CCS needs were more likely to be triggered by sudden health deterioration or hospitalisation. Not surprisingly, the caregiving burden of CCS respondents was significantly higher than that of RCS respondents, owing to the influence of LTC policies on differential LTC utilisation in Hong Kong. Before a frail older person can be moved to residential facilities, he has to wait for about 32 months for a subvented home or contract home, and about 7 months for a private home (participating by way of the Enhanced Bought Place Scheme). Consequently, immediate placement to RCS is not feasible. They prepare to meet the care needs of the frail older person by family arrangements, moving the elder person to a private home as a temporary arrangement, or receiving CCS. Hence, when older people experience a sudden change of functional ability (such as after a stroke or peripheral vascular disease), they apply for LTC facilities and are usually offered CCS. In other words, CCS teams provide services to those who have urgent and acute rehabilitation needs and whose caregivers experience a higher level of caregiver burden.

Regarding the expected possibility of changing LTC arrangements, the metaphor for CCS and RCS is that of a 'fortress besieged'. Those outside of the fortress expect to move in, while those inside expect to move out. Moreover, it appears that CCS respondents consider their current status of receiving CCS as some sort of temporary measure, and may eventually need RCS (particularly when the elders' condition deteriorates to the level that the caregivers can no longer care for them). Further study is suggested to examine this phenomenon.

Limitations
First, error in recall of information is a potential limitation. To safeguard the validity of the study, intensive training

was provided to the interviewers, and the importance of asking respondents to recall their experiences was emphasised (the time when they made up their mind to choose a particular service). Second, the recruitment of the respondents relied on referrals by frontline workers through multi-stage sampling. The success rate was 56% at the service unit level, and thus generalisation of the results should be performed cautiously. Third, data were analysed in multiple stages, owing to limited sample sizes. Some of the potential significant variables may have been excluded. Repeat longitudinal studies are therefore recommended.

Acknowledgements

References

1. Health and Welfare Bureau. Rethinking policy, reinventing ageing: paper for submission to the Second World Assembly on Ageing. Hong Kong: Health and Welfare Bureau; 2002.
2. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav 1995;36:1-10.
3. Bradley EH, McGraw SA, Curry L, et al. Expanding the Andersen model: the role of psychological factors in long-term care use. Health Serv Res 2002;37:1221-42.
4. Lee WK. Living arrangements and informal support for the elderly: alteration to intergenerational relationships in Hong Kong. J Intergener Relatsh 2004;2:27-49.
5. Chow NW. Asia value and aged care. Geriatr Gerontol Int 2004;4:S21-25.

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Advance directive and preference of old age home residents for community model of end-of-life care in Hong Kong

Key Messages

1. Among 1600 cognitively normal elderly persons living in old age homes in Hong Kong, 88% preferred palliative treatments that could keep them comfortable and free from pain, and 88% agreed to have advance directives. Factors that favour having advance directives among Chinese elders included the practice of asking for relatives' advice in medical decisions, wishing to be informed of their terminal illness diagnoses, absence of a stroke history, and having no problems in self-care.

2. Approximately one third of old age home residents would accept dying in place. Older age, religion (Catholic or non-believer of traditional Chinese religion), having a better mood score (Geriatric Depression Scale), having no siblings, not receiving an old age allowance, and being a resident of subvented old age homes were independent predictors of preference for community end-of-life care and dying in place.

3. End-of-life care in the hospital was expensive. The total bed-day costs for the 2084 deaths in the two clusters for the index death episode, cumulative 3, 6, and 12 months of hospitalisation were HK$65 474 591, HK$82 543 510, HK$100 170 949, and HK$108 960 348, respectively. The annual cost-savings in hospitalisation bed-days would be HK$177 million when about 30% of elders accepted dying in their old age homes.

4. Elderly residents were willing to pay an additional fee for community end-of-life care services in old age homes. Both the services of the doctor and old age home staff were important attributes. Hence, elderly people were prepared to use more community end-of-life care if better staff and doctor services were provided.

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Introduction

In Hong Kong, nearly all elderly persons who have terminal illnesses receive end-of-life care and die in a hospital setting, unlike in most other countries.[1] With ageing of the population, there is a need to review this hospital-inclined model of health care for the elderly. It is important to assess whether the government needs to develop community end-of-life care, particularly in the old age home setting. There are no local data to evaluate the preferences of old age home residents for the community model of end-of-life care. Health and social care professionals also have no means to know end-of-life care preferences of our Hong Kong elders. In this regard, the role of advance directive is very relevant.

An advance directive is a statement, usually in writing, in which mentally competent individuals indicate their health care preference in the future when they are no longer competent.[2] Advance directive has been promoted in Hong Kong.[2] Racial differences exist in end-of-life decisions.[3] There is a paucity of local data on the preferences for advance directive, end-of-life care decisions, and community end-of-life care among Chinese elderly people. In Hong Kong, there was only one study on advance directive, but only a small number of elderly subjects were included.[4] There are also no local data on the preferences for community end-of-life care among Chinese old age home residents.

This study aimed (1) to describe the knowledge and preferences of Hong Kong Chinese elders regarding advance directives and end-of-life care decisions, (2) to investigate the predictors of preference for advance directive and community end-of-life care, (3) to investigate the proportion of old age home residents who would accept community end-of-life care in the old age home, rather than the hospital, and the corresponding trade-off between attributes of care, and (4) to evaluate the potential cost-savings on the bed-day costs of hospital end-of-life care if community end-of-life care was available.

Methods

This study was conducted from July 2007 to May 2009. A total of 1600 cognitively normal subjects were recruited by face-to-face interviews from 140 old age homes in the Hong Kong West and New Territories East Clusters.

Questionnaires on preferences of advance directives, end-of-life care decisions, and community end-of-life care models were used. Hypothetical end-stage disease scenarios were used to explore the participants' preferences for end-of-life care. Using a conjoint analysis and discrete choice experiment approach,[5] specific questions explored acceptable trade-offs between three attributes: availability of doctors on site, attitude of care staff, and additional cost of care per month. The 2006 death case series in two clusters were retrieved for the calculation of annual bed-day costs of hospital end-of-life care and the potential cost-savings if alternative community end-of-life care was available.

Outcome measures included the proportion of elderly persons who preferred community end-of-life care in old age homes, the knowledge and preferences

on advance directives and end-of-life care decisions, the predictors of these preferences, their willingness-to-pay for additional fees for such care, and the potential cost-savings by avoiding hospital end-of-life care.

Results

Preference for advance directive and community end-of-life care

The mean subject age was 82 years; 66% were females; 94% preferred to be informed of the diagnosis if they had terminal diseases; 88% preferred treatments that could keep them comfortable; 88% agreed that it would be good to have advance directives; and 60% would ask relatives for advice in making medical decisions. Factors that favoured having advance directives in our Chinese elders included the practice of asking for relatives' advice in making medical decisions, wishing to be informed of their terminal illness diagnoses, absence of a stroke history, and having no problems in self-care.[6]

Approximately one third of old age home residents would accept dying in place. Older age, religion (Catholic or non-believer of traditional Chinese religion), having a better mood (Geriatric Depression Scale) score, having no siblings, not receiving any old age allowance, and being a resident of subvented old age homes were independent predictors of preference for community end-of-life care.[6]

Bed-day costs for hospital end-of-life care

The annual number of deaths among old age home residents in the two clusters was 2084 in 2006. The total bed-day costs for these 2084 deaths in the two clusters for the index death episode, cumulative 3, 6, and 12 months of hospitalisation were HK$65 474 591, HK$82 543 510, HK$100 170 949, and HK$108 960 348, respectively. About 30% of these costs could be saved, as 30% of the elders accepted dying in their present old age homes. Projected for the whole of Hong Kong, the annual cost savings in hospitalisation bed-days would be HK$177 million. The savings can be used to create additional 62 149 general medical bed-days for other hospital users (at an average bed-day cost of HK$2847).

Marginal willingness-to-pay for community end-of-life care

Conjoint analyses and discrete choice experiments showed the marginal willingness-to-pay for different levels of end-of-life care services in old age homes. A good home staff attitude was the most important attribute for community end-of-life care. Elders were willing to pay an extra cost for more coverage of doctors' time and for a better attitude from staff in the old age home. Elders who lived in subvented old age homes and not receiving any Comprehensive Social Security Allowance were more willing to pay additional fees for community end-of-life care.

Discussion

Advance directive

This was the first large-scale study on the preference for advance directives, end-of-life care decisions, and community end-of-life care among cognitively normal old age home residents in Hong Kong. Regarding the acceptability of advance directive, 88% of elders preferred to have their own advance directives. Those who would ask for relatives' advice in making medical decisions and those wishing to be informed of their terminal illness diagnoses were more likely to prefer having advance directives. In the present study, 94% of the elders wanted to know their diagnoses and 60% would ask for relatives' advice. In the only advance directive study in Hong Kong,[4] 76% of Chinese subjects were in favour of having advance directives, which was less than the 88% noted in our study.[6] Nonetheless, there were key differences in both studies in terms of subject age and place of accommodation. In the former study, the subjects were from heterogeneous groups including nurses, layman adults and elderly persons living in their own homes and old age homes, and only 331 were elderly (aged ≥65 years).[4]

In view of the high rates of acceptance for advance directives among Hong Kong subjects,[4,6] further implementation is recommended. As there is no law regarding advance directive in Hong Kong,[1] public education programmes and promotion of the concept among elderly people should be initiated. There is also a need to reconsider legislation on advance directives to hasten implementation. Many countries have implemented laws on advance directives.[2]

Community end-of-life care

One third of elders would accept community end-of-life care and dying in their old age homes. Factors including older age, religion (Catholic or non-believer of traditional Chinese religion), having a better mood score (according to Geriatric Depression Scale), having no siblings, not receiving any old age allowance, and being a resident in subvented old age homes increased acceptance of community end-of-life care models. These factors should be considered when formulating criteria for potential participants in future community end-of-life care programmes. Appropriate health policy to promote the implementation of community end-of-life care among elderly people living in subvented old age homes are needed in Hong Kong. The use of community end-of-life care would increase if better care staff and doctors on call at night services become available. Alternative community end-of-life care programmes may lead to a large reduction in hospital end-of-life care bed-day costs. Elders can be charged a small fee not exceeding HK$400 per month. The government should provide the main funding for these programmes.

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References

1. Tse DM, Chan KS, Lam WM, Leu K, Lam PT. The impact of palliative care on cancer deaths in Hong Kong: a retrospective study of 494 cancer deaths. Palliat Med 2007;21:425-33.

2. The Law Reform Commission of Hong Kong HKSAR Government. Substitute decision-making and advance directives in relation to medical treatment (HKLRC Report). Available from http://www.hkreform.gov.hk/en/publications/rdecision.htm. Accessed on 26 March 2009.

3. Kwak J, Haley WE. Current research findings on end-of-life decision making among racially or ethnically diverse groups. Gerontologist 2005;45:634-41.

4. Pang M, Wong KS, Dai LK, Chan KL, Chan MF. A comparative analysis of Hong Kong general public and professional nurses' attitudes toward advance directives and the use of life-sustaining treatment in end-of-life care. Chin Med Ethics 2006;3:11-5.

5. Ryan M, Farrar S. Using conjoint analysis to elicit preferences for health care. BMJ 2000;320:1530-3.

6. Chu LW, Luk JK, Hui E, et al. Advance directive and end-of-life care preferences among Chinese nursing home residents in Hong Kong. J Am Med Dir Assoc 2011;12:143-52.

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Patient self-management and the role of pharmacists: developing a consensus-based policy framework

Key Messages

1. This first consensus-based policy framework on self-management and role of pharmacists comprises views of physicians, pharmacists, traditional Chinese medicine practitioners and dispensers, and the general public in Hong Kong.
2. Patients with stable chronic conditions have the responsibility to manage their own health.
3. Pharmacists are suggested playing a role in patient self-management and responsible to manage medication problems.

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Introduction

Chronic diseases can have a significant impact on health and quality of life. The long duration of such diseases leads to increased health care expenditure.[1] Self-management is one of the main approaches to managing chronic disease.[2] It improves patient self-efficacy, disease outcomes, communication with physicians, and cognitive symptom management.[3,4] Hence, days in hospitals, number of outpatient visits, and hospitalisation are also reduced.[4] Besides, some patients use over-the-counter (OTC) medications without consulting health professionals whenever they experience mild discomfort. It is, therefore, necessary to involve a health professional to oversee patients during self-management, and pharmacists have the potential to fulfil that role.[5]

In Hong Kong, research on both self-medication and self-management is limited. Little is known about the acceptability and attitudes of local physicians, pharmacists, and traditional Chinese medicine (TCM) practitioners and dispensers towards self-management and pharmacist-led self-management. We therefore examined the perspectives of these four groups of professionals and the local population, and developed a consensus-based policy framework on patient self-management and the role of pharmacists in self-management.

Methods

This study was conducted from June 2007 to January 2010 and comprised four stages: thematic household survey (THS) analysis, focus group discussion, a telephone survey, and the Delphi process.

The THS dataset was conducted during November 2005 to March 2006 by the Census and Statistics Department, Hong Kong SAR. It was used to study patterns of consultations with western medicine doctors and TCM practitioners, and utilisation of western and Chinese OTC medications in the past 12 months. The THS covered the entire land-based population in Hong Kong. Respondents were aged 14 years or above. Univariate and logistic regression analyses were used to identify factors associated with different utilisation patterns.

Nine homogeneous focus groups with 13 physicians (2 groups), 10 pharmacists (2 groups), 10 TCM practitioners (2 groups), and 18 TCM dispensers (3 groups) were formed to understand their attitudes towards patient self-management and roles of pharmacists in self-management. The participants were working in academic and/or clinical units. A preamble introducing patient self-management and a case on diabetes mellitus were provided to facilitate discussion. The moderators led the focus group discussions based on a semi-structured discussion guide, which consisted of questions emphasising attitudes towards patient self-management and pharmacist-led self-management of patients with chronic conditions, roles of pharmacists in patient self-management, and collaboration between health care professionals. The discussions lasted approximately 60 to 90 minutes, and the proceedings were audio-recorded and transcribed verbatim. Themes were identified independently by two investigators using the NVivo 7 software. Interpretations of the themes were illustrated by extracts from the transcripts.

Telephone survey was used to measure views and practice of the Hong Kong population on self-medication and self-management. Telephone numbers were randomly selected from residential phone directories. Trained interviewers invited eligible persons to participate in the survey after briefing them about the purpose of the study. A household member at least 18 years of age, whose birthday was closest to the date of the interview, was invited to complete the survey. Persons not able to communicate in Cantonese and Mandarin were excluded. The 68-item Chinese questionnaire was composed based on the THS, findings from the focus group discussions, and the literature. It covered practice, attitude, and knowledge towards self-medication, attitude, and acceptability on management of long-term chronic conditions, views on pharmacist-led self-management, self-reported health status, and demographic characteristics. Descriptive statistics were reported. Univariate and multivariate analyses were used to identify factors associated with their practices and attitudes.

The Delphi process was used to develop an expert consensus-based policy framework on self-management. Physicians, pharmacists, and TCM practitioners and dispensers working in academic and/or clinical units, and/or administration were invited to participate. Self-administered questionnaires written in Chinese and English were sent to the participants by post or email. It contained 53 statements on the scope of self-management, roles of community pharmacists in self-management, and barriers that might hinder pharmacist-led self-management (extracted from focus group discussions and findings from telephone survey). At round one, participants were asked to rate the validity and clarity of the statements on a 9-point scale (1 being lowest). A statement was retained if ≥85% of the respondents rated 7 to 9 on both validity and clarity; otherwise, the statements were disregarded at round one or revised for reassessment in round two. At round two, each participant received a Delphi questionnaire showing his/her responses, the median and distribution of rating of each statement obtained in round one. Participants were asked to re-rate the validity and clarity of the revised statements on a 9-point scale again.

Results

Stage 1: thematic household survey analysis

A total of 33 263 individuals participated in the THS interview; the response rate was 79%. Around 41% of the respondents consulted western medical doctors and used western OTC products in the past 12 months. They tended to be aged 30 to 39 years, have attended primary school education, have fair to very good self-reported health, have no chronic diseases, and have higher individual monthly income. About 7% of the respondents consulted TCM practitioners and used Chinese OTC products. They were more likely to be aged ≥40 years, have chronic illnesses, and have no insurance coverage for western medicinal services. People who used western and Chinese OTC products only tended to be male, have a low education level, and have low monthly income. By contrast, those who used Chinese OTC products only were more likely to be aged ≥60 years, whereas those who used western OTC products only tended to be aged 30 to 49 years.

