

# Determinants of physicians' attitude towards prescribing

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## SUMMARY

**Objective:** To identify the primary care physicians' (PCP) characteristics that are associated with their prescribing attitude.

**Methods:** A validated questionnaire was sent to randomly selected PCPs stratified in three groups according to any higher qualification in family medicine.

**Result:** The best predictor for orientation of quality of care in prescribing was the country of qualification. Duration after qualification was negatively associated with PCP's belief in the use of drugs. Physicians who were female, with higher qualification, sooner after qualification, and working in group practice were less likely to perceive pressure from patients to prescribe, with group practice being the most significant determinant.

**Conclusion:** Different physician factors affect different aspects of PCPs' prescribing attitude. As duration after qualification was an important but negative attribute, quality use of medication should be emphasized in continuing medical education.

**Keywords:** attitude, prescription, primary care

## INTRODUCTION

Many consultations in general practice end with prescription (1, 2). Physicians' prescribing behaviour is complex and affected by interacting physician- and patient-factors: biomedical, psychosocial, and commercial (3, 4). Because of its complexity, this behaviour has not been fully understood and study-results are often inconsistent. For example, physi-

cians from different countries differ in prescribing rates (5) and their perception of patients' expectation for prescription (6). One American study showed that graduates from foreign medical schools were more likely to be 'injudicious prescribers' (7). A British study showed that doctors qualified overseas were more likely to perceive patients' expectation to prescribe (8) whereas another showed no difference in the volume and cost of drugs prescribed by Asian or British trained physicians (9). Moreover, physicians' postgraduate qualifications or training are associated with lower prescribing rates (8, 10, 11). In a study of British general practitioners, practices providing vocational training prescribed fewer broad-spectrum antibiotics than the practices not associated with training (12). How postgraduate training affects a physician's prescribing behaviour is however, not clear.

In Hong Kong, primary care physicians (PCPs) are a heterogeneous group. The local undergraduate medical curriculum is largely based on the British model. Many physicians are graduates from medical schools outside Hong Kong. Of 600 non-specialists randomly selected from the list of registered doctors in Hong Kong in Year 2000, we found that 45.1% were local graduates, 30.2% were from Mainland China, Taiwan, or Indo-China (excluding Malaysia and Singapore), and 23.5% from Britain, Australia, New Zealand, or North America. Physicians without training in family medicine or with training in any specialty may practice primary care. This mixed group of PCPs, practising in a largely uniform Chinese culture [about 93% of the Hong Kong population is born in China or Hong Kong (13)], is a good source for studying the physicians' prescribing attitude by minimizing the patients' diversified variables.

Our department developed a self-administered questionnaire (Appendix 1) to assess physicians' attitude towards medication (14). The questionnaire consists of 13 items which are reduced to three factors and interpreted as Factor 1 for

Received 29 October 2001, Accepted 20 November 2001  
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orientation to quality care, Factor 2 for perceived pressure to prescribe, and Factor 3 for disbelief in the usefulness of drugs. It was field-tested among local physicians and was found to meet accepted standards for reliability (test-retest internal consistency) and validity (content, face, construct) by factor analysis. Using this questionnaire, we surveyed PCPs in Hong Kong to examine their attitude towards medication, as part of a larger study of the knowledge and attitude on medication in local physicians and their Chinese patients.

This report aims to identify the important physician characteristics that are associated with their attitude in prescribing.

## METHOD

Physicians were recruited from the published lists of Full Membership of the Hong Kong College of Family Physicians (HKCFP) in 1997 (15) and the Practising Estate Doctors Association (PEDA, physicians running primary care practices in government low-cost housing estates) with the cooperation of the PEDA Council. These two lists contained nearly all the PCPs in Hong Kong and there was substantial overlap of membership. A master list was compiled for stratification into three physician groups:

- (i) Group 1 – with no postgraduate qualifications;
- (ii) Group 2 – with postgraduate qualifications in family medicine/general practice;
- (iii) Group 3 – with postgraduate qualifications other than family medicine but practising primary care.

