

Enhancing patient education about medicines: factors influencing reading and seeking of written medicine information

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Abstract

Objective To investigate the influence of patient factors on patients' reading and seeking of written medicine information (WMI).

Design A cross-sectional questionnaire study.

Main variables studied Patient's health locus of control, coping style, health literacy, demographics and disease state (independent variables) and patient's interest and likelihood in reading and seeking WMI (dependent variables).

Main outcome measures Patient factors predicting interest in reading and seeking WMI.

Setting and participants Patients (total $n = 479$) from three Rheumatology/Pain clinics in teaching hospitals ($n = 217$) and 40 community pharmacies ($n = 262$) in metropolitan Sydney, Australia.

Results The majority of patients were interested and likely to read WMI about their prescription medicines. However, not many were likely to seek WMI and not many frequently sought WMI. Using logistic regression, patients' interest in reading WMI was predicted by their coping style [monitor vs. blunter, odds ratio (OR) = 2.19, confidence interval (CI) = 1.17–4.10], health literacy levels (adequate vs. inadequate/marginal, OR = 2.86, CI = 1.16–7.05) and occupation (blue-collar vs. homemaker, OR = 3.42, CI = 0.09–0.88) whilst patients' interest in seeking WMI was predicted by their disease state (pain/rheumatology condition vs. hypertension, OR = 1.84, CI = 1.11–3.05), health locus of control (powerful other, OR = 0.95, CI = 0.90–0.99) and health literacy levels (adequate vs. inadequate/marginal, OR = 2.7, CI = 1.17–6.39).

Conclusions Patients' interest in reading and seeking WMI were influenced by several patient factors including disease state, health locus of control, coping style, health literacy levels and occupation. Furthermore, the results highlighted that reading and seeking WMI were regarded as distinct activities influenced by different factors. These findings may guide health professionals in assessing the utility of WMI for different patient groups and more broadly in the tailoring of patient education to meet patient needs.

Introduction

Written medicine information (WMI), which refers to any form of printed information leaflet on medications intended for patients, is integral to informing and educating patients about their medicines and has been the focus of much research over the past decades. From the literature, there is a burgeoning desire and demand by patients for medicine information in general¹ and for WMI specifically as the latter serves to reinforce verbal information² and can be used at the patient's own pace.³

In line with the increasing demand for information by patients, in the past few decades, there has been a gradual shift from a paternalistic approach by health professionals to a growing recognition of patient autonomy with respect to their health care^{4,5}. Hence, there has been an emphasis on patient rights to evidence-based, consumer-centred, accurate and balanced information to empower patients to actively participate in their own health care⁶⁻⁸ and to ensure that patients are equipped to use their medications correctly and optimally^{8,9}.

To this end, there is need for research that focuses on understanding how patients use information. In relation to WMI, much research has been conducted on the impact of WMI on patients but little is known about the factors which may influence a patient's use of WMI.¹⁰ A better understanding of these factors will enable health professionals to tailor the design and delivery of WMI to meet individual patient needs.

Many patients actively seek a range of health-related information; nonetheless, as information may be acquired passively, there are also those who do not actively look for information.¹¹ In relation to WMI, the factors that actually influence patients to take an interest, be it active or passive, are largely unknown. In a recent literature review of possible factors influencing use of WMI, these factors were arbitrarily divided into three broad areas, bearing in mind some potential overlap: factors related to the written information document, the environment and the patient.¹⁰

Of the three broad factors, patient factors arguably exert the most influence when it comes to patients and their interest in WMI.¹⁰ Patient factors include various psychological and non-psychological factors such as the disease state, health literacy, health locus of control, coping style and demographics. Although studies exploring the relationship between patient factors and WMI are lacking, related literature provides some indication on potential influences.

The first influence is the presence of symptoms in a disease state. No studies have examined the impact of symptoms on a patient's use of WMI. However, taking pain as an example, chronic pain has been shown to greatly impact patients' ability to perform daily tasks¹² and has been cited as an important impetus for seeking medical help.¹³ Given the impact of symptoms such as pain on everyday life, it is possible that patients experiencing symptomatic conditions may be more interested in WMI compared with those with asymptomatic conditions.

Secondly, functional health literacy, defined as 'the ability to read, understand and act on health information'¹⁴ is a fundamental prerequisite to understanding WMI. Poor health literacy has been linked to poorer health and higher use of health services.^{15,16} Although it is expected that patients with poor health literacy will have difficulty understanding WMI, it is unknown if this will limit patients' interest in reading and seeking WMI.

Thirdly, health locus of control (HLC) relates to the degree to which individuals attribute their personal health outcomes to themselves (internal HLC), to others (powerful other HLC) or to chance, luck or fate (chance HLC).¹⁷ A wealth of literature has examined the influence of HLC on health-related activities and behaviour but overall, the predictive relationship is still weak. Internal HLC has been found to positively influence health behaviour including cancer screening and adherence to medical treatment in some studies¹⁸⁻²⁰ but not in others.^{21,22} Despite these inconsistencies, there is some evidence to suggest that patients with internal HLC are more active in seeking general health information²³ as well as WMI.²⁴

An individual's coping style may also play a part in determining their interest in reading and seeking WMI. Individuals cope differently with their illnesses, so whilst some cope by becoming actively involved with their treatment, others cope by avoidance. For example, some patients with cancer preferred to maintain hope by avidly searching for information, but others maintained hope by limiting their search or avoiding new information.²⁵ Providing detailed information will benefit the former but upset the latter.²⁶

Lastly, demographic characteristics may play a role in patients' reading and seeking of WMI. According to literature on health behaviour, generally, younger age, higher socio-economic status and higher level of education are linked with greater involvement in health-enhancing behaviours.²⁷ In addition to this, younger age, higher socio-economic status and being female are also associated with seeking