Stage 2: focus group discussion

Most of the physicians, pharmacists, and TCM practitioners and dispensers agreed that patients have the responsibility to manage their own health. They identified a similar scope that patients should involve in the process of self-management. These included understanding of the disease symptoms and complications, disease parameter monitoring, drug management, lifestyle modifications, obtaining carer support, and seeking help from health professionals when necessary.

"For diabetic patients, for example, they need to know how to self-monitor their blood sugar level… they need to understand their disease and its complications… they also need to know about diet control and other life style modification including smoking and alcohol." (physician)

For the role of pharmacists in self-management, physicians and TCM practitioners and dispensers admitted that pharmacists were drug experts and should manage patients' medications, and thus play an assisting role in patient self-management. However, physicians were more competent and more experienced in disease management. The three professional groups suggested that physicians lead self-management instead.

"I think both diagnosis and medications are important. Pharmacists are drug specialists but they are not as capable as physicians in disease diagnosis and treatment…" (TCM practitioner)

Pharmacists believed that they had extended roles in health care. Their services were free and accessible. Therefore, they could be the first point of contact in patient self-management. To facilitate their relationship with patients with respect to the pharmacist-led approach, they needed to develop the trust with patients and receive government support, including funding and adjustment of regulations.

Physicians were willing to collaborate with pharmacists but primarily on medication issues, for example, suggesting desirable medications and assisting in monitoring patients for drug interactions and side-effects. Pharmacists suggested having a multi-disciplinary team involving physicians, TCM practitioners, nurses, dietitians, and social workers to provide more comprehensive treatment to patients with chronic conditions. Pharmacists, TCM practitioners and dispensers believed that collaboration between the western and Chinese medicine professionals was necessary, but that the dissimilarities between western and Chinese medicines made communication and cooperation difficult.

"We can share tasks like education and lifestyle modifications with physicians…. We can ask the TCM practitioners or dispensers what Chinese medicines and treatments the patients are using, but as there is still no concrete evidence to show the interactions between western and Chinese medicines, this would inhibit our collaboration …" (Pharmacists)

Stage 3: telephone survey

A total of 1104 surveys were completed; the response rate was 71%. Among participating subjects, 571 (52%) respondents were female, 656 (60%) were aged 18 to 49 years, and 386 (35%) had completed Form 5 education. Approximately 52% had monthly household income of HK\$10 000 to 29 999; 59% reported good or very good health in the past 3 months, and 53% had private and/or company paid health insurance coverage. Approximately 14% paid no medical fee, including Comprehensive Social Security Assistance recipients and civil servants.

To assess their knowledge in self-management, the respondents knew that they needed to consult physicians if problems persisted, a possible food-drug interaction, and risks of medication sharing. A total of 359 (33%) respondents reported that they had purchased Chinese and/or western OTC medications, vitamins, and/or minerals in the past 3 months; 76% of them never consulted pharmacists before purchasing these products.

About 95% of respondents agreed that patients were responsible to care for their own chronic illnesses. Those who agreed to self-management were significantly more likely to have purchased OTC medications in the past 3 months (odds ratio [OR], 7.35; 95% confidence interval [CI], 1.30-41.58; P=0.024). A total of 215 (20%) reported that they had at least one chronic illness, and most of whom were engaged in self-management activities, including medication compliance (90%), follow-up compliance (90%), and monitoring of disease progress (85%). However, lack of disease knowledge (43%), inadequate equipment for disease monitoring (42%), and unstable health conditions (41%) could interfere with their health management.

Regarding pharmacist-led patient self-management, the proportions agreed (45%) and disagreed (44%) with this concept were comparable. Those who agreed believed that they could obtain assistance efficiently when they have problems (42%) and that pharmacists could frequently monitor their disease condition (35%). Those who had tried to manage their own discomfort without consulting a health professional in the past 3 months (OR, 2.22; 95% CI, 1.08-4.55; P=0.030) and those who maintained that patients should consult a pharmacist before using OTC medications (OR, 3.65; 95% CI, 1.85-7.19; P>0.001) were significantly more likely to agree with pharmacist-led self-management.

Stage 4: Delphi process

A total of 19 participants comprising five physicians, five pharmacists, five TCM practitioners, and four TCM dispensers completed the Delphi process. It took two rounds to achieve a consensus on the policy framework. Basically, the four professions agreed that patients with stable chronic illnesses should be involved in self-management. The scope of self-management included medication and follow-up compliance, maintaining a healthy lifestyle, using proper channels to obtain disease information, and knowing when to seek help from health care providers. Community pharmacists could play an assisting role in self-management. Handling drug-related problems would be the major responsibility of community pharmacists. Other roles like health promotion, lifestyle modification with the collaboration of physicians and nurses, and referring patients to physicians were also be involved. Actions needed to resolve barriers and facilitate patient self-management and the role of pharmacists were suggested.

Discussion

To develop a consensus-based policy framework on pharmacist roles in patient self-management, we conducted focus group discussions and a telephone survey to collect perspectives and views of physicians, pharmacists, TCM practitioners and dispensers, and the general public. They generally agreed that patients with chronic diseases should self-manage their own illness provided that their health conditions were stable and they had sufficient knowledge about their diseases. The consensus-based policy framework suggested that patients should obtain some basic disease information including symptoms, complications and treatments through proper channels, followed by drug and follow-up compliance and establishment of a healthy lifestyle. However, we should note that self-monitoring of disease parameters, such as blood pressure and blood glucose, awareness of our own treatment plan, family and emotional support (all usually covered in self-management programmes) were not included in our consensus-based framework. This indicated that the concept and scope of patient self-management in this study was quite different from the practice reported in the literature.

Although pharmacists believed that they were able to monitor patients' diseases and parameters, provide health education, and assist patients in lifestyle modification, the other three professions believed that pharmacists could only play an assisting role in self-management, primarily in drug management. They worried that pharmacists did not have the relevant training and skills to lead patient self-management.

Based on the views of physicians, pharmacists, TCM practitioners and dispensers, without further work to change their views, it would not be possible to implement

pharmacist-led patient self-management. To promote the role of pharmacists, the government can consider developing multidisciplinary patient care with involvement of pharmacists and public-private partnership programmes, so as to encourage patients to consult community pharmacists for drug-related problems and drug compliance monitoring. To enable effective communication, an electronic patient record system which can be accessed and updated by both medical doctors and community pharmacists should be established. To ensure quality of care by pharmacists, continuing pharmacy education is needed. Pharmacist-led patient self-management needs to be developed gradually, with the support of the government, so as to extend their roles and enhance their responsibilities.

Acknowledgements

References

1. Holman H, Lorig K. Patient self-management: a key to effectiveness and efficiency in care of chronic disease. Public Health Rep 2004;119:239-43.
2. Jordan JE, Osborne RH. Chronic disease self-management education programs: challenges ahead. Med J Aust 2007;186:84-7.
3. Foster G, Taylor SJ, Eldridge SE, Ramsay J, Griffiths CJ. Self-management education programmes by lay leaders for people with chronic conditions. Cochrane Database Sys Rev 2007;4:CD005108.
4. Chronic disease self-management program. Stanford, School of Medicine. Available from: http://patienteducation.stanford.edu/programs/cdsmp.html. Accessed 19 June 2009.
5. The Pharmaceutical Society of Hong Kong & The Society of Hospital Pharmacists of Hong Kong. The Consultation Document on Health Care Reform "Lifelong Investment in Health". Hong Kong Special Administrative Region: Health and Welfare Bureau; March 2001.

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Key Messages

1. Since the launch of the cervical screening programme, the ever-screened rate has increased significantly from 37% in 2003 to 64% in 2008.

2. Using Hong Kong specific data on age-specific human papillomavirus (HPV) prevalence and cervical cancer incidence, the first cost-effectiveness analysis of the role of adjunctive HPV DNA testing was conducted.

3. Based on the principle that revision to current practice should not reduce effectiveness, the cost-effectiveness analysis suggests that 1,1,3-yearly cytology screening with HPV DNA testing is an optimal testing paradigm.

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STUDIES IN HEALTH SERVICES

Cervical cancer prevention through cytologic and human papillomavirus DNA screening in Hong Kong Chinese women

Introduction

In March 2004, the Department of Health (DH) launched Hong Kong's first organised population-based cytologic (conventional or liquid-based) screening recall programme for women aged between 25 and 64 years. Women are recommended to undergo screening every 3 years following 2 consecutive annual negative cytologic smear results ("1,1,3-yearly smear cycle").[1] However, there has not been any formal evaluation of DH's cervical screening programme, and there is a need to investigate whether and by what factors this programme would result in higher screening coverage.

Given that persistent infection with high-risk human papillomavirus (HPV) subtypes is a necessary precursor to cervical carcinogenesis, the Hong Kong College of Obstetricians and Gynaecologists (HKCOG) suggested using HPV DNA testing as an adjunct to routine cytology screening.[2] Before widely adopting this strategy, its cost-effectiveness needs to be carefully evaluated using local-specific data.

This study aimed to (1) assess intermediate outcomes of the DH's cervical screening programme in terms of overall population coverage, stratified by socioeconomic determinants (ie equity of access), using a pre-post survey design; (2) predict the medium-to-long-term clinical effectiveness conferred by such population coverage patterns by fitting empirical parameters from objective 1 into a previously developed age-period-cohort projection model;[3] and (3) adapt and extend our previous state-transition Markov cost-effectiveness model[4] to include HPV DNA testing as an adjunct to conventional or liquid-based cytology.

Methods

This study was conducted from June 2007 to July 2009.

Objective 1

We used a pre-post survey design to assess the population coverage of cervical cytologic screening. We used the 2003 Population Health Survey[5] (coded PHS-2003) to extract data on the baseline coverage pattern before the launch of the cervical screening programme in 2004. To assess the current coverage, we designed a similar survey (coded SHS-2008) and conducted telephone interviews by random-digit dialling of all fixed, land-based telephone lines and sampling all women aged at least 25 years in the household.

We compared SHS-2008 with PHS-2003 to assess the impact of the cervical screening programme. We used multivariate logistic regression to generate adjusted odds ratios (ORs) for potential personal characteristics that were associated with the tendency of cervical cancer screening.

Objective 2

We adapted a previously developed maximum likelihood age-period-cohort (APC) model[3] to project the likely avertable disease burden associated

with the level and pattern of screening uptake after the implementation of the cervical screening programme as assessed in objective 1.

Data on cervical cancer incidence and mortality from January 1972 to December 2006 were based on the Hong Kong Cancer Registry. Statistics on population figures were obtained from the Census and Statistics Department. Incidence data were grouped from 1972-76 to 2002-06 into 5-year periods and 5-year age-groups from 25-29 to 80-84 years to give synthetic birth cohorts centred at 5-year intervals since 1892. Age-groups of <25 and >85 years were omitted due to small numbers.

We fitted the data by Poisson regression to compute 15-year projections of incidence rates to the period 2017-21.[3] We applied linear extrapolation of the seven observed periods and the seven most recent birth cohorts based on data from 1972 to 2006. This set of projected rates would reflect a continuation of the status quo of opportunistic screening in Hong Kong through 2021 (base case).

Population mortality rates were combined with incidence rates to derive age-period-specific mortality to incidence (M/I) ratios using observed data from 1972-76 to 2002-06. Assuming no change in cancer-specific survival over the projected time horizon, we applied a constant set of age-period-specific M/I ratios that were based on the two most recent observed periods and were smoothed using moving averages. To assess the impact of the new organised screening programme, we computed the number of cancer cases under different screening frequencies by applying the risk reduction estimates as per the International Agency for Research on Cancer (IARC). We derived these figures by calibrating the original IARC estimates, which were based on the comparator scenario of no screening, to Hong Kong's status quo of opportunistic screening.[3] Projected incident case numbers obtained from the APC modelling were adjusted downwards based on these cancer incidence reduction figures, beginning from the period 2007-11, assuming that all Hong Kong women would derive a similar level of benefit from screening compared with populations in the IARC study and irrespective of age and other characteristics. We assumed that the full benefit of the organised screening programme would only begin from 2007. The numbers of cancer-related deaths were then scaled pro rata according to the procedure using age-period-specific M/I ratios as specified above.

Objective 3
To conduct the cost-effectiveness analysis for cervical screening strategies and the inclusion of HPV DNA testing as a triage, we developed an individual-based stochastic model, which simulated the natural history of cervical cancer. Each stochastic realisation of this model corresponded to the life history of an individual. A simulated individual entered the model at the age of 10 years without HPV infection. Once infected, the individual was free of lesions (HPV-

infected) for some time and then either cleared the infection or progresses to cervical intraepithelial neoplasia (CIN) 1. After CIN 1 was established, the individual may regress to earlier stages (normal or HPV-infected) or progress to CIN 2,3. Similarly, with CIN 2,3, the individual may regress to earlier stages or progress to cervical cancer if the HPV causing the infection belonged to the high-risk group. Our assumptions regarding management of abnormal screening results were based on the Guidelines on Management of Abnormal Cervical Cytology published by HKCOG.[2]

To perform the cost-effectiveness analysis using the natural history model, we needed to estimate the age-specific probabilities of infection. We used two Hong Kong specific data sources for this procedure: (1) age-specific HPV prevalence data from a Hong Kong study conducted in 2002,[6] and (2) age-specific cancer incidence data from the Hong Kong Cancer Registry.[7]

We used the incremental cost-effectiveness ratio (ICER), defined as the marginal cost divided by the marginal health benefit compared with the next most effective non-dominated strategy, to evaluate the cost-effectiveness of different strategies. Strategies with ICER below a predetermined threshold (an ICER threshold) were considered to be cost-effective. In this study, we interpreted the cost-effectiveness of strategies in the context of the World Health Organization (WHO) threshold of three times the gross domestic product (GDP), which was equivalent to around US$90 000 (the Hong Kong GDP was around US$29 820 to 30 781 in 2007 to 2009).[8] We defined the optimal strategy as the strategy that yields the best health outcome among all cost-effective strategies.

Results

Objective 1
The telephone survey was conducted from December 2007 to March 2008. We contacted 1858 women and successfully interviewed 1023, which corresponded to a response rate of 55%. All comparisons were examined on weighted whole population samples, using age-specific weighting adjusted for the size of the land-based non-institutional population (excluding foreign domestic helpers). To assess the change in screening coverage since the launch of the DH's cervical screening programme, we compared the results of SHS-2008 to that of PHS-2003.[5]

In SHS-2008, 64% of the respondents reported to have had cytology smears in the absence of symptoms (ie preventive screening), which was substantially higher than the 37% in PHS-2003 (Table 1). In particular, the ever-screened rate increased sharply from 13% to 40% among those aged ≥65 years, and from 26% to 53% among those who did not have regular physical check-up.

Among those who had been screened without symptoms, 64% of the SHS-2008 respondents reported to have regular

screening, which was similar to that in PHS-2003 (60%). There was a significant decrease in regular-screening rate among those divorced/widowed (61% vs 37%) and significant increases among those economically active (Table 1).

Our multivariate regression analysis suggested that respondents in SHS-2008 were more likely to have had preventive screening (OR, 4.3). Women were more likely to have had preventive screening if they had a secondary education or above (OR, 1.4-1.6) or a monthly income of ≥HK$20 000 (OR, 1.8). In contrast, women were less likely to have had preventive screening if they were currently non-married (OR, 0.27) or aged ≥65 years (OR, 0.25). Among those who had ever had preventive screening, those who had regular physical check-up were more likely to have regular screening (OR, 6.8), whereas those who aged 45 to 64 years (OR, 0.7) or ≥65 years (OR, 0.1) were less likely to have regular screening than those aged 25 to 44 years.

Objective 2

The maximum likelihood APC model predicted that there will be 5911 cervical cancer cases and 1428 deaths over the 15 years from 2007 to 2016 under the base-case scenario of opportunistic screening (Fig 1). From the APC model, 15-year projections from 2007 to 2021 estimated that if all women were screened every 1, 3, and 5 years, compared with the status quo of opportunistic screening, the incremental cumulative number of cases prevented (years of life saved) would be 5254 (32 000), 4655 (28 200) and 2322 (14 100), representing 89%, 79%, and 39% reductions, respectively (Fig 1).