A physician who satisfied the following criteria was considered to be eligible if:

- (a) the physician was involved in primary care (a small proportion of members of HKCFP practised hospital medicine);
- (b) the physician's practice was not primarily for non-Chinese expatriates.

We planned to recruit 30 physicians from each group, each of whom would agree to let us interview 50 patients. We invited them to complete the questionnaire even if they did not agree to have their patients interviewed. Because of the small number in the group, all 34 physicians of Group 3 were invited. For the other two groups, 30 physicians from each group were randomly selected and invited by letters. A reminder was sent about

2 weeks later. To replace those who refused or did not reply after the reminder, further sets of physicians were randomly selected from the master list until 6 months after the start of the project.

The response to each item in the questionnaire was coded in a Likert Scale from '1' to '5' so that high scores reflected the 'ideal' knowledge, attitude or behaviour. Student's *t*-test and analysis of variance (ANOVA) were used to evaluate differences in a single variable (e.g. gender or practice type) for each factor. A general linear model was used to analyse the main effects and interactions of multiple variables (e.g. gender and practice type) on a factor. Statistical significance was taken as  $P < 0.05$ .

## RESULT

### *Physicians' characteristics*

There were 471 physicians who satisfied the inclusion criteria (Group 1, 284; Group 2, 153; Group 3, 34). After several rounds of invitation letters, 129 physicians in Group 1, 102 in Group 2, and 34 in Group 3 (total 265) were invited. Only 133 physicians completed the questionnaires, giving a response rate of 50.2% (Table 1). The respondents were mainly males (117 or 88.0%), working in solo practice (96 or 72.2%) or in the private sector (106 or 79.7%). Those who graduated from Asian medical schools apart from Hong Kong were from Mainland China, Taiwan, and Indo-China. None of these Asian graduates worked in the public sector and only one out of the 11 held higher qualification. Physicians working in group practice were mainly (80.0%) from Group 2, and 70% (21) of physicians in group practice were in the public sector.

The mean duration since basic qualification was similar across the three groups (Table 1, ANOVA  $F = 0.203$ ,  $P = 0.82$ ); so was the mean years in primary care (ANOVA  $F = 1.98$ ,  $P = 0.14$ ). These two variables were highly correlated (Pearson coefficient = 0.89,  $P < 0.001$ ) and colinear so that we included only the variable of years after qualification into the general linear model. Although the Group 3 physicians spent less years in primary care than those in the other groups, the difference is of marginal significance (ANOVA, *post hoc* test  $P = 0.05$  for Groups 2 and 3).

**Table 1.** Characteristics of the physician recruited

Physicians' variables	Group 1: No higher qualification	Group 2: With higher qualification in family medicine	Group 3: Other specialists in primary care	Total
<b>Recruitment</b>				
Eligible	284	153	34	471
Invited	129	102	34	265
Questionnaire completed (% of those invited in the Group)	46 (35.7)	69 (67.6)	18 (52.9)	133 (50.2)
<b>Gender</b>				
Male (% of total male)	39 (33.3)	61 (52.1)	17 (14.5)	117
Female (% of total female)	7 (43.8)	8 (50.0)	1 (6.3)	16
<b>Medical school</b>				
Hong Kong	28	58	14	115
Other Asian cities	10	0	1	11
Overseas	8	11	3	22
Mean duration since graduation (years) $\pm$ SD	22.8 $\pm$ 9.6	21.8 $\pm$ 9.5	22.5 $\pm$ 6.5	22.2 $\pm$ 9.1
Mean duration in general practice (years) $\pm$ SD	16.9 $\pm$ 8.6	17.4 $\pm$ 8.9	12.6 $\pm$ 4.0	16.7 $\pm$ 8.5
<b>Practice</b>				
Solo	39	44	13	96
Group	4	24	2	30
Private	43	49	14	106
Public	0	19	2	21

**Overall responses**

Table 2 summarizes the responses of the physicians. More than 90% viewed their consultation as important even without prescription (Item 1E) and less than 40% thought that their patients regarded drugs as very important (Items 2A and 2B). The majority (89%) also regarded drugs as symptomatic relief in most occasions (Item 3C) and 43% agreed that drugs were required for successful treatment of most illnesses (Item 3A). Although 55% were confident that their patients would follow their advice even without prescription (Item 2C), another 34% worried that their patients would shop for other doctors if they received no prescription (Item 2D).