Objective 3

We performed a cost-effectiveness analysis to compare different combinations of cytology screening and HPV DNA testing from annually to 5-yearly. We assumed that cytology testing had a sensitivity of 70% and 80% for CIN 1 and CIN 2,3, respectively, and a specificity of 95%.[9] We also assumed that HPV DNA test had a sensitivity of 83% and a specificity of 93%.[10] We considered quality-adjusted life-year (QALY) and cancer incidence reduction as outcome measures of screening strategies. We also calculated the total cost including both the treatment cost for CIN 2,3 and cervical cancer and the cost for cytology and HPV DNA tests (Table 2). Both the QALYs and costs were discounted at an annual rate of 3%.

Table 3 shows the total cost, cancer incidence, cancer incidence reduction, QALY and ICER for different combination of strategies comprising cytology and HPV DNA tests. When there was no screening, the individual cost and QALY were US$66 and 28.80812 years, respectively. In the baseline scenario (60% screening coverage), all strategies averted around 50 to 60% cancer cases and saved 8.94 to 10.52×10^{-3} QALYs (Table 3).

We performed a pair-wise comparison of screening strategies with and without HPV DNA testing (Table 3). The addition of HPV DNA testing to cytology-only strategies resulted in more QALYs at the expense of a higher costs and would be cost-effective for regular screening every ≥3 years under the WHO ICER threshold (US$90 000 per QALY). When considering all screening strategies, all the cytology-only screening strategies were dominated (Fig 2). The optimal screening strategy was regular, 4-yearly cytology screening with HPV DNA testing.

Table 1. Comparison of screening practice between PHS-2003 and SHS-2008

Variable	% of women who had been screened preventively		% of women who have regular screening among those who had been screened preventively	
	PHS-2003	SHS-2008	PHS-2003	SHS-2008
Overall	37	64	60	64
Age-group (years)				
25-44	41	65	63	73
45-64	44	74	58	61
≥65	13	40	36	28
Marital status				
Single	18	25	53	61
Married	45	80	60	68
Divorced/widowed	27	51	61	37
Monthly income (HK$)				
1-9999	38	61	57	64
10 000-19 999	40	53	63	74
≥20 000	54	68	58	78
No income	34	67	60	58
Occupation				
Professionals	42	58	54	79
White-collar	40	63	61	70
Blue-collar	39	61	54	71
Economically inactive	34	67	60	58
Physical check-up				
Yes	65	79	79	78
No	26	53	43	41

Table 2. Treatment and test costs in cost-effectiveness analysis

Parameter*	Cost (US$)
Treatment	
CIN 2,3[11]	733
Local ICC[11]	13 172
Regional ICC[11]	14 098
Distant ICC[11]	22 580
Test	
Administration[11]	30
Cytology smear[11]	10
Human papillomavirus DNA[12]	49
Colposcopy and biopsy[11]	284
Health status	Utility[13]
No cancer	1
CIN 1	0.91
CIN 2,3	0.87
Local ICC	0.76
Regional ICC	0.67
Distant ICC	0.48
Cancer survivor	0.84

* CIN denotes cervical intraepithelial neoplasia, ICC invasive cervical cancer

Table 3. Cost-effectiveness analysis comparing different cytology screening and human papillomavirus (HPV) DNA testing strategies up to age 65 years

Strategy	Cost (US$)	No. of cervical cancer cases per 100 000 women (reduction %*)	Quality-adjusted life-year saved (10^{-3} year)*	Incremental cost-effectiveness ratio[†]	Incremental cost-effectiveness ratio[‡]
No screening	66	1506	-	-	-
Cytology, 5-yearly	200	787 (48)	8.94	-	14 979
Cytology+HPV, 5-yearly	215	741 (51)	9.43	32 505	32 505
Cytology, 4-yearly	223	749 (50)	9.41	-	Dominated
Cytology+HPV, 4-yearly	241	707 (53)	9.75	52 139	78 902
Cytology, 3-yearly	262	708 (53)	9.83	-	Dominated
Cytology+HPV, 3-yearly	283	672 (55)	10.08	83 601	127 516
Cytology, 2-yearly	333	675 (55)	10.17	-	Dominated
Cytology+HPV, 2-yearly	360	646 (57)	10.31	191 352	345 363
Cytology, 1-yearly	532	645 (57)	10.44	-	Dominated
Cytology+HPV, 1-yearly	573	626 (58)	10.52	532 132	678 118

* Calculated using 'no screening' as the reference
† Comparing cytology screening and HPV DNA testing strategies versus cytology screening only strategies at the same interval
‡ Comparing the next most-effective non-dominated strategy

Fig 1. Cumulative incident cases and deaths from cervical cancer (1972 to 2021) under different screening scenarios
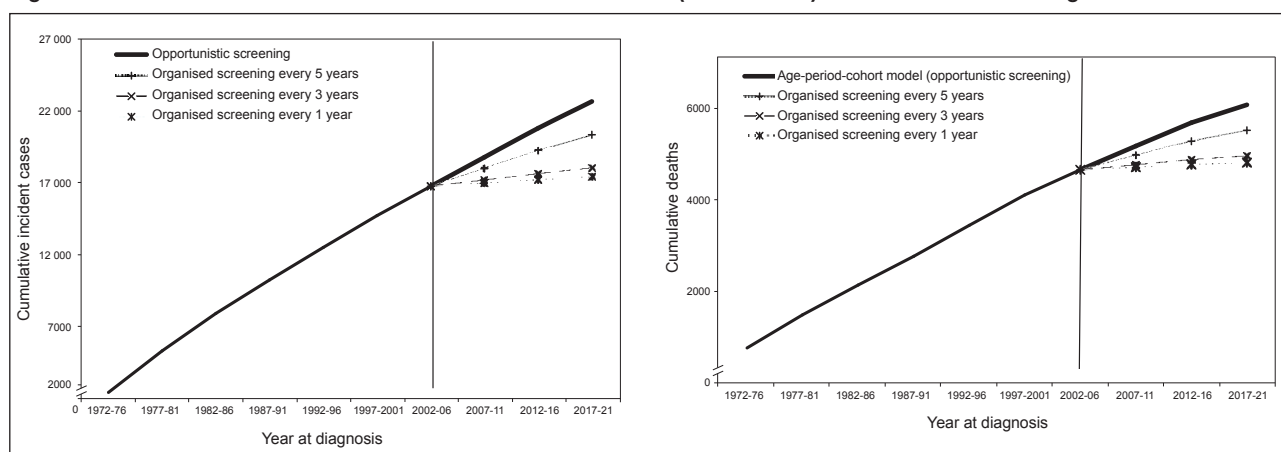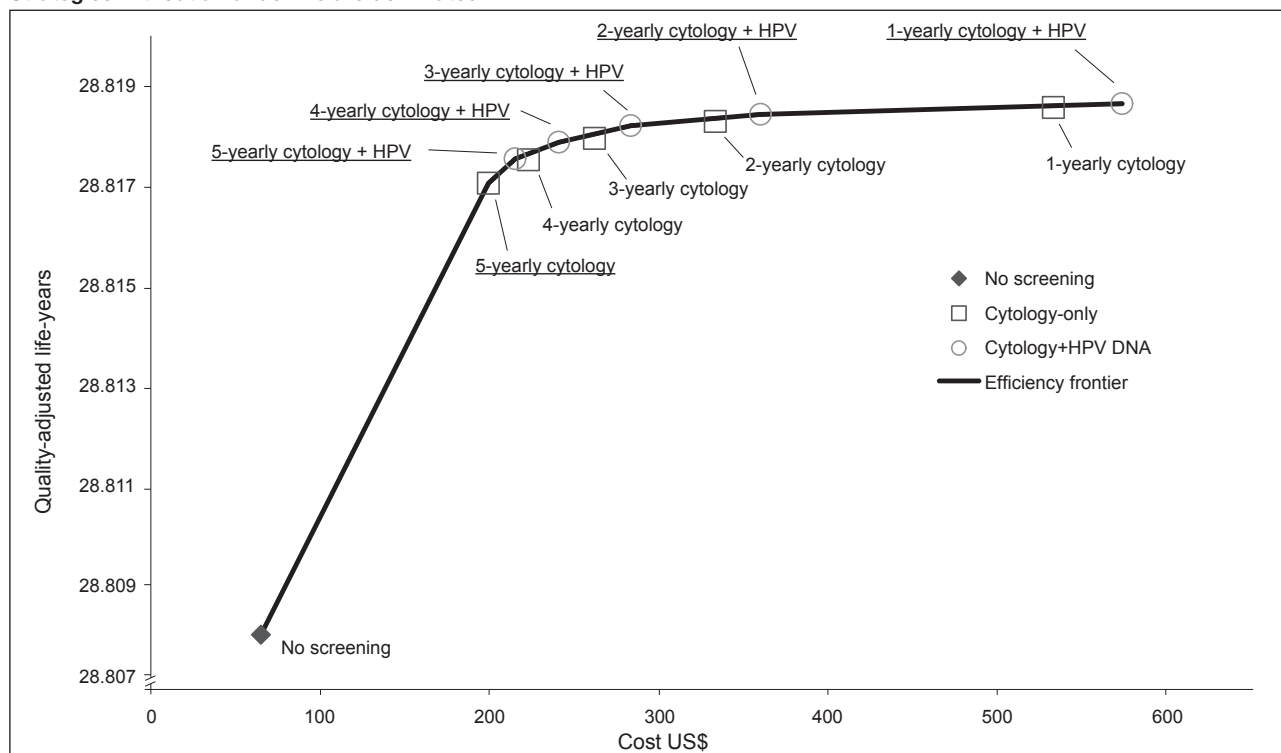

Fig 2. Cost-effectiveness of different combinations of cytology screening and human papillomavirus (HPV) DNA testing. Strategies without an underline are dominated.

Discussion

Objective 1

The ever-screened rate in the absence of symptoms (ie preventive screening) increased from 37% in PHS2003 to 64% in SHS-2008 and an increase was uniformly observed when subjects were stratified by socioeconomic determinants. These results suggest that cervical screening programme has increased coverage in the general population and has been particularly successful in boosting the ever-screened rate among those with very low baseline tendency to do so (ie those aged ≥65 years and those with no regular physical check-up). However, the ever-screened rate among those aged ≥65 years remained low at 40%. The programme recommends that women aged ≥65 years undergo screening if they have never been screened before or if the most recent screening was performed a long time ago.[1, 2] The low ever-screened rate among women aged ≥65 years may be due to their misconception that women who are sexually inactive or postmenopausal do not benefit from it.[1] Overall, while the ever-screened rate has significantly increased since the launch of the programme, the current rate of 64% should be further increased to maximise the benefits.

Objective 2

In terms of policy implementation, the screening programme launched in Hong Kong in 2004 was really a government-operated programme, which provided a prospective record and recall function for those who had ever been screened.[1] The programme encouraged women to undergo regular cytologic examination through social marketing campaigns for the general public, via primary care and women's health providers on an opportunistic basis. For women who decided to get screened, they could be tested at public or private care providers on a full fee-for-service basis and these providers were then encouraged to enter the screened woman's details into a centralised database for subsequent automatic recall (every 3 years) and archiving of test results. For an ideal programme, it is important to explicitly anchor the screening to proactive and personalised invitations (initial 'call' function).

Objective 3

Although HPV DNA testing could be used as an adjunct to cervical cancer screening,[2] its role has not been addressed by the cervical screening programme.[1] Using Hong Kong specific data on age-specific HPV prevalence and cervical cancer incidence, we provided the first cost-effectiveness analysis on this topic. Under the WHO ICER threshold (defined as three times the local GDP, which is US$90 000), our cost-effectiveness analysis suggested that adding HPV DNA testing to cytology-only screening would be cost-effective if the regular screening interval was ≥3 years (Table 3). Therefore, our analysis supports adding HPV DNA testing to the current recommended 1,1,3-yearly screening strategy.

Our analysis suggests that among all screening strategies, screening with cytology and HPV DNA testing every 4 years is the optimal strategy. However, although the 1,1,4-yearly cytology with HPV DNA testing strategy was more cost-effective than 3-yearly cytology screening alone, the former was less effective in preventing cervical cancer. Based on the principle that revision to current practice should not reduce effectiveness, our analysis suggests that 1,1,3-yearly cytology screening with HPV DNA testing is optimal.

Acknowledgements

References

1. Department of Health. Cervical Screening Programme. Hong Kong; 2008. Available at: http://www.cervicalscreening.gov.hk. Accessed on 1 October 2009.
2. The Hong Kong College of Obstetricians and Gynaecologists. Guidelines on the Management of Abnormal Cervical Cytology. Hong Kong 2008.
3. Woo PP, Thach TQ, Choy ST, McGhee SM, Leung GM. Modelling the impact of population-based cytologic screening on cervical cancer incidence and mortality in Hong Kong: an age-period-cohort approach. Br J Cancer 2005;93:1077-83.
4. Woo PP, Kim JJ, Leung GM. What is the most cost-effective population-based cancer screening program for Chinese women? J Clin Oncol 2007;25:617-24.
5. University of Hong Kong. Population Health Survey. Hong Kong Special Administrative Region 2005.
6. Chan PK, Chang AR, Cheung JL, et al. Determinants of cervical human papillomavirus infection: differences between high- and low-oncogenic risk types. J Infect Dis 2002;185:28-35.
7. Hong Kong Cancer Registry. Cancer Statistics Query System. Hong Kong Special Administration Region. Available at: http://www3.ha.org.hk/cancereg/e_stat.asp. Accessed on 3 April 2009.
8. Census and Statistics Department. Table 30: Gross domestic product (GDP), implicit price deflator of GDP and per capita GDP. 2010. Available at: http://www.censtatd.gov.hk/hong_kong_statistics/statistical_tables/index.jsp?charsetID=1&tableID=030. Accessed on 28 July 2010.
9. Goldhaber-Fiebert JD, Stout NK, Ortendahl J, Kuntz KM, Goldie SJ, Salomon JA. Modeling human papillomavirus and cervical cancer in the United States for analyses of screening and vaccination. Popul Health Metr 2007;5:11.
10. Goldhaber-Fiebert JD, Stout NK, Salomon JA, Kuntz KM, Goldie SJ. Cost-effectiveness of cervical cancer screening with human papillomavirus DNA testing and HPV-16,18 vaccination. J Natl Cancer Inst 2008;100:308-20.
11. Kim JJ, Leung GM, Woo PP, Goldie SJ. Cost-effectiveness of organized versus opportunistic cervical cytology screening in Hong Kong. J Public Health (Oxf) 2004;26:130-7.
12. Kim JJ, Goldie SJ. Health and economic implications of HPV vaccination in the United States. N Engl J Med 2008;359:821-32.
13. Elbasha EH, Dasbach EJ, Insinga RP. Model for assessing human papillomavirus vaccination strategies. Emerg Infect Dis 2007;13:28-41.

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Incentives and barriers to adopting the family doctor model in Hong Kong: an in-depth qualitative study of the views, knowledge, and attitudes of patients

Key Messages

1. Many patients regard family doctors as a 'luxury item', some of whom continue to attend the public health care system for their chronic diseases even if they have a family doctor.
2. Cost, quality, perceived need, and choice are important barriers to adopting the family doctor model.
3. Incentives include financial subsidies and a long-term therapeutic relationship with a doctor.
4. If findings of this study are representative, successful implementation of a family doctor system in Hong Kong for chronic disease management seems unlikely, unless these barriers are addressed.

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Introduction

Effective primary health care is essential for a high-quality, equitable, and cost-effective health care system.[1] The increasing prevalence of chronic health conditions and the ageing of the population are important drivers for the development of more effective primary care services.

In Hong Kong, recent health care reform proposals by the government emphasise the need for an effective primary care system, especially for chronic disease and preventive care. The family doctor model has been put forward as a possible solution.[2]

The aim of the present study was to explore the incentives and barriers to adopting the family doctor model in Hong Kong from the viewpoint of patients with chronic disease. We focused on patients with chronic diseases, because of their significant need and demand on health care services.

Methods

This study was conducted from June 2007 to July 2008 using qualitative methodology and one-to-one interviews. Interviews from 28 patients with a range of chronic conditions were taped and transcribed verbatim. The patients were classified as having a family doctor (n=10), having a regular doctor but not a family doctor (n=10), and having no regular doctor (n=8). To ensure maximum variation in terms of age group, gender, socioeconomic status, and type of chronic disease, the sample was selected purposively.