The physicians' mean scores for Factors 1, 2, and 3 were  $21.67 \pm 2.24$  (out of a maximum of 25),  $15.19 \pm 3.36$  (out of 25), and  $8.78 \pm 2.16$  (out of 15), respectively. When expressed as a percentage of the maximum, the mean scores became 87, 61, and 59%, respectively.

**Factor 1 (orientation for quality care)**

For Factor 1, physicians who graduated from Asian medical schools other than Hong Kong scored lower ( $19.9 \pm 2.3$ ) than those from Hong Kong ( $21.9 \pm 2.4$ ) or outside Asia ( $21.6 \pm 1.6$ ). This difference is statistically significant ( $F = 3.76$ ,  $P = 0.026$ ). Although the type of practice had a marginally significant association with Factor 1 (Table 3), the general linear model showed that this association was not significant ( $F = 2.37$ ,  $P = 0.126$ ) when controlled for place of qualification.

**Factor 2 (perceived patient's pressure to prescribe)**

For Factor 2 (noting that the higher score in Factor 2 denoted less perceived pressure), female physicians and those in group practice scored significantly higher than their counterparts (Table 3). The length of years after medical school was inversely and significantly (Pearson coefficient =  $-0.244$ ,  $P = 0.005$ ) related to the scores in Factor 2. After

Table 2. Frequency of physicians' responses to the questionnaire by factor items

	<i>n</i> <sup>a</sup>	Score (%)					Mean ± SD
		5 Always	4 Often	3 Sometimes	2 Rarely	1 Never	
<b>Factor 1 – orientation for quality care</b>							
1A The quality of rapport and trust shared between patient and physician influences how a physician prescribes	132	62 (46.6)	49 (36.8)	14 (10.5)	6 (4.5)	2 (1.5)	21.67 ± 2.31 4.23 ± 0.92
1B The ability to accurately assess the patient's complaint(s) influences how a physician prescribes	132	66 (49.6)	55 (41.4)	11 (8.3)	0 (0.0)	0 (0.0)	4.42 ± 0.64
1C The amount of knowledge the physician has about patient's current medications influences how a physician prescribes	133	53 (39.8)	66 (49.6)	12 (9.0)	2 (1.5)	0 (0.0)	4.28 ± 0.69
1D The physician's ability to keep abreast of the drugs involved (i.e. continuing medical education) influences how a physician prescribes	133	56 (42.1)	62 (46.6)	14 (10.5)	1 (0.8)	0 (0.0)	4.30 ± 0.69
1E If a doctor does not give drugs, there should be no charge for the consultation	133	67 (50.4)	61 (45.9)	2 (1.5)	2 (1.5)	1 (0.8)	4.44 ± 0.68
<b>Factor 2 – patient pressure to prescribe</b>							
2A Patients prefer the doctor to prescribe as few drugs as possible	131	3 (2.3)	51 (38.3)	42 (31.6)	34 (25.6)	1 (0.8)	15.19 ± 2.36 2.84 ± 0.87
2B The more drugs a doctor prescribes, the better the value a patient thinks he/she gets for his/her money	133	8 (6.0)	48 (36.1)	25 (18.8)	45 (33.8)	7 (5.3)	3.04 ± 1.08
2C If I do not prescribe drugs for my patient's illness, he/she would still likely accept and follow my advice	132	0 (0.0)	22 (16.5)	36 (27.1)	70 (52.6)	4 (3.0)	3.42 ± 8.02
2D If I do not prescribe drugs to my patient, he/she would likely go to another doctor	131	4 (3.0)	41 (30.8)	40 (30.1)	43 (32.3)	3 (2.3)	3.00 ± 0.93
2E Patients prefer the doctor to give them whatever drugs they request	133	3 (2.3)	48 (36.1)	16 (12.0)	64 (48.1)	2 (1.5)	2.89 ± 0.99