Results

Knowledge and understanding of the family doctor model

Patients' descriptions of a family doctor generally matched most of the key concepts of a family physician, ie first contact for care, continuous, comprehensive, coordinated, and orientated to patients (patient-centred). Some believed that a family doctor is a regular doctor attending the whole family and having a close relationship with them, almost like a 'family member'.

Those having a family doctor considered that such a model was appropriate, irrespective of age and type of condition. They were mainly in the higher socioeconomic brackets in terms of educational level and income (Table). Many of those who had no family (or regular) doctor considered such a doctor to be a 'luxury item' for the better off.

Most respondents viewed the family doctor model as only possible in the private sector. This was largely because of perceived pressure on the public system. Patient knowledge was very limited regarding available training or qualifications in family medicine, and the concept of a family doctor was not

solely limited to general practitioners or family physicians. For example, most respondents believed that traditional Chinese medicine practitioners also had the potential to become family doctors.

Views on public and private primary care

Most respondents (irrespective of having a family doctor or not) attended the public health care system (specialist or general out-patient clinics) for management of their chronic diseases. Reasons for this included issues related to cost, consistency, informational continuity, duration of prescriptions, quality, trust, access to specialists and allied health professionals (in-house referrals), and access to tests and investigations. Nonetheless, the public health care system was criticised for problems related to access, waiting times, a lack of interpersonal continuity, short consultations, and poor attitude of doctors. Thus 'being in the public health care system' was often seen as the 'least bad option'. Other factors that conspired to keep patients in the public health care system included recommendations by their private doctors, and ongoing internal referrals with no effective linkage to the private sector.

Table. Patient characteristics

Variable	No. of patients		
	With family doctor (n=10)	With regular doctor but not family doctor (n=10)	With no regular doctor (n=8)
Income (HK$ per month)			
<5000	0	0	1
5000-10000	1	2	2
10000-20000	1	3	3
20000-30000	4	0	1
30000-40000	2	1	0
>40000	0	3	0
Refused to answer	2	1	1
Education			
None	0	0	1
Primary	1	3	3
Secondary	3	2	4
Tertiary	6	4	0
Age (years)			
21-30	3	1	0
31-40	0	2	0
41-50	3	4	2
51-60	2	1	1
61-70	1	1	2
71-80	1	1	3
Male:female ratio	1:1	1:1	1:3
Marital status			
Single	2	1	0
Married	7	7	3
Divorced	1	2	1
Widowed	0	0	4
Chronic disease*			
Musculoskeletal problem	3	6	3
Heart disease	2	1	1
Diabetes	1	1	1
Hyperthyroidism	0	2	0
Hypertension	4	2	4
Respiratory problems	4	1	0
Minor stroke	2	0	2

* Some have more than one co-morbidity (range, 1-4)

Private primary care was generally regarded as being mainly for acute illnesses, rather than chronic diseases. Many patients voiced concerns about health care reforms by the government, and public-private partnerships between the Hospital Authority and private general practitioners.

Attitudes towards health and self-care

Respondents generally considered health as an absence of symptoms, pain, and disease. Many reported that a healthy person has no need to see a doctor, and there was little mention of preventive public health measures. Self-care was a common theme and mostly referred to diet and exercise. It also included massage, Tai Chi, herbal remedies, dietary supplements and vitamins, and traditional 'food therapies' such as certain types of soups.

Barriers and incentives to adopting the family doctor model

The five main barriers to the adoption of the family doctor model were cost, perceived need of a family doctor, choice of doctors, doctor-patient relationships, and quality issues.

Regarding costs, some patients felt that 'good things can't be cheap', ie high quality family medicine had to be expensive.

Regarding perceived need of a family doctor, many who had no family doctor considered having one as unnecessary (irrespective of financial issues). Conversely, others perceived the need for family doctors. The need was related to perceptions of risk and concurrent diseases and to a large extent current or past experience of having a family doctor, but could also be 'created' through the media and social network.

Regarding choice of doctors, respondents strongly defended their right to choose a doctor (or doctors), in order to find the 'right match'. 'Doctor shopping' was regarded as a way to assert choice in order to find a good doctor. A potential barrier to the adoption of the family doctor model was the concern that the government might limit choice (imposing restrictions). Despite provision of financial incentives or subsidies for the adoption of a family doctor model, many also wanted reassurance that the 'right to choose' would not be diminished.

Regarding the doctor-patient relationship, an enduring therapeutic relationship was associated with numerous potential advantages, such as effectiveness, efficiency, holistic support, empathy, respect, trust, confidence, health promotion, and self-care support. Nonetheless, many felt that a therapeutic relationship with a family doctor took a long time to develop. Thus, the relationship had to be nurtured over a period of years, irrespective of the doctor's training, qualifications or certificates. Respect and trust had to be earned through contact and experience, and the patient's judgement of the doctor's skills by their own personal evaluation of honesty, integrity, and effectiveness of care.

Regarding quality, many patients were concerned that private family doctors were not adequately trained or skilled to deal with chronic diseases. Some felt that only specialists could look after specific chronic conditions, and therefore family doctors had to be specialists in the patient's particular disease. Qualifications and certificates were rarely used by patients as criteria on which to judge whether a doctor was suitably qualified to deal with chronic diseases. The issue of trust was not simply related to knowledge, it was also closely related to perceptions of the doctor's ethics and values.

Discussion

That most respondents had some knowledge of the concept of a family doctor is in agreement with a recent survey of over 1000 members of the public by the Hong Kong College of Family Physicians.[3] The survey found that over 90% of respondents had heard of the term family doctor, and that cost was the most important issue influencing choice of service. Moreover, only a few felt that private doctors were capable of dealing with chronic illness, which was in line with our own findings.

Almost all respondents (irrespective of having a family doctor or not) attended the public health care system for ongoing management of their chronic diseases. Many factors seemed to conspire to keep patients in the public health care system, both from within and without the system. Nonetheless, for most respondents, the public health care system was regarded as the appropriate setting for chronic disease management. Thus 'shifting the balance of care' from the public to the private health care system, or even to a more 'shared-care' system between public and private providers (as suggested in the recent consultation document on health care reforms in Hong Kong[2]) is unlikely to be straightforward.

Three quarters of all patients were interested in knowing more about their diseases.[4] In the present study, the patients generally expressed a keen interest in knowing more about their health problems. In this respect, they tended not to enquire and seek explanations about their diseases from the doctors in public clinics, owing to the limited time available in the consultation, and possibly because when patients are paying they feel more able to assert their 'purchasing power' and demand more from the consultation.

Regarding barriers to adopting the family doctor model,

cost, perceived need, choice, relationship, and quality were important. Incentives included the perceived benefits of a long-term therapeutic relationship with a family doctor, and the possibility of government financial subsidies. That respondents knew little about the Hong Kong College of Family Physicians, nor how to find a qualified family doctor reflects both the limited number of fully qualified family physicians in Hong Kong, and the lack of such information available to the public.

One limitation of qualitative research is that definitive statements on the generalisability of findings and transferability to whole populations cannot be made. Thus, in drawing conclusions, caution is warranted and further quantitative research of a large patient sample would be helpful.

In conclusion, according to patients with chronic diseases, there are major barriers to the implementation and adoption of the family doctor model in Hong Kong. Unless they are addressed, effective implementation of a comprehensive family doctor system for chronic disease management in Hong Kong is likely to be difficult.

Acknowledgements

References

1. Starfield B. Primary Care. Oxford: Oxford University Press; 1998.
2. Health, Welfare and Food Bureau. Building a Healthy Tomorrow - Discussion Paper on the Future Service Delivery Model for our Health Care System. Available at http://www.fhb.gov.hk/download/press_and_publications/consultation/050701_hmdac/e_healthy_tomorrow.pdf. Accessed on 2 July 2008.
3. Hong Kong College of Family Physicians. What sort of primary healthcare service does the public want? Hong Kong Pract 2008;30:24-8.
4. Gauld R, Gould D. The Hong Kong health sector: development and change. Hong Kong: The Chinese University Press; 2002.

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Utilisation patterns of primary health care services in Hong Kong: does having a family doctor make any difference?

Key Messages

1. The population adjusted monthly primary care consultation rate was 0.70 (95% confidence interval, 0.65-0.75), equivalent to 8.4 consultations at a cost of HK$2553 per person per year.

2. About 63% of the population reported having a regular primary care doctor with one third having a regular family doctor.

3. One third of the respondents had used the medical service in a month, and one third of all primary care consultations were provided by family doctors and Chinese medicine practitioners respectively.

4. Primary care consultations were effective in enabling better illness coping and improving health.

5. Compared to persons without a regular family doctor, those with such a doctor were 50% less likely to use accident and emergency and in-patient services, but they were more likely to report non-drug management and greater enablement after consultation.

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Introduction

Primary care should be a gate-keeper for secondary health services to prevent illness, improve health, enable coping with illness, and satisfy needs. The family doctor model has been proposed by the government as a solution for the rising demand for quality primary health care services for the ageing population in Hong Kong. This study aimed to explore the utilisation rates and patterns of various primary health care services, and the process and outcomes of primary care consultations in Hong Kong, and whether having a family doctor makes any difference.

The objectives were to determine the rates and patterns of utilisation of different primary health care services, the process (including non-drug managements) and patient self-reported outcomes (enablement, change in health, and satisfaction) following primary care consultations, and any difference in the care for people with and without a regular family doctor.

Methods

This study was conducted from June 2007 to November 2008. It was approved by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

A cross-sectional general population random telephone survey was carried out in two phases, first from September to October 2007, and second from March to April 2008 to cover the Summer and Winter seasons, respectively. A structured questionnaire was administered on the presence and type of regular primary care doctor, illness episodes, and medical service utilisations, process and outcome of consultations, health status, and sociodemographics. Longitudinal studies on 319 subjects with a diary on all illness episodes and consultations for 12 weeks were carried out to cross-validate the cross-sectional results.

A total of 5174 eligible households were contacted, and 3148 (61%) subjects (1616 and 1532 in the first and second phases, respectively) completed the cross-sectional survey. Of these, 708 agreed to the longitudinal study and 327 returned the diaries (self-completion), and 319 subjects had complete cross-sectional and longitudinal data for the final analysis.

Subjects were classified by whether they had (1) a regular family doctor (RFD), defined as a doctor whom one would consult for all types of health problems; (2) a regular primary care doctor, defined as a doctor whom one would first consult when one needed to, who was not a family doctor (RnFD); or (3) no regular primary care doctor (NRD). Monthly medical service utilisation rate was calculated by the number of consultations over a period of 4 weeks. Patient self-reported outcomes of the consultation was measured by the Patient Enablement Instrument (PEI) score,[1] perceived improvement in health and satisfaction. The rates of non-drug managements such as explanation of illness and advice on self-care were measured.

The mean monthly illness and consultation rates were calculated and weighted on the 2007 Hong Kong general population age-sex distribution to estimate the population-based illness and consultation rates. Multivariate regressions were used to identify factors associated with different primary care doctor choices, and to test the effects of having a RFD on the various outcomes, with adjustment of confounding factors including sociodemographics, health status, lifestyle and chronic morbidity. Utilisation rates were compared across three groups by a Poisson regression model with seasonality entered as a covariate. Regression analysis was carried out on the longitudinal data to determine whether any adjustment factor for the estimation of the illness and service utilisation rates was needed and to cross-validate the results of the cross-sectional data.

All estimates were accompanied with a 95% confidence interval (CI) and a P value of <0.05 was considered statistically significant.

Results

Choice of primary health care doctors

A total of 1969 (63%) subjects said that they had a regular primary care doctor, whereas 1157 (37%) did not. Among those with regular doctors, 1150 said their regular doctors were family doctors. Multivariate logistic regressions found that younger age, currently married, white-collar work, higher household monthly income, having a

chronic disease, need of long-term medication and regular exercise were independent factors associated with having a regular primary care doctor. There was little difference in characteristics between the RFD and RnFD groups, except that the former were more likely to have regular exercise and better general health.

The RFD group was less likely to smoke (18%) or drink (37%), but more likely to have regular exercise (68%) than the RnFD and NRD groups. Overall, 44% of the subjects said they would consult their primary care doctors for preventive care, with a higher proportion (53%) in the RFD group than the others (42% and 37%, respectively). Over 80% of the RFD and RnFD groups who were aged ≥30 years had their blood pressure checked in the last year, which was higher than the 70% in the NRD group. About 74 to 77% of ever-married women in the regular primary care doctor groups had cervical smears within the last 3 years, but only 61% of the NRD did so. About 47% of the people would consult their primary care doctors for their chronic disease follow-up, with a higher proportion in the RFD (50%) than RnFD (46%) and NRD (45%) groups.

Illness and primary health services utilisation rates and patterns

The illness and health service utilisation rates and patterns during the last 4 weeks and last episode of illness are shown in Table 1. The Hong Kong general population weighted monthly illness rate was 0.57 (95% CI, 0.51-0.64), and the

Table 1. Illness and service utilisation rates in patient groups having a regular family doctor (RFD), regular non-family doctor (RnRD), or no regular doctor (NRD)

Parameter	Total* (n=3148)	RFD (n=1150)	RnFD (n=746)	NRD (n=1157)
During last 4 weeks (mean±SD [prevalence])				
Monthly illness rate[†‡§]	0.57±1.81 (35)	0.51±0.83 (37)	0.68±1.83 (40)	0.57±2.43 (30)
Days of sick leave per month[†‡]	0.23±1.20 (11)	0.3±1.31 (14)	0.29±1.29 (13)	0.14±1.05 (7)
Monthly consultation rate[†‡]	0.71±1.53 (34)	0.85±1.73 (39)	0.85±1.60 (38)	0.49±1.26 (25)
Western medicine family doctors[†‡§]	0.21±0.75 (13)	0.5±1.10 (30)	0.06±0.41 (4)	0.03±0.26 (2)
Western medicine but not family doctors[†‡§]	0.22±0.65 (14)	0.11±0.40 (9)	0.44±0.98 (26)	0.17±0.56 (12)
Chinese medicine practitioner[†‡§]	0.24±1.03 (10)	0.24±1.04 (10)	0.32±1.12 (13)	0.19±0.97 (8)
Government or Hospital Authority accident & emergency departments[‡§]	0.06±0.45 (4)	0.05±0.56 (2)	0.08±0.47 (5)	0.05±0.29 (4)
Hospital admission rate	0.01±0.14 (1)	0.01±0.14 (1)	0.02±0.15 (1)	0.01±0.13 (1)
Self-medication (%)	30	28	32	32
Other medical treatments (%)	4	4	4	4
During last episode of illness				
Median (range) weeks of last episode of illness	5 (0.5-1144)	4 (0.5-364)	4 (0.5-520)	7 (0.5-1144)
Had used any medical service[†‡§] (%)	72	80	75	61
Consulted family doctor[†‡§] (%)	30	67	11	7
Consulted regular primary care doctor who is not a family doctor[‡§] (%)	28	17	55	19
Consulted other doctors[†‡] (%)	20	14	13	29
Consulted Chinese medicine practitioner (%)	12	13	13	11
Consulted accident & emergency department[†§] (%)	7	4	8	10
Admitted to the hospital[†§] (%)	3	2	4	4
Self-medication[†‡§] (%)	32	28	33	37
Any other treatment[†‡] (%)	4	2	3	5
Consulted more than one doctor[†‡] (%)	14	16	15	12
Median (range) number of doctors used by people who had consulted	2 (1-7)	2 (1-7)	2 (1-6)	2 (1-7)

* The sum of three groups did not add up to the total, as some respondents were not sure if they had regular or family doctors. Minor discrepancies between the reported totals and the sum of specific consultations were due to recall variations

† Significant difference between RFD and NRD by univariate Poisson/logistic regression

‡ Significant difference between RnFD and NRD by univariate Poisson/logistic regression

§ Significant difference between RFD and RnFD by univariate Poisson/logistic regression

consultation rate was 0.70 (95% CI, 0.65-0.75). About 14% of subjects (20% of those who had consulted) had doctor-shopped with no difference between the three groups. The overall consultation rate reported in the cross-sectional survey was higher than that found in the longitudinal study, mainly due to a seasonality effect. Thus, no adjustment to the utilisation rate was indicated.