Factor 3 – disbelief in value of medication	133								8.78 ± 2.16
3A Drugs are necessary for successfully treating most illnesses	133	8 (6.0)	61 (45.9)	7 (5.3)	52 (39.1)	5 (3.8)			3.11 ± 1.11
3B Without drugs, patients do not recover from most illnesses	133	14 (10.5)	88 (66.2)	8 (6.0)	22 (16.5)	1 (0.8)			3.69 ± 0.90
3C Drugs help in relieving patient's symptoms in most cases	133	1 (0.8)	9 (6.8)	4 (3.0)	91 (68.4)	28 (21.1)			1.98 ± 0.76

<sup>a</sup>n: number of respondents. There were missing data in some items.  
 SDA, strongly disagree; DA, disagree; UC, uncertain; A, agree; SA, strongly agree.  
 SD = standard deviation.  
 (%) denotes the percentage of the individual item.

re-grouping physicians from Groups 2 and 3 into a single group, the mean score for those with higher qualifications was  $15.67 \pm 3.38$ , significantly different from the physicians in Group 1 (Student's  $t = -2.27$ ,  $P = 0.025$ ).

The general linear model (including gender, type of practice, higher qualification, and years after qualification) showed that the significant determinant for Factor 2 was type of practice ( $F = 11.87$ ,  $P = 0.001$ ). The physicians' gender was marginally insignificant ( $F = 3.38$ ,  $P = 0.07$ ), and years after qualification became insignificant ( $F = 1.73$ ,  $P = 0.19$ ) when controlled for type of practice. The predicted scores for Factor 2 would be highest for female physicians working in group practice (18.46), then in descending order: male physicians in group practice (16.77), female physicians in solo practice (16.06), and male physicians in solo practice (14.37).

### Factor 3 (disbelief in value of medication)

The three groups of physicians scored similarly for Factor 3 (the higher the score the less belief). The length of years after medical school was again inversely and significantly (Pearson coefficient =  $-0.326$ ,  $P < 0.001$ ) related to the scores in Factor 3, i.e. older physicians had stronger belief in the use of drugs. So was the duration in primary care (Table 3).

## DISCUSSION

As prescribing behaviour is complex, the contributing factors should not be studied individually in isolation but in totality. In this study, we rated the physicians' responses to analyse quantitatively not just the physicians' individual characteristics but the summated effect of variables associated with knowledge and attitude. The variables considered (physician's gender, country of qualification, higher qualification, practice status, health care system, years after basic qualification, and years in primary care) were global characteristics about physicians, not peculiar to any region, so that the results could be useful to places other than Hong Kong.

Most physicians who responded to our questionnaire were orientated towards quality care (the score for Factor 1 being much higher than that for