Process and outcomes of the consultation

Based on the recall of the last consultation, 60% had consulted private western medicine doctors, 16% had consulted public general outpatient clinics, 8% had consulted Chinese medicine practitioners, and 7% had consulted public specialist clinics. The NRD group was the most likely to have consulted public primary (25%) or specialist (10%) services, whereas the RFD group was the least likely (7% and 4%, respectively) to have done so. About 81% of the RFD group consulted their usual primary care doctor, whereas only 69% of the RnFD did so. There were wide variations in consultation costs ranging from HK$0 to HK$40 000. The mean and median costs for a private consultation were HK$304 and HK$180, respectively. There was no significant difference in cost between the three groups. At their last consultation, about 92% of subjects received a prescription for a median of 3 medications. The prescription rate was higher in the two regular doctor groups than the NRD group. The rates of non-drug management ranged from 4% (referrals) to 72% (explanation of the diagnosis). The RFD group was significantly more likely than others to have received an explanation on the nature (70%) and course (49%) of the illness, reassurance of concerns (41%), and advice on self-care (66%).

Patient-reported outcomes of the last consultation showed a significantly higher mean PEI score in the RFD group (3.33) than the others, but there was no difference between the RnFD (2.63) and NRD (2.58) groups. Overall, 49% felt that their health had improved after the consultation; the proportion was higher in the RFD (54%) than the RnFD (50%) or NRD (45%) groups. About 94% were satisfied to a certain extent with the consultation, and 60% would recommend the doctor to their family and friends. The RFD group (76%) was more likely to recommend their doctors to others, whereas only 44% of the NRD group would do so.

Effects of primary care doctor choice on utilisation, process and outcomes of care

The differences between different primary care doctor choice groups were compared pair-wise by multivariate regressions on the cross-sectional data, adjusted for all confounding factors. Analyses on the longitudinal data showed similar trends of differences between the groups. Poisson regressions showed that the monthly illness rate in the RFD group was 16% and 21% less than those of the RnFD and NRD groups, respectively. The RFD and RnFD groups had 54 to 65% more consultations than the NRD group, but there was no difference between the RFD and

RnFD groups. Seasonality had the most significant effect on illness and service utilisation rates, with lower rates in summer than winter.

Table 2 shows the effect of doctor choice groups on the patterns of service utilisation during the last episode of illness and preventive care. The odds of accident and emergency department visits or hospital admissions were about 50% less in the RFD group than in the RnFD and NRD groups.

Table 3 shows the effect of primary care doctor choice groups on the process and patient-reported outcomes of the last consultation. The odds of all non-drug managements, except for investigations and referrals, were 50% to 100% higher in the RFD group than in the NRD group, and were 25% to 40% higher in the RFD group than in the RnFD group. The odds of most non-drug managements were 25% to 40% higher in the RnFD than NRD groups, except for those entailing disease screening. Having a RFD was associated with higher PEI score, when compared with either the NRD or RnFD groups, but there was no difference between the RnFD and NRD groups.

Discussion

In this study, we defined a family doctor as one who would be consulted for all types of health problems. About 37% of subjects reported having a regular family doctor; the proportion was much higher than the 11% found in an earlier study, probably because the latter used a narrower definition based on a postgraduate qualification.[2] Our study showed that the public was able to differentiate family doctors from other primary care doctors based on their function. People with chronic diseases and requiring chronic medications were less likely to have a family doctor, although they were the group theoretically most in need. Most chronic diseases are managed by public health services because of costs, which is often traded off with continuity and comprehensiveness of care. Thus, the health care and funding system needs to change to enable more people with chronic diseases to be cared by family doctors.

The illness prevalence of 35% was lower than the symptom prevalence of 57% found in the Household Thematic Survey,[3] because our survey asked about illness and some symptoms might not be regarded as illnesses by some people. On the other hand, the primary care service utilisation prevalence (34%) was similar to the 37% of primary care consultations found in the Household survey.[3] A monthly primary care consultation of 0.7 (95% CI, 0.65-0.75) is equivalent to 8.4 (95% CI, 7.5-9) consultations per year, which is consistent with the nine consultations per year reported in 1998 by the Harvard Team Survey in Hong Kong.[4]

An important function of primary care is to gate-keep accident and emergency and hospital care. Over 80% of the

Table 2. Effects of primary care doctor choice on use of medical services and preventive care

Parameter	Odds ratio (95% CI) by logistic regression		
	RFD vs NRD*	RnFD vs NRD*	RFD vs RnFD*
Use of medical services during the last episode of illness			
Any doctor consultation	2.486 (2.053-3.010)[†]	1.853 (1.509-2.275)[†]	1.342 (1.074-1.676)[†]
Accident & emergency department consultation	0.479 (0.330-0.695)[†]	0.768 (0.536-1.098)	0.624 (0.411-0.949)[†]
Hospital admission	0.458 (0.267-0.788)[†]	0.891 (0.540-1.470)	0.514 (0.284-0.932)[†]
Preventive care			
Cervical smear test (ever-married women)	1.731 (1.245-2.408)[†]	1.463 (1.015-2.109)[†]	1.183 (0.806-1.736)
Blood pressure check within 1 year (age ≥30 years)	2.640 (2.013-3.461)[†]	1.818 (1.359-2.433)[†]	1.452 (1.058-1.991)[†]
Regular exercise	1.400 (1.166-1.682)[†]	1.083 (0.886-1.325)	1.292 (1.054-1.584)[†]

* Reference category for doctor choice groups; RFD denotes regular family doctor, RnRD regular non-family doctor, and NRD no regular doctor
† P<0.05 (forward LR: entry 0.05), adjustment of confounding factors including sociodemographics, health status, chronic morbidity, and lifestyle. Odds ratio of
  <1 and >1 represent less and more likely than the reference category, respectively

Table 3. Effects of primary care doctor choice on process and outcome of consultation

Parameter	RFD vs NRD*	RnFD vs NRD*	RFD vs RnFD*
Process of consultation	Odds ratio (95% CI) by logistic regression		
Drug prescription	1.836 (1.331-2.531)[†]	2.375 (1.602-3.521)[†]	0.773 (0.508-1.177)
Investigation	0.675 (0.502-0.907)[†]	0.894 (0.655-1.219)	0.755 (0.543-1.050)
Referral	0.739 (0.463-1.179)	0.829 (0.505-1.362)	0.892 (0.521-1.527)
Non-drug management			
Diagnosis explained	2.075 (1.707-2.522)[†]	1.484 (1.207-1.824)[†]	1.398 (1.119-1.748)[†]
Nature of the illness explained	1.758 (1.473-2.099)[†]	1.415 (1.165-1.719)[†]	1.242 (1.017-1.518)[†]
Course of illness explained	1.693 (1.427-2.010)[†]	1.251 (1.031-1.518)[†]	1.353 (1.119-1.637)[†]
Concerns reassured	1.964 (1.638-2.355)[†]	1.456 (1.186-1.787)[†]	1.349 (1.109-1.641)[†]
Advice on self-care	1.671 (1.405-1.988)[†]	1.319 (1.089-1.598)[†]	1.267 (1.041-1.541)[†]
Physical treatment	1.486 (1.001-2.204)[†]	1.097 (0.693-1.736)	1.355 (0.879-2.090)
Preventive care			
Screening for disease	1.487 (1.165-1.898)[†]	1.178 (0.889-1.560)	1.263 (0.965-1.653)
Lifestyle advice	1.654 (1.389-1.969)[†]	1.390 (1.145-1.688)[†]	1.190 (0.983-1.439)
Outcomes of consultation	Coefficient (95% CI) by general linear model		
Patient enablement instrument score[‡]	0.733 (0.472-0.994)[†]	0.104 (–0.191-0.398)	0.629 (0.336-0.923)[†]
	Odds ratio (95% CI) by logistic regression		
Health improved	1.392 (1.177-1.646)[†]	1.216 (1.007-1.468)[†]	1.145 (0.948-1.382)
Overall satisfied	2.000 (1.376-2.907)[†]	1.549 (1.054-2.278)[†]	1.291 (0.833-1.999)
Would recommend doctor	3.857 (3.193-4.660)[†]	2.054 (1.684-2.505)[†]	1.878 (1.523-2.316)[†]

* Reference category for doctor choice groups; RFD denotes regular family doctor, RnRD regular non-family doctor, and NRD no regular doctor
† P<0.05 in regression analysis, adjustment of confounding factors including sociodemographics, health status, chronic morbidity, lifestyle. Odds ratio of <1 and
  >1 represent less and more likely than the reference category
‡ Score calculated as mean of answered items times 6, excluding cases that answered N/A or missing in >3 items

RFD group consulted their regular doctors during the last episode of illness and 65% of the RnFD group did so. There was better continuity of care with the family doctors. People with RFDs were about 50% less likely than others to have visited the accident and emergency department or have been hospitalised during their last illness, whereas those in the RnFD and NRD groups had the same rates. These indicate low accessibility of community-based services for the NRD group members, who then rely more on the accident and emergency departments as a source for primary care.

Having a regular primary doctor was associated with an increased likelihood of disease screening. About half of the population said that they would consult primary care doctors for chronic disease follow-up and preventive care, but only 12% and 4% of their last consultations were for such purposes, respectively. The fee for service system in Hong Kong may be a barrier to proper provision of preventive and chronic disease care in primary care; individuals are less motivated to consult if they have no symptoms and most private insurances do not cover preventive care. A qualitative study found that, apart from cost, a lack of supportive services was also a major barrier to the use of private family doctors for the care of chronic disease.[5]

The RFD group reported higher rates of explanation of the nature and course of their illnesses, reassurance for concerns, and advice on self-care, which was also consistent with the patient-centred approach that distinguishes the family doctor from other primary care doctors. Patient enablement is an indicator of patient-centred care, the mean PEI score of the RFD group was of a comparable standard to that found from general practice consultations in the United Kingdom where primary care is much better developed,[1] but those of the other groups were significantly lower.

Limitations
A loose definition of the family doctor was used in this study and the classification into the RFD, RnFD, and NRD groups was based on subjective self-reporting. This might have

affected the differences between groups, but this bias would be more likely to underestimate rather than overestimate differences. The results of our analyses were mainly based on data from a cross-sectional study, which was subject to recall bias and the uncertainty of a causal or effect relationship. This study only compared doctor-led models of primary health care currently available in Hong Kong, therefore the results cannot be generalised to alternative models such as nurse-led primary care. The evaluation of non-physician–led primary care models should be an area for future research.

Conclusions

The concept of primary care and the family doctor are being recognised by the public. The population adjusted monthly primary care consultation rate was 0.70 (95% CI, 0.65-0.75), which is equivalent to 8.4 consultations and an average cost of $2553 (mean cost of $304 per consultation) per person per year. About 63% of the population reported having a regular primary care doctor and one third had RFD. One third of the population reported an illness and one third had used medical service in the last month. Most felt more enabled to cope with their illnesses and about half of them felt their health conditions had improved after primary care consultation.

In Hong Kong's existing health care system, persons with RFD reported better health, lower utilisation of accident and emergency departments and hospital services, more preventive care, more non-drug managements, and better outcome following consultations than those with RnFD or NRD. In turn, those with RnFD were more likely than those with NRD to have had disease screening, non-drug managements, and improvement in health after a consultation. However, there was no difference between the groups with respect to their utilisation of accident and emergency departments, other hospital services, or enablement to cope with illnesses.

These findings supported the development of a family doctor–led primary health care delivery system in Hong Kong. How to help one third of population find a regular primary care doctor and enable more primary care doctors become family doctors is a challenge. Having RFD may not reduce the demand and cost of primary care services, but it could save on expensive accident and emergency department visits and other hospital services. There is room for expanding the role of primary care in chronic disease management and preventive care.

Acknowledgements

References

1. Howie JG, Heaney DJ, Maxwell M, Walker JJ, Freeman GK, Rai H. Quality at general practice consultations: cross sectional survey. BMJ 1999;319:738-43.
2. HKCFP Research Committee, What sort of primary healthcare service does the public want? Hong Kong Pract 2008;30:24-8.
3. Leung GM, Wong IO, Chan WS, Choi S, Lo SV; Health Care Financing Study Group. The ecology of health care in Hong Kong. Soc Sci Med 2005;61:577-90.
4. The Harvard Team. Improving Hong Kong's health care system: why and for whom? Hong Kong SAR: Government Printing Department; 1999.
5. Mercer SW, Griffiths SM, Lam C, et al. Incentives and barriers to adopting the family doctor model in Hong Kong: an in-depth qualitative study of the views, knowledge, and attitudes of patients, SHS-P-2 Final Report, 2008.

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Key Messages

1. The most common reason for doctor consultation was upper respiratory tract infection (26.4%), followed by hypertension (10.0%), diabetes (4.0%), gastroenteritis (3.9%), and lipid disorder (2.7%).
2. Imbalance of care was evident between the private and public primary care sectors; the public sector was heavily burdened with care for patients with chronic diseases. There is room to expand the role of private sector in primary care for chronic diseases and in disease prevention.
3. Funding methods and training in family medicine was associated with morbidity and management patterns.
4. These findings could guide health care policy and resource allocation as well as the content of medical training programmes.

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Patient morbidity and management patterns of community-based primary health care services in Hong Kong

Introduction

Population ageing and changes in the socioeconomic structure affect the disease pattern. Chronic diseases and psychological illnesses are major health care burdens in the 21st century.[1] Primary care doctors are taking care of an increasing load of patients with chronic illness.[2]

This study aimed to explore the patterns of diseases and their management presenting to primary care doctors in Hong Kong, and whether different funding methods had an effect on these patterns.

Methods

This study was conducted from June 2007 to February 2009. Primary care doctors from both private and public sectors were invited to take part. Patient demographics, payment method, diagnosis, nature of the illness (acute, chronic, preventive or administrative), and management (prescription, investigation, referral, and preventive activities) were recorded using standardised forms for patients presenting from July 2007 to June 2008. Diagnoses were coded using the International Classification of Primary Care (ICPC-2) developed by the World Organization of Family Doctors.[3] Doctor demographics, type and years of practice, training, and postgraduate qualifications were recorded on a separate form.

Patient morbidity and management patterns were presented as percentage distribution. Multivariate regression analyses were performed to examine the relationship between payment method and nature of illness, investigation and referral patterns, and practice sectors and management pattern, with adjustment of confounding factors such as patient and doctor demographics, the nature of illness, the number of years the doctor in general practice, training in family medicine, and postgraduate qualification.

All estimates were accompanied with a 95% confidence interval. A P value of <0.05 was considered statistically significant.

Results

A total of 109 doctors (of whom 67 had family medicine training) participated in the survey. They recorded 52 337 patient encounters and 69 973 health problems. As the public sector was over-represented, the cross-sectional data was weighted to simulate the private and public primary care service utilisation ratio, as reported by the general population study on service utilisation patterns in Hong Kong in 2007-08.[4]

Overall patient morbidity patterns in primary care in Hong Kong
The most common reason for consultation was upper respiratory tract infection (26.4%), followed by hypertension (10.0%), diabetes (4.0%), gastroenteritis (3.9%), and lipid disorder (2.7%). Table 1 shows the top 10 health problems by age-groups. Upper respiratory tract illness was commonest in all age-groups, except in the elderly, where it came second (10.8%) following hypertension (23.7%).

In the elderly, chronic diseases were commonest and accounted for >50% of all health problems. Hypertension, diabetes, and lipid disorder together accounted for almost 25% of all health problems in adults. Hypertension ranked ninth among young adults, accounting for 1.4%. Over 70% of all health problems in the children and over 50% in adolescent and young adults were acute in nature. In terms of psychological problems, anxiety accounted for 1.1% in adults, 1.0% in young adults, and 0.6% in the elderly, whereas depression accounted for 0.7% in young adults, 0.9% in adults, and 0.5% in the elderly. In terms of preventive care, immunisation was in the top 10 for all age-groups (except in the elderly [1.3%]), as was physical check-up in young adults (2.7%) and adults (1.9%), but only 0.5% in the elderly.

Table 2 shows the age-sex distribution of the patient population, payment method, nature of health problems, and workload by practice sectors. Doctors in the public sector encountered more elderly patients and those with chronic illness. They also encountered significantly more health problems per encounter and had a heavier workload than those in the private sector. Chronic illnesses with significant morbidity and mortality, such as hypertension (25.7%), diabetes (10.4%), lipid disorder (5.3%), cerebrovascular disease (2.3%), ischaemic heart disease (1.5%), osteoarthritis (1.7%), and chronic obstructive pulmonary disease (0.9%), accounted for almost half of all problems encountered in the public sector, but were less frequently in the private sector. Preventive care (such as immunisation and physical check-up) was more commonly performed in the private sector, accounting for 2.6% and 2.3% of all health problems, respectively. Anxiety and depression accounted for 1.1% and 0.8% of health problems, respectively, in the private sector, compared to only 0.2% and 0.4% in the public sector. Moreover, doctors with family medicine

training were more involved in chronic disease care than doctors without such training.