**Table 3.** Mean score  $\pm$  SD (and percentage of possible maximum) obtained by different physician groups

Physician variable	Factor 1 (%)	Factor 2 (%)	Factor 3 (%)
<b>Gender</b>			
Male	21.66 $\pm$ 2.32 (87.0)	14.86 $\pm$ 3.23 (59.4)	8.70 $\pm$ 2.19 (58.0)
Female	21.69 $\pm$ 2.33 (86.8)	17.56 $\pm$ 3.42 (70.2)	9.38 $\pm$ 1.86 (62.5)
Student's <i>t</i> -test	$t = -0.038, P = 0.97$	$t = -3.12, P = 0.002$	$t = -1.33, P = 0.20$
<b>Medical school (undergraduate)</b>			
Hong Kong	21.88 $\pm$ 2.38 (87.8)	15.03 $\pm$ 3.28 (60.1)	8.72 $\pm$ 2.13 (58.1)
Other Asian	19.91 $\pm$ 2.34 (79.6)	14.27 $\pm$ 2.90 (57.1)	7.91 $\pm$ 2.39 (52.7)
Overseas	21.59 $\pm$ 1.56 (86.4)	16.36 $\pm$ 3.76 (65.4)	9.50 $\pm$ 2.09 (63.3)
ANOVA test	$F = 3.764, P = 0.026$	$F = 1.889, P = 0.155$	$F = 2.191, P = 0.116$
<b>Postgraduate qualification</b>			
Group 1: no higher qualification	21.09 $\pm$ 2.22 (84.4)	14.29 $\pm$ 3.15 (57.2)	8.50 $\pm$ 2.14 (56.7)
Group 2: family medicine	22.01 $\pm$ 2.41 (88.0)	15.63 $\pm$ 3.35 (62.5)	9.07 $\pm$ 2.09 (60.5)
Group 3: other specialities	21.83 $\pm$ 1.95 (87.3)	15.82 $\pm$ 3.59 (63.3)	8.39 $\pm$ 2.45 (55.9)
ANOVA test	$F = 2.312, P = 0.103$	$F = 2.575, P = 0.080$	$F = 1.319, P = 0.271$
<b>Practice type</b>			
Solo	21.45 $\pm$ 2.39 (85.8)	14.47 $\pm$ 3.12 (57.9)	8.54 $\pm$ 1.98 (56.9)
Group	22.40 $\pm$ 2.03 (89.6)	17.25 $\pm$ 3.13 (69.0)	9.37 $\pm$ 2.66 (62.5)
Student's <i>t</i> -test	$t = -1.958, P = 0.053$	$t = -4.129, P < 0.001$	$t = -1.829, P = 0.070$
<b>Health care system</b>			
Private	21.60 $\pm$ 2.38 (86.4)	14.80 $\pm$ 3.24 (59.2)	8.66 $\pm$ 1.98 (57.7)
Public	22.00 $\pm$ 2.12 (88.0)	16.75 $\pm$ 3.29 (67.0)	9.29 $\pm$ 2.72 (61.9)
Student's <i>t</i> -test	$t = -0.716, P = 0.475$	$t = -2.462, P = 0.045$	$t = -1.199, P = 0.233$
<b>Years after basic qualification</b>			
Linear regression: $R^2$	0.001	0.059	0.107
Standardized coefficient	-0.028	-0.244	-0.326
Test significance	$t = -0.322, P = 0.748$	$t = -2.842, P = 0.005$	$t = -3.952, P < 0.001$
<b>Years in primary care</b>			
Linear regression: $R^2$	0.000	0.021	0.097
Standardized coefficient	0.009	-0.146	-0.312
Test significance	$t = 0.096, P = 0.924$	$t = -1.636, P = 0.104$	$t = -3.673, P < 0.001$

Factor 1: orientation for quality prescribing.

Factor 2: less patient pressure.

Factor 3: disbelief in value of medication.

Factor 2 or 3). The country of qualification was the best predictor for Factor 1 (quality of care). Group practice, duration after qualification, higher qualification and physician's gender had individually significant association with Factor 2 (pressure to prescribe), although type of practice was the most significant determinant. Lastly, duration after qualification was the most significant factor for Factor 3 (disbelieve in medication).

Previous studies showed that the perceived pressure to prescribe was the most important factor

associated with physicians' prescription (1, 8, 16, 17). Physicians were more likely to prescribe if they thought their patients wanted drugs, even when not medically indicated or not actually expected by the patients (8, 16, 18). Our study showed that this factor was most complicated, related individually to physician's gender and years of experience, higher qualifications, and type of practice. However, the determinants of this factor could be reduced to physician's gender and particularly type of practice.

Physicians with higher qualifications in this study perceived less pressure to prescribe. Higher qualifications might give the physicians more self-confidence in negotiation with patients for prescription. This could explain the observation that training practice was associated with better antibiotic prescribing (12). Our result on gender was contrary to a few previous studies (19, 20) that reported higher volume of prescription or lower quality prescribing in female physicians.

Group practice as the most favourable feature for reducing physician's perceived pressure to prescribe is the prominent observation in this study and has seldom been documented in previous studies. The health care system (private or public) did not affect the significant association between group practice and less pressure to prescribe. Physicians in group practice were mostly (in the private sector) or solely (in the public sector) on salaries and might have less direct financial strain as a consequence of patient dissatisfaction. They were more advantageous than the solo practitioners in the sharing of medical information and mutual support. It would be important to further identify which features of group practice were helpful to the physicians.