Management pattern in primary care in Hong Kong

Table 3 summarises overall management patterns in primary care services in Hong Kong and those in the private and public sectors. Almost 90% of all encounters resulted in a prescription. The overall prescribing rate for antibiotics was 11.0% and those of benzodiazepines, the non-benzodiazepine or 'Z' hypnotics, and antidepressants were low. Investigations (including all types of blood tests, microbiology tests, and imaging) were ordered in 9.0% of all encounters. In the private sector, 34.8% of all encounters entailed investigations for acute problems, 26.9% for preventive care (such as physical check-ups), and only 21.0% for chronic problems. However in the public sector, 60.0% of the encounters entailed investigations for chronic problems, 22.6% for acute problems, and only 0.1% for preventive care.

To a certain extent, referral rates can reflect the need for other health care services. The overall referral rate was 3.6%; the referral rate to specialist care was 2.5%, to allied health professionals was 0.7%, and to emergency departments and for hospital admission was 0.3%. Most referrals were made to surgery (16.8%), followed by physiotherapy (14.1%), ophthalmology (11.4%) and internal medicine (10.0%). Within medical disciplines, most referrals were to surgery, ophthalmology, and internal medicine, from both the private and public sectors. Physiotherapy was the major allied health service receiving referrals from both the private and public sectors. Public sector doctors also referred patients to occupational therapy and dietetics.

Preliminary results also showed that doctors with family medicine training prescribed fewer drugs per encounter than

Table 1. Top 10 health problems encountered during consultation among different age-groups

Top 10 health problems encountered (%)				
Paediatrics	Adolescents	Young adults	Adults	Elderly
Upper respiratory tract illness (52.1)	Upper respiratory tract illness (41.9)	Upper respiratory tract illness (34.9)	Upper respiratory tract illness (19.4)	Hypertension (23.7)
Immunisation, acute bronchitis (6.0)	Gastroenteritis (7.6)	Gastroenteritis (6.0)	Hypertension (13.9)	Upper respiratory tract illness (10.8)
Gastroenteritis (4.8)	Dermatitis (4.1)	Dermatitis (3.2)	Diabetes (6.0)	Diabetes (8.9)
Dermatitis (4.2)	Allergic rhinitis (3.3)	Physical check-up (2.7)	Lipid disorder (4.5)	Lipid disorder (5.0)
Influenza (2.6)	Acute bronchitis (3.1)	Acute bronchitis (2.3)	Gastroenteritis (2.5)	Osteoarthritis, cerebrovascular disease (2.4)
Allergic rhinitis (2.1)	Influenza (3.0)	Immunisation (2.0)	Acute bronchitis, dermatitis (2.1)	Dermatityis (1.9)
Asthma (1.6)	Immunisation (2.5)	Allergic rhinitis (1.6)	Physical check-up (1.9)	Gout (1.8)
Acute tonsillitis, infectious conjunctivitis (1.3)	Acne (2.1)	Abdominal pain (1.5)	Dyspepsia (1.5)	Ischaemic heart disease (1.7)
Acute otitis media, skin infection, chickenpox, abdominal pain, cough (0.7)	Acute tonsillitis (1.6)	Influenza, hypertension (1.4)	Immunisation, abdominal pain (1.2)	Acute bronchitis (1.6)
Blepharitis/stye/chalazion, other viral rash/disease, urticaria (0.6)	Abdominal pain (1.5)	Dyspepsia, acute tonsillitis (1.2)	Anxiety, test results (1.1)	Benign prostatic hypertrophy (1.4)

those without such training. They had a lower prescribing rate for antibiotics, benzodiazepines, the 'Z' hypnotics, and antidepressants; and had higher investigation and referral rates.

Potential effects of funding on management pattern in the private sector

As primary care in the public sector is heavily subsidised by the government, only the possible effects of the funding method in the private sector were explored. This included: how likely patients consulted for acute problems, chronic problems, and preventive care, and how likely their management would entail investigations and referrals.

Comparison was made between consultations in which patients paid out of their own pockets as opposed to being reimbursed. Logistic regression analyses showed that patients who were reimbursed were more likely to consult for both acute and chronic problems, and were less likely to consult for preventive care. They were also more likely to have investigations ordered and be referred to other services.

Discussion

Primary care doctors are often the first point of contact of care and encounter problems at an early, undifferentiated

Table 2. Age-sex distribution, encounter characteristics, and workload by practice sectors

Variable	No. (%) of encounters		
	Private sector (n=38 414)	Public sector (n=13 923)	Total (n=52 337)
Mean (SD) age (years)*	38.7 (20.7)	57.0 (19.6)	43.5 (21.9)
Female:male ratio	1.4:1	1.3:1	1.4:1
Age-group (years)			
0-9	3904 (10.2)	486 (3.5)	4392 (8.4)
10-19	2710 (7.1)	386 (2.8)	3097 (5.9)
20-44	17 173 (44.7)	1929 (13.9)	19 112 (36.6)
45-64	9983 (26.0)	5789 (41.6)	15 725 (30.1)
≥65	4541 (11.8)	5362 (38.5)	9904 (19.0)
Payment method			
Out of pocket	23 177 (60.6)	9163 (65.9)	32 340 (62.0)
Insurance/employer cover	14 367 (37.6)	1757 (12.6)	16 124 (30.9)
Government assistance	275 (0.7)	2983 (21.5)	3258 (6.2)
Others	404 (1.1)	2 (0.0)	406 (0.8)
Nature of health problems	n=45 639	n=24 334	n=69 973
Acute	33 045 (72.5)	8121 (33.4)	41 166 (58.9)
Chronic	9014 (19.8)	16 031 (65.9)	25 045 (35.8)
Preventive	3428 (7.5)	162 (0.7)	3590 (5.1)
Administrative	90 (0.2)	13 (0.1)	103 (0.1)
No. of health problems per encounter*	1.2	1.7	1.3
No. of doctors	80	29	109
Mean (SD) working hours per day*	8.1 (1.5)	7.6 (0.6)	8.0 (1.3)
Mean (SD) No. of encounters per day*	33.7 (16.8)	57.5 (14.8)	40.0 (19.3)
Mean (SD) No. of encounters per hour*	4.2 (2.0)	7.6 (2.2)	5.1 (2.5)
Mean (SD) length of consultation (minutes)*	18.3 (11.4)	8.7 (3.2)	15.8 (10.7)

* P<0.05 between private and public sectors by independent sample *t* test

Table 3. Management pattern by practice sectors

Variable	No. (%) of encounters		
	Private sector (38 414)	Public sector (13 923)	Total (52 337)
No. of drugs prescribed per encounter			
Nil	4543 (12.2)	765 (5.6)	5308 (10.4)
1-3	15 629 (41.9)	7940 (57.9)	23 569 (46.2)
4-6	16 240 (43.5)	4390 (32.0)	20 630 (40.4)
>6	887 (2.4)	628 (4.6)	1515 (3.0)
Prescription			
Antibiotics	5357 (13.9)	386 (2.8)	5743 (11.0)
Benzodiazepines	570 (1.5)	38 (0.3)	608 (1.2)
'Z' hypnotics	292 (0.8)	5 (0.0)	297 (0.6)
Antidepressants	464 (1.2)	82 (0.6)	546 (1.0)
Investigation ordered	2769 (7.2)	1957 (14.1)	4726 (9.0)
Referral			
Overall	1203 (3.1)	681 (4.9)	1884 (3.6)
Specialist	856 (2.2)	457 (3.3)	1313 (2.5)
Hospital admission/accident & emergency department	104 (0.3)	57 (0.4)	161 (0.3)
Allied health	202 (0.5)	147 (1.1)	349 (0.7)
Preventive care			
Physical measurement	14 033 (36.5)	6956 (50.0)	20 989 (40.1)
Lifestyle advice	10 444 (27.2)	4935 (35.4)	15 379 (29.4)
Vaccination advice	1931 (5.0)	601 (4.3)	2532 (4.8)
Cancer screening	912 (2.4)	154 (1.1)	1066 (2.0)
Others	1865 (4.9)	957 (6.9)	2822 (5.4)

stage where a definite diagnosis cannot be made. Our findings reflect the diversity of health problems presented to primary care doctors. Primary care doctors are taking care of an increasing load of patients with chronic illness, as population is ageing. In our study, the overall prevalence of hypertension, diabetes, and lipid disorder were 10.0%, 4.0%, and 2.7%, respectively, compared to 6.6%, 2.6%, and 0.4% in the 1994 survey. Patients with these chronic conditions are prone to develop complications, particularly ischaemic heart disease and cerebrovascular disease among the elderly. Hypertension was one of the 10 commonest reasons for consultation in young adults. In the public sector, diabetes accounted for 2.9% of all health problems in this group. The high prevalence of these chronic disorders may raise the public's awareness to promote healthy lifestyle, early detection, continual monitoring, and early detection of complications, as well as the provision of support services.

In our study, the prevalence of respiratory allergic diseases and mental health problems may not be reflected accurately, as patients with these conditions could be under the care of specialists or these conditions may be prone to misdiagnosis or under-diagnosis. Further studies are warranted to reveal their true prevalence.

Primary care doctors are taking a greater role in preventive care; immunisation and physical check-ups together accounted for 3.6% of all encounters as compared to only 1.7% in the 1994 survey. Nonetheless, with physical check-up accounting for 2.7% of all encounters in the young adults, further studies should be conducted to explore their cost-effectiveness.

Differences in morbidity and management patterns and workload were observed between the private and public sector. Primary care doctors in the public sector encountered more chronic health problems, more health problems per encounter, and rarely performed preventive care. This can be explained by the difference in the appointment system, the nature of service provided, and the fees structure in private and public sectors. The investigation rate was much higher in the public than the private sector; most investigations were ordered for patients with chronic illness. Although the study design did not allow for the differentiation of the types of investigation ordered, sub-analysis of data may provide more information on the health problems. The overall prescribing rates for antibiotics and psychotropic drugs were generally low. The true prevalence of mental problems were likely to have been underestimated. Further studies on the type of antibiotics prescribed, their dosage and course duration are needed, as these have implications on the rational use of antibiotics and the containment of antibiotic resistance. The overall referral rate was low, indicating that most of the presenting health problems could be managed in primary care alone. The rate may be under-estimated as patient self-referral and specialist-to-specialist cross referral were not taken into account. Nonetheless, to a certain extent it reflects the demand for access to other health care services.

There was a significant difference in the allied health service referral rates between the private and public sectors. This could be explained by the more readily available and much cheaper allied health services in the public sector. Further studies are needed to examine whether there is any service gap in the private sector. Sub-analysis of the data is also needed to explore what problems resulted in referrals.

In patients whose medical fee could be reimbursed, they were more likely to consult for their health problems, have investigation ordered, and be referred to other health professionals. However, they were less likely to consult for preventive care, as the costs of preventive care were not reimbursable. Our methodology could not capture payment methods related to various medical benefit schemes, the extent of co-payment or deductibles, and other third-party payments.

Doctors with family medicine training were more involved in chronic care, and their management behaviour differed from those without such training. Further regression analyses should be performed to explore the effects of family medicine training on management behaviour.

Limitations

In the Hong Kong health care system, the service utilisation pattern is complex. There are various types of primary care services available including specialist care. This complex pattern may influence estimates of symptom prevalence and disease frequency.

Variations between diagnoses made by different doctors, or by the same doctor on different occasions were bound to occur. Discrepancies in diagnostic coding can be minimised by conducting ICPC workshops and providing doctors with ICPC-2 pages (in which common health problems were highlighted and explanatory notes provided).

This study relied on the voluntary participation of doctors; we therefore need to balance the comprehensiveness of data collected against doctors' busy clinic workload. Some data collected were very crude (for example payment method, types of drugs prescribed, and types of investigation ordered).

We can only elucidate associations, but not causality between payment methods and consulting or management patterns, as analyses were based on cross-sectional data. Other factors such as patient-doctor relationship, the doctor's training and qualification may also have an influence. Further studies, such as qualitative research, are required to explore the effect of the payment method on the choice of primary care providers, patient consultation behaviour, subsequent management, and whether other influences are present.

Conclusions

Primary care doctors are taking care of an increasing

load of patients with chronic illness; the public sector is heavily burdened with chronic disease care. There is room for expanding the private sector role in primary care for chronic disease and preventive care. As in other developed countries, more younger persons are diagnosed with chronic illness such as hypertension and diabetes. This is a public health concern. The scope of mental health problems may not be truly reflected.

The funding method may be associated with the way patients consult their doctors. Those whose medical fees were reimbursed were more likely to consult for health problems than those who pay out of pocket. These schemes had shortcomings in health promotion as they only reimbursed treatment care and not preventive care.

The current patient morbidity and management patterns in primary care in Hong Kong provide an insight on the health care services needs in our population. This information should be used to guide the content of the undergraduate medical curriculum and family medicine vocational training programmes. Further prospective studies examining the effects of various payment schemes on service utilisation pattern in the private sector may help to identify ways to galvanise chronic and preventive care in the private sector, where the bulk of primary care takes place.

Acknowledgements

References

1. Strong K, Bonita R. The SuRF Report 1. Surveillance of risk factors related to non-communicable diseases: current status of global data. World Health Organization; 2003.
2. Lee A, Chan KK, Wun YT, Ma PL, Li L, Cheong SP. A morbidity survey in Hong Kong 1994. Hong Kong Pract 1995;17:246-55.
3. WONCA. International Classification of Primary Care ICPC-2. Second edition. Oxford University Press; 1998.
4. Lam C, Leung GM, Mercer SW, et al. Utilisation pattern of primary health care services in Hong Kong – does having a family doctor make any difference? Studies in Health Services. Final report: SHS-P-10. Food and Health Bureau, Hong Kong SAR Government. Available at http://fhbgrants.netsoft.net/english/funded_search/funded_search_detail.php?id=935&no=1.

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Key Messages

1. The implementation of the smoke-free legislation has shown no evidence of displacement of smoking from restricted smoking venues to home, and there was a decline in the prevalence of fathers smoking at home and around children. Hence, second-hand smoke exposure at home was reduced.

2. Mothers responded positively to the legislation as reflected by a substantial increase in their actions to protect their children from second-hand smoke exposure and a moderate increase in advising the smoking fathers to quit.

3. Only a small proportion of the smoking fathers showed changes in their smoking-related psychological factors suggesting the need for a comprehensive and strategic promotion of smoking cessation services to support smokers in the community.

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New anti-smoking legislation on second-hand smoke exposure of children in homes

Introduction

Exposure to second-hand smoke is harmful to health and causes death, disease, and disability.[1] The Hong Kong SAR government has implemented a comprehensive smoke-free legislation that bans smoking in all indoor places in workplaces, restaurants, karaokes, schools and universities (indoor and outdoor), parks, and beaches on 1 January 2007. Non-smokers are better protected by the smoking restriction in public places, but their second-hand smoke exposure at home depends on the smoker's behaviour inside the household. Although previous studies showed no evidence of displacement of smoking from public areas to the homes after legislation,[2] it is unclear whether this would also be observed in Hong Kong given the uneven distribution of smokers by gender.[3]

We aimed to study whether smoking fathers would smoke inside their homes owing to the restriction in non-smoking areas, and hence lead to an increase in second-hand smoke exposure to their spouse and children.

Methods

This study was conducted from May 2007 to December 2008, using a prospective survey of two cohorts of families recruited before legislation and a cross-sectional survey of families after legislation. Families with a non-smoking mother and a child aged <12 years living in the same household for at least 5 days in the past week, and a smoking father who smoked at least one cigarette daily in the past week but not partaking in a smoking cessation programme were recruited at four Maternal and Child Health Centres and five Student Health Service Centres. We administered two standardised and structured questionnaires developed from previous telephone instruments directed at mothers and fathers in June 2007 to August 2008.