A relationship between years of experience and over-prescribing had been shown (20–23). In our study, years of experience were inversely associated with scores in Factors 2 and 3. Physicians with long years of experience felt more pressed for prescriptions, and placed higher value on medication and its value for symptomatic treatment. Although this relationship might be a cohort effect because of the nature of medical education and hospital practice at the time they graduated rather than an effect of experience, it needs further study for the underlying cause, e.g. older physicians seeing more elderly patients who need more drugs for chronic illness (20), or older physicians using a different pattern of information source (22). It does suggest that quality prescribing should be repeatedly emphasized in programmes of continuous medical education.

It should be highlighted that the determinants for physicians' attitude on prescribing could be modified: both undergraduate and postgraduate medical education contributed to the attitude of prescribing. This finding is consistent with the previous observation that various interventions did

improve quality prescribing by physicians (11, 24–26). These interventions should be directed to relieve the pressure to prescribe and to promote the knowledge on the use of and indication for drugs.

### *Limitations of the study*

There is a potential systemic bias in the present study. The response of PCPs in research activities is often low. Only half of the physicians approached responded to the questionnaire. Physicians might be reluctant to participate because the second part of the study required a patient survey. Although they could return the questionnaire without participating further, some may have found this intimidating. More recent graduates and those with family medicine qualifications were more likely to complete the questionnaire. The plausible explanation may be that they were more confident, as reflected by the better Factor 2 score. This study might have also recruited physicians who were more confident in their prescribing behaviour. This possible selection bias may have produced higher scores for those who responded than in the total sample, especially in Group 1 (those without further qualifications). The physicians who agreed to let us interview their patients in the second part of our study perceived less pressure to prescribe and had less belief in the usefulness of drugs.

### ACKNOWLEDGEMENT

We thank Dr D.V.K. Chao and Professor C. Hazlett for their permission to use the Doctor Questionnaire, and, above all, the physicians who responded to our request for participation. We also thank the Department of Health, Hong Kong Government, for agreeing us to survey their physicians and patients in General Outpatient Clinics. The study received funding by the Direct Grant for Research (#2040663, 1997/1998), the Chinese University of Hong Kong. We were indebted to Mr Wilson Tam for his statistical advice.

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**Appendix 1.** Factors influencing the prescribing behaviour of physicians. (A) Please indicate your degree of agreement with each of the following statements (✓). (B) The following factors can influence how a physician prescribes. Please indicate how often each has influenced your own prescribing behaviour (×)

<b>A</b>	<i>Strongly disagree</i>	<i>Disagree</i>	<i>Uncertain</i>	<i>Agree</i>	<i>Strongly agree</i>
1. Medications are necessary for successfully treating most illnesses	5	5	5	5	5
2. Without medications, patients do not recover from most illnesses	5	5	5	5	5
3. Medications help in relieving patients' symptoms in most cases	5	5	5	5	5
4. Patients prefer the doctor to prescribe as few medications as possible	5	5	5	5	5
5. The more medications a doctor prescribes, the better the value a patient thinks he/she gets for his/her money	5	5	5	5	5
6. If I do not prescribe medications for my patient's illness, he/she would likely accept and follow my advice	5	5	5	5	5
7. If I do not prescribe medications for my patient's illness, he/she would likely go to another doctor	5	5	5	5	5
8. Patients prefer the doctor to give them whatever medications they request	5	5	5	5	5
9. If a doctor does not give medications, there should be no charge for the consultation	5	5	5	5	5
<b>B</b>	<i>Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Often</i>	<i>Always</i>
1. The quality of rapport and trust shared between patient and physician	5	5	5	5	5
2. The ability to accurately assess the patient's complaint(s)	5	5	5	5	5
3. The amount of knowledge the physician has about the patient's current medications(s)	5	5	5	5	5
4. The physician's ability to keep abreast of the drugs involved (i.e. continuing medical education)	5	5	5	5	5