Regarding the pre-legislation groups, the 2005 and 2006 studies were pilots of randomised controlled trials to test a nurse-delivered smoking hygiene intervention to the non-smoking mothers to reduce the second-hand smoke exposure in the household, and a low-intensity smoking cessation intervention to the smoking fathers with feedback on second-hand smoke exposure among non-smoking mothers and children in the home. The 2005 group comprised 186 families (95 interventions, 91 controls) and the 2006 group comprises 114 families (34 interventions, 80 controls).

Regarding the post-legislation groups, 742 non-smoking mothers and 608 smoking fathers completed the survey and formed the 2007a group, whereas 101 mothers and 90 fathers in the 2005 study and 88 non-smoking mothers and 84 smoking fathers in the 2006 study completed the survey and formed the 2007b group (189 mothers, 174 fathers).

The primary outcome was the parent-reported second-hand smoke exposure of the children in the home. Secondary outcomes included mother's actions in (1) protecting their children from second-hand smoke exposure in the home, (2) helping the father in quitting, and (3) parents' perceived impact of the legislation on their behaviours regarding father's smoking behaviour.

Results

Characteristics of the subjects of the 2007a group

The mean age of fathers was 39.3 years; 75.1% had secondary education; 95.4% were currently employed; and 74.5% had monthly personal income of ≤$20 000. They were significantly older, more diverse in terms of educational level, and had higher monthly personal income than the 2005 group. They were also significantly younger than the 2006 group and had similar educational profiles.

The mean age of mothers was 36.6 years; 82.6% had secondary education; 51.7% were housewives; 56.3% reported a monthly household income of ≤$20 000; 65% perceived having good physical health; and 98.1% reported a good relationship with their spouse. They were similar in educational profiles to mothers in the 2006 group, but were significantly older. Fewer of them were housewives, had monthly household income of ≤$20 000, and perceived good physical health than the 2005 group.

The mean age of children was 6.4 years; 50.3% were boys; 65.8% had never been hospitalised since birth; and 72.3% did not consult doctors in the past month. They were also significantly younger, had more hospitalisations since birth, and consulted doctors more in the past month than the 2005 group.

Parent-reported second-hand smoke exposure of the children

About 26.7% and 63.8% of the fathers reported they had never smoked and smoked at specific areas/time period at home, respectively, whereas 59.7% and 34.2% never and sometimes smoked around their children, respectively (Table 1). Significantly more fathers in the 2007a group than the 2006 group never smoked at home (26.7% vs 14.0%), and never smoked around their children (59.7% vs 30.7%). The differences remained significant after adjusting for the father's educational level and age using MANOVA (F=9.24, P<0.001). Regarding 60.6% of fathers who smoked at home and 45.3% of fathers who smoked around children in the 2007a group, they only smoked one to four cigarettes daily at home and around children, respectively.

Over 70% of the mothers reported that the fathers smoked one to 14 cigarettes at home, whereas 67.0% reported that the fathers did not smoke around their children in the past week. Only 18% of the mothers reported their children had at least 1 hour of second-hand smoke exposure at home, and 94.4% said that there was no smoker other than the father who smoked near the child. The 2007a group mothers reported that fathers smoked significantly fewer cigarettes around the children, there were fewer smokers around the children, and children had less second-hand smoke exposure at home, but more mothers reported that the fathers consumed more cigarettes at home than the 2005 group. The differences in mother-reported father's cigarette consumption at home and around children remained significant after adjusting for

mother's education level, age, and employment status using MANOVA (F=54.0, P<0.001).

Mothers' actions in protecting the children from second-hand smoke exposure and helping fathers quit

Among mothers who reported their children had second-hand smoke exposure at home (186 in 2005 group, 318 in 2007a group), significantly more 2007a group mothers practised seven out of the nine specific actions in protecting their children from second-hand smoke exposure, and the differences in proportions of mothers taking the seven specific actions were substantial (Table 2).

About one third of the mothers did not advise their husbands to quit smoking in both 2005 and 2007a groups. Significantly more 2007a group mothers asked the fathers to quit more frequently than the 2005 group mothers did; they 'placed a no-smoking sign at home' (1.6% vs 8.6%) and 'discussed the need to quit with the fathers' (0.8% vs 9.3%), but fewer mothers 'gave the fathers the smoking cessation booklet' (17.7% vs 6.3%).

Mothers provided only limited support in helping the fathers quit smoking; small proportion (<20%) reported this practice in each of the 10 supporting actions in both groups. Compared to the 2005 group, significantly more 2007a group mothers 'complimented the fathers when they did not smoke' (7.3% vs 17.4%) and 'told the fathers to stick with quitting' (0% vs 6.6%), but fewer mothers helped the fathers to 'think of' (19.5% vs 10.3%) and 'use' (13.0% vs 9.0%) substitutes for cigarettes.

Parents' perceived impact of the smoke-free legislation

Over 95% of the fathers were aware of, and about 40% of them had changed in their cigarette consumption after the smoke-free legislation in both the 2007a and 2007b groups (Table 3). After the legislation in the 2007a group, 4% of the fathers had increased their smoking and 14% had no smoking at home, whereas 4% of the fathers had increased smoking and 33% did not smoke around their children. Similar patterns were observed in the 2007b group except that only 1.3% and 2.0% of the fathers had increased their smoking at home and around their children, respectively. Moreover, although a large proportion of fathers remained unchanged, more fathers reported that they had increased their perceived motivation, recognition of its importance, and confidence in quitting smoking. They had less perceived difficulty in quitting, owing to the implementation of the legislation.

In both 2007a and 2007b groups, most of the mothers were aware of the new legislation; more mothers reported that their husbands had reduced their cigarette consumption at home; more mothers had increased their actions in protecting their children from second-hand smoke exposure, and were more active in helping their husband to quit after the legislation. There was no significant difference in the 2007a and 2007b groups.

Table 1. Parent-reported second-hand smoke exposure of the children*

Second-hand smoke exposure of children	No. (%) of persons			P value (Chi-square test)
	2005 group	2006 group	2007a group	
Father-reported	n=186	n=114	n=608	
Smoking behaviour at home				0.008
Never smoke at home	-	16 (14.0)	158 (26.7)	
Smoked at specific area/period	-	81 (71.1)	377 (63.8)	
Smoked everywhere	-	17 (14.9)	56 (9.5)	
Smoking behaviours around children				<0.001
Never smoked around children	-	35 (30.7)	352 (59.7)	
Sometimes	-	69 (60.5)	202 (34.2)	
Usually	-	5 (4.4)	11 (1.9)	
Always	-	5 (4.4)	25 (4.3)	
No. of cigarettes smoked daily at home (among those smoked at home)				
<1	-	-	37 (8.7)	
1-4	-	-	258 (60.6)	
5-14	-	-	104 (24.4)	
15-24	-	-	16 (3.8)	
>24	-	-	5 (1.2)	
Don't know	-	-	6 (1.4)	
No. of cigarettes smoked within 10 feet of the child in the past week (among those who smoked near children)				
<1	-	-	91 (39.2)	
1-4	-	-	105 (45.3)	
5-14	-	-	22 (9.5)	
15-24	-	-	3 (1.3)	
>24	-	-	11 (4.7)	
Mother-reported	n=186	n=114	n=742	
Father's daily cigarette consumption at home in the past week				<0.001
<1	30 (16.1)	-	38 (7.3)	
1-4	119 (64.0)	-	269 (51.6)	
5-14	34 (18.3)	-	111 (21.3)	
15-24	2 (1.1)	-	24 (4.6)	
>24	0 (0)	-	3 (0.6)	
Don't know	1 (0.5)	-	76 (14.6)	
Father's cigarette consumption within 10 feet of the child in the past week				<0.001
None	18 (9.7)	-	493 (67.0)	
<1	67 (36.0)	-	53 (7.2)	
1-4	78 (41.9)	-	116 (15.8)	
5-14	20 (10.8)	-	36 (4.9)	
15-24	2 (1.1)	-	6 (0.8)	
>24	0 (0)	-	2 (0.3)	
Don't know	1 (0.5)	-	30 (4.1)	
No. of smokers (excluding father) who smoked within 10 feet of the child in the past week				<0.001
0	48 (25.8)	-	689 (94.4)	
1	124 (66.7)	-	38 (5.2)	
2	12 (6.5)	-	3 (0.4)	
3	2 (1.1)	-	0 (0)	
Child's exposure at home (hours per day)				<0.001
No exposure	9 (4.8)	-	425 (58.1)	
Occasional	77 (41.4)	-	175 (23.9)	
1	53 (28.5)	-	71 (9.7)	
2-4	44 (23.7)	-	47 (6.4)	
5-7	2 (1.1)	-	11 (1.5)	
8-10	1 (0.5)	-	3 (0.4)	
Mother-reported child's symptoms of second-hand smoke exposure				
No symptoms	175 (94.1)	-	208 (66.0)	<0.001
Eye discomfort	2 (1.1)	-	18 (5.7)	0.009
Sore throat	1 (0.5)	-	7 (2.2)	0.27
Coughing	4 (2.2)	-	51 (16.2)	<0.001
Shortness of breath	0 (0)	-	10 (3.2)	<0.001
Running nose and sneezing	4 (2.2)	-	34 (10.8)	<0.001
Loss of appetite	0 (0)	-	5 (1.6)	0.16
Increase in heart rate	0 (0)	-	2 (0.6)	0.53
Father's smoking behaviour at home				
Never	-	-	39 (6.9)	
Smoked in specific areas	-	-	461 (81.9)	
Smoked everywhere	-	-	63 (11.2)	
Father's smoking behaviour around children				
Never	-	-	465 (62.7)	
Sometimes	-	-	219 (29.5)	
Usually	-	-	11 (1.5)	
Always	-	-	47 (6.3)	

* Missing data are excluded from analysis

Table 2. Mother's actions to protect children from second-hand smoke exposure and helping fathers quit*

Mother's actions	No. (%) of persons		P value (Chi-square test)
	2005 group (n=186)	2007a group (n=318)	
Take the child away from smoke	11 (5.9)	267 (84.0)	<0.001
Open the window	182 (97.8)	292 (91.8)	0.006
Place a 'No Smoking' sign at home	2 (1.1)	88 (27.7)	<0.001
Advise father to reduce smoking	181 (97.3)	286 (90.0)	0.04
Advise other family members to reduce smoking	11 (5.9)	105 (37.6)	<0.001
Advise father avoid smoking at home	166 (89.2)	263 (83.5)	0.087
Advise other family members avoid smoking at home	3 (1.6)	99 (35.7)	<0.001
Advise father avoid smoking around the child	131 (70.4)	271 (85.8)	<0.001
Advise other family members avoid smoking around the child	3 (1.6)	101 (36.6)	<0.001
Mother advised father quit smoking	n=186	n=737	<0.001
Never	62 (33.3)	274 (37.2)	
1-3 times	113 (60.8)	198 (26.9)	
4-6 times	8 (4.3)	81 (11.0)	
7-9 times	2 (1.1)	22 (3.0)	
>9 times	1 (0.5)	162 (22.0)	
Mother's actions to help father quit	n=124	n=460	
Set a quit date	1 (0.8)	12 (2.6)	0.32
Removed all the smoking-related utensils	6 (4.8)	24 (5.2)	1.00
Placed a 'No Smoking' sign at home	2 (1.6)	39 (8.5)	0.001
Requested others not to smoke near the father	6 (4.8)	16 (3.5)	0.44
Gave father smoking cessation booklet	22 (17.7)	29 (6.3)	0.004
Advised to seek professional help	2 (1.6)	21 (4.6)	0.19
Benefit to the child's health after quitting	53 (42.7)	201 (43.7)	0.10
Smoking can lead to death	34 (27.4)	127 (27.6)	0.36
Quit smoking can save money	36 (29.0)	127 (27.6)	0.91
Discussed with father of needs in quitting	1 (0.8)	43 (9.3)	<0.001
Mother's support in helping father quit	n=123	n=456	
Compliment father when he did not smoke	9 (7.3)	79 (17.4)	0.005
Congratulated him for decided to quit	1 (0.8)	17 (3.7)	0.14
Help father to think of substitutes for cigarettes	24 (19.5)	47 (10.3)	0.008
Celebrate with father on his success in quitting smoking	0 (0)	4 (0.8)	0.58
Comfort father when he was feeling stressed or irritated	9 (7.3)	14 (3.1)	0.18
Tell father to stick with quitting	0 (0)	30 (6.6)	0.001
Express confidence in father's ability to quit/remain quitting	4 (3.3)	13 (2.9)	0.77
Participate in activities with father to keep him from smoking	7 (5.7)	2 (0.4)	<0.001
Express pleasure at father's effort to quit	4 (3.3)	25 (5.5)	0.48
Help father to use substitutes for cigarettes	16 (13.0)	41 (9.0)	0.23

* Missing data are excluded from analysis

Discussion

This study revealed a reduction in parent-reported second-hand smoke exposure in children at home after the implementation of the smoke-free legislation in Hong Kong. The father-reported smoking prevalence rate around children decreased from 69.3% at baseline to 40.3% after the legislation. There was a more striking drop from 90.3% to 33.0% in the corresponding mother-reported father's smoking rate around the children. The father-reported smoking prevalence rate at home decreased from 86.0% in the 2006 group to 73.3% in the 2007a group. However, mothers reported an increase in father's cigarette consumption at home in the 2007a group as compared to the 2005 group. This contradictory observation can be explained by the higher mean daily cigarette consumption among the fathers in the 2007a group, and the possibility of the father smoking in different areas in the home where the child was not around.

The mothers reported a substantial increase in actions they took to protect their children from second-hand smoke exposure. Over 50% of the mothers in both 2007a and 2007b groups reported an increase in their actions after legislation. The non-smoking mothers more often advised that the smoking fathers quit smoking.

Most fathers thought that there had been little/no change in their smoking-related psychosocial factors. About 50% reported a reduction, and only <15% reported an increase in their own second-hand smoke exposure after the legislation. The reduction in second-hand smoke exposure may be due to the complete ban of smoking in indoors including places for entertainment where smoking was mostly seen in public open areas. Mothers reflected more changes in their behaviours regarding smoking that 50% reported an increase in their actions to protect their children from second-hand smoke exposure and about 30% reported an increase in their support to help their husbands to quit after the legislation. These results suggest that the non-smoking mothers were more responsive, in a positive way, to the smoke-free legislation. Nonetheless, some of the smoking fathers did not change their smoking behaviour at all.

Our repeated cross-sectional design is less robust than a longitudinal design, but this is the best method given the limitations. The two pre-legislation samples were pilots for randomised controlled studies, hence the sample size was small and may not be representative of the Hong Kong population. The samples recruited before and after the legislation showed some socioeconomic differences (ie age, education level, and employment status) but these

Table 3. Perceived effect of the new anti-smoking legislation on parents' behaviours*

Parents' behaviour	No. (%) of persons		P value (Chi-square test)
	2007a group	2007b group	
Father's opinion	n=608	n=174	
Aware of the new legislation	587 (96.9)	174 (98.9)	0.19
Change in cigarette consumption	249 (41.3)	66 (37.5)	0.38
Smoking at home			0.04
Decrease	112 (18.6)	41 (27.2)	
No change	382 (63.3)	92 (60.9)	
Increase	25 (4.1)	2 (1.3)	
Did not smoke at home	84 (13.9)	16 (10.6)	
Smoking around their children			0.10
Decrease	105 (17.4)	32 (21.2)	
No change	276 (45.8)	56 (37.1)	
Increase	25 (4.1)	3 (2.0)	
Did not smoke in front of children	197 (32.7)	60 (39.7)	
Motivation to quit smoking			0.047
Decrease	38 (6.3)	5 (2.9)	
No change	407 (67.4)	109 (63.0)	
Increase	159 (26.3)	59 (34.1)	
Importance of quitting smoking			0.07
Decrease	11 (1.8)	1 (0.6)	
No change	440 (72.8)	115 (66.1)	
Increase	153 (25.3)	58 (33.3)	
Confidence in quitting			0.13
Decrease	11 (1.8)	1 (0.6)	
No change	481 (79.8)	130 (75.1)	
Increase	111 (18.4)	42 (24.3)	
Difficulty in quitting			0.002
Decrease	52 (8.6)	31 (18.0)	
No change	519 (85.9)	132 (76.7)	
Increase	33 (5.5)	9 (5.2)	
Significant others encourage them to quit			0.35
Decrease	7 (1.2)	0 (0)	
No change	409 (67.8)	115 (67.3)	
Increase	187 (31.0)	56 (32.7)	
Experience less second-hand smoke exposure			0.63
Decrease	272 (45.0)	86 (49.1)	
No change	246 (40.7)	66 (37.7)	
Increase	86 (14.2)	23 (13.1)	
Mother's opinion	n=742	n=189	
Aware of the new legislation	703 (94.7)	181 (96.3)	0.46
Cigarettes consumption of the fathers at home			0.81
Decrease	167 (22.6)	38 (20.7)	
No change	520 (70.4)	134 (72.8)	
Increase	52 (7.0)	12 (6.5)	
Actions in protecting their children from second-hand smoke exposure			0.93
Decrease	87 (11.7)	20 (10.6)	
No change	282 (38.1)	71 (38.2)	
Increase	372 (50.2)	95 (51.1)	
Support in helping the fathers to quit			0.82
Decrease	20 (2.7)	6 (3.2)	
No change	502 (67.7)	128 (69.2)	
Increase	219 (29.6)	51 (27.6)	

* Missing data are excluded from analysis

differences were controlled for in the analyses of primary outcomes, making systematic bias less likely.

These results demonstrated the effectiveness of comprehensive smoke-free legislation in protecting non-smokers, in particular children, from second-hand smoke exposure. Not only has it shown no displacement of smoking from restricted smoking venues to homes, it has also influenced the fathers' smoking behaviour and improved smoking hygiene at home. Other Asian countries with a high prevalence of smoking should consider adopting such a policy to improve health and save lives.

References

1. US Department of Health and Human Services. The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General. Washington: US Department of Health and Human Services; 2006.
2. Akhtar PC, Currie DB, Currie CE, Haw SJ. Changes in child exposure to environmental tobacco smoke (CHETS) study after implementation of smoke-free legislation in Scotland: national cross sectional survey. BMJ 2007;335:545.
3. Social Surveys Section. Thematic Household Survey, Report No.28. Hong Kong: Census and Statistics Department, Hong Kong; 2008.

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STUDIES IN HEALTH SERVICES

New anti-smoking legislation on youth smoking and quitting behaviours via a smoking cessation hotline

Key Messages

1. The new anti-smoking legislation resulted in a short-term increase in the number of telephone calls received and subjects recruited by the quitline.
2. The effects of de-normalisation in the smoking behaviour appeared to have started among the youth smokers seeking help from Youth Quitline after the legislation. Nevertheless, more regular scoial marketing campaigns targeting youth quitting and the provision of free, easily accessible, and youth-oriented smoking cessation services are needed to maximise youth smokers' motivation to quit.
3. Smoke-free legislation needs to be reinforced by additional and regular campaigns to maximise smokers' motivation to quit.

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Introduction

The Hong Kong SAR government has implemented comprehensive smoke-free legislation on 1 January 2007 to prohibit smoking in all indoor workplaces, restaurants, karaokes, most public places/parks, and all beaches. Youth smokers are of concern as they are likely to become long-term smokers. They are more deterred by restrictions on smoking in public places, which are associated with the prevalence of youth smoking.[1,2]

Data were collected from the Youth Quitline[3] (first smoking cessation hotline for youth) before and after the smoke-free legislation came into effect to examine its impact on youth smokers in Hong Kong.

Methods

This study was conducted from May 2007 to December 2008, using a two-group comparison. The Youth Quitline targeted Chinese smokers aged 12 to 25 years who smoked at least one cigarette in the past 30 days. Peer-led telephone counselling (a motivational intervention with multiple follow-up sessions) was provided. Data obtained from the quitline were classified into pre- and post-legislation groups.

From 8 August 2005 to 30 June 2008, 542 youth smokers consented and received telephone smoking cessation counselling from the Youth Quitline, of which 254 and 288 subjects formed the pre- and post-legislation groups, respectively.

Six months after legislation, the primary outcome was the self-reported number of quit attempts in the past 3 months; secondary outcomes included (1) the self-reported 7-day point prevalence quit rate, (2) self-reported continuous 1-month quit rate, (3) smoking reduction by at least 50%, and (4) the stage of readiness to quit in the past 30 days.

Results

The Youth Quitline received 2765 calls, of which 1549 (56%) were relevant, and 600 eligible youth smokers were received. Our time-series analyses on the first three quarters of the pre- and post-legislation periods showed that the initial impact of legislation yielded an increase of 16.5 calls per week (P<0.001) and became insignificant within 6 months.[4] The mean number of calls per week decreased from 21.8 before implementation of the legislation to 15.0 thereafter. A higher percentage of smokers were recruited in the post- than the pre-legislation period (288/751 vs 254/798, P=0.008), given similar levels of the publicity about the quitline in terms of total events and the percentage initiated by The University of Hong Kong team in both periods (pre-legislation period: 57 events and 29 (50.0%); P=0.52).

Among the 542 youth smokers (mean age, 17.9 years; standard deviation [SD], 3.7 years) receiving smoking cessation interventions from Youth Quitline, 73%

were male; 96% were single; 61% were full-time students; 45% had attained education below Form 4; 60% reported household income of HK$10 000-29 999; 55% perceived good physical health; and 60% drank alcohol regularly. The youth smokers in the post-legislation period were younger, more were students, had higher household income, and had exercised in the past 30 days. Overall, the youth smokers started smoking at age 13.7 (SD, 2.4) years and consumed 11.1 (SD, 7.7) cigarettes daily (in their smoking days) in the past month, and 15% had a severe level of nicotine dependency. They usually smoked in public places (71%) and at home (52%). The post-legislation youth smokers were younger when they started smoking (P=0.02), and fewer smoked at places for entertainment (24% vs 12%, P<0.001), during social events (15% vs 6%, P<0.001) and at school (17% vs 7%, P<0.001).

Overall, 80% of the youth smokers had tried to reduce their daily cigarette consumption and 71% had previous attempts at quitting (lasting ≥24 hours). Of these smokers, 64% were in the lower stages of readiness to quit (pre-contemplation/contemplation). The youth smokers had high mean levels in perceived importance and difficulty in quitting, a moderate level of perceived confidence to quit successfully, and a relatively low level of self-efficacy to resist smoking. The two groups were not significantly different in these parameters.

Comparison of changes in quitting-related behaviours 6 months after legislation

The post-legislation group showed more positive changes in quitting-related behaviours at month 6 compared to baseline, although only the difference in reduced cigarette consumption by at least half was significant. In particular, the post-legislation group had higher rates in having ≥3 quit attempts in the past 3 months (47% vs 39%), in having ≥1 quit attempt in the past 3 months (57% vs 53%), in self-reported successful quitting (7-day point prevalence quit rate of 27% vs 22%, continuous 1-month quit rate of 19% vs 18%), moving upward in the stage of readiness to quit (28% vs 26%), and reducing cigarette consumption by at least half (45% vs 36%, P=0.04) [Table 1]. Exploratory analyses showed that the significant reduction in cigarette

consumption disappeared after excluding self-reported quitters (28% vs 22%, P=0.09).

Multivariate logistic regression analysis revealed that the likelihood of having ≥3 quit attempts increased if the subject was in the preparation stage, had less nicotine dependency, was male, was more confident about quitting, and smoked fewer days in the last week. The likelihood of quitting increased if the subject was in the preparation or action stage, more confident about quitting, smoked fewer cigarettes (in smoking days) in the last month, and had an education level of Form 4-5. The likelihood of moving upward in the stage of readiness to quit increased if the subject had an education level above Form 5. The likelihood of reducing cigarette consumption by at least half increased if the subject was in the preparation stage, smoked fewer days in the last week, was more confident about quitting, and was recruited in the post-legislation period (Table 2).

Perceived impact of the smoke-free legislation after legislation

Among the post-legislation group, about one third of the youth smokers had increased in their motivation to quit smoking (37%), perceived the importance in successful quitting (32%), and were confident of quitting (28%). About 11% perceived less difficulty in quitting, whereas over 60% exhibited no change in these variables. About 29% of the youth smokers reported receiving more encouragement to quit from their significant others; 22% offered more encouragement to other smokers to quit, and 78% were not affected by the legislation. After implementation of the legislation, 17% had increased and 35% had decreased exposure to second-hand smoke (Table 3).

Discussion

The findings appeared to have an overall increase in awareness of smoking cessation among the youth smokers and persons around the smokers during the post-legislation period, as there were more calls and case recruitments for counselling, at least in the initial period after implementation. The indoor smoking ban has also restricted the venues for smoking among our youth smokers such as in schools,

Table 1. Quitting behaviours at the 6-month follow-up (intention-to-treat analysis)

Quitting behaviour	No. (%) of youth smokers			P value
	Total (n=542)	Pre-legislation (n=254)	Post-legislation (n=288)	
Had at least 3 quit attempts in the past 3 months	232 (42.8)	100 (39.4)	136 (47.2)	0.07
Had quit attempt(s) in the past 3 months	294 (54.5)	134 (52.8)	160 (56.5)	0.38
No smoking in the past 7 days	130 (24.0)	57 (22.4)	77 (26.7)	0.27
No smoking in the past month	101 (18.6)	45 (17.7)	56 (19.4)	0.66
Moved upward in stage of readiness to quit	144 (26.6)	65 (25.6)	81 (28.1)	0.56
Reduced daily cigarette consumption by at least half	219 (40.4)	92 (36.2)	130 (45.1)	0.04
Excluding quitters	n=412	n=197	n=211	
Had at least 3 quit attempts in the past 3 months	104 (25.2)	43 (21.8)	60 (28.4)	0.14
Reduced daily cigarette consumption by at least half	89 (21.6)	35 (17.8)	53 (25.1)	0.09

places for entertainment, and during social events, as fewer subjects reported smoking in those places. Previous studies showed that restriction in the overall social and physical environment for smoking would lead to de-normalisation of the smoking behaviour and would motivate smokers to quit.[1,2] More subjects in the post-legislation period indicated they would receive support from family and friends if they quit smoking, which shows a more favourable environment towards quitting.

Positive changes were noted in individual smoking and quitting behaviours at month 6 in the two periods, although not all differences were significant. After the legislation, the proportion of youth smokers reporting at least 3 quit attempts in the past 3 months increased from 39.4% to 47.2% (a difference of 7.8%). The legislation could motivate youth smokers to quit. There was a significant increase of 8.9% (from 36.2% to 45.1%) of those reducing cigarette consumption by at least half after

Table 2. Multivariate logistic regression analysis of baseline predictors of four quitting-related outcomes at the 6-month follow-up (including quitters)

Predictors	Adjusted odds ratio	95% CI
Had at least 3 serious attempts in the past 3 months		
Stage at baseline		
Pre-contemplation (reference)	1	
Contemplation	1.03	0.59-1.81
Preparation	2.54*	1.38-4.68
Action	1.28	0.50-3.30
Nicotine dependency		
Mild (reference)	1	
Moderate	1.10	0.64-1.90
Severe	0.50*	0.26-0.98
Gender		
Male (reference)	1	
Female	0.46*	0.38-0.99
Confidence in quitting (per score)	1.15*	1.04-1.27
No. of smoking days in the last week (per day)	0.87*	0.76-0.99
7-day point prevalence quit rate		
Stage at baseline		
Pre-contemplation (reference)	1	
Contemplation	1.10	0.59-2.03
Preparation	2.18*	1.20-3.97
Action	3.85*	1.73-8.57
Education level		
<Form 4 (reference)	1	
Form 4-5	0.60*	0.36-1.00
>Form 5	1.67	0.91-3.06
Confidence in quitting (per score)	1.19*	1.07-1.32
Daily cigarette consumption in smoking days in the last month (per cigarette)	0.97*	0.94-1.00
Moved up in stage of readiness to quit		
Education level		
<Form 4 (reference)	1	
Form 4-5	0.85	0.55-1.32
>Form 5	1.83*	1.09-3.07
Reduced cigarette consumption by at least half		
Stage at baseline		
Pre-contemplation (reference)	1	
Contemplation	1.03	0.62-1.70
Preparation	1.85*	1.10-3.12
Action	1.57	0.72-3.42
No. of smoking days in the last week (per day)	0.88*	0.79-0.99
Confidence in quitting (per score)	1.09*	1.00-1.20
Legislation period		
Before (reference)	1	
After	1.74*	1.17-2.61

* P<0.05

Table 3. Perceived impact of the anti-smoking legislation on youth smokers in the post-legislation group (n=288)

Perceived impact	No. (%) of youth smokers		
	Increased	No change	Decreased
Motivation to quit (missing=29)	95 (36.7)	157 (60.6)	7 (2.7)
Importance in successful quitting (missing=29)	82 (31.7)	174 (67.2)	3 (1.2)
Confidence in quitting (missing=30)	73 (28.3)	179 (69.4)	6 (2.3)
Difficulty in quitting (missing=29)	39 (15.1)	191 (73.7)	29 (11.2)
Encouragement to quit from important others (missing=24)	76 (28.8)	187 (70.8)	1 (0.4)
Encouragement to others to quit (missing=19)	58 (21.6)	210 (78.1)	1 (0.4)
Second-hand smoke exposure (missing=16)	46 (16.9)	132 (48.5)	94 (34.6)

the legislation (including quitters). This showed a positive effect of the legislation on smoking behaviour among youth smokers. Calling during the post-legislation period was an independent predictor of smoking reduction by at least 50% after controlling for the effects of stage of readiness to quit, daily cigarette consumption, and confidence in quitting at baseline. Reducing smoking is an important first step to complete quitting in the future, and sheds light on developing and testing of effective strategies focusing on smoking reduction as a tool to reach complete cessation among the youth smokers.

The post-legislation group showed a slight increase in the 7-day point prevalent quit rate (22.4% vs 26.7%), but the result was not statistically significant, which may not be too surprising, as the youth smokers in our samples reported similar intention to quit before and after legislation. Despite the overall decrease in smoking prevalence in Hong Kong from 14% to 12% after the legislation, in 2008 the smoking prevalence among Hong Kong adolescents (aged 15-19 years) increased from 2.4% to 3.5%.[5] Therefore, the smoke-free legislation alone may not be effective in preventing the initiation of smoking and inducing quitting if there are no strong and sustained campaigns. The stage of readiness to quit and confidence of quitting at baseline were important independent predictors for quitting behaviour at month 6 among the youth smokers. To boost motivation and confidence, there should be personalised smoking cessation counselling such as the Youth Quitline.

Although most youth smokers in the post-legislation group thought that there had been little/no change, about one third of them reported a positive impact on their perceived self-efficacy to resist smoking, suggesting that more effort from the government in promoting quitting is necessary.

Limitations

Only 288 youth smokers were recruited from the Youth Quitline after legislation, which was smaller than the 377 expected. The existing sample size did not provide sufficient statistical power to detect small legislation effects. In addition, the self-reporting of data could have introduced a bias. The follow-up rates could have been improved but as the rates were similar in both groups, the bias was unlikely, and a conservative approach was used by treating the drop-outs as smokers. About 33.9% of the pre-legislation youth smokers had their 6-month follow-up during the post-legislation period, which might have introduced biases, particularly with respect to differences in smoking and quitting behaviours that might tend to reduce the apparent impact of the legislation.

Conclusion

The effect of denormalisation of smoking has started to appear among the youth smokers who called Youth Quitline, as they reported an overall moderate reduction in cigarette consumption and fewer of them smoked in schools, places of entertainment, and during social events. There were positive changes in smoking reduction and more quit attempts initially, but so far there was no significant effect on complete cessation.

Acknowledgements

References

1. Wakefield MA, Chaloupka FJ, Kaufman NJ, Orleans CT, Barker DC, Ruel EE. Effect of restrictions on smoking at home, at school, and in public places on teenage smoking: cross sectional study. BMJ 2000;321:333-7.
2. Siegel M, Albers AB, Cheng DM, Biener L, Rigotti NA. Effect of local restaurant smoking regulations on progression to established smoking among youths. Tob Control 2005;14:300-6.
3. Chan SS, Wong DC, Fong DY, et al. The establishment and promotion of the first Youth Quitline in Hong Kong: challenges and opportunities. Eval Health Prof 2008;31:258-71.
4. Chan SS, Wong DC, Fong DY, et al. Short-term impact of the new smoke-free legislation on the utilization of a quitline in Hong Kong. Nicotine Tob Res 2009;11:356-61.
5. Social Surveys Section, Census and Statistics Department. Thematic Household Survey Report No. 36. Pattern of Smoking. Hong Kong: Census and Statistics Department, Hong Kong SAR Government, China; November 2008.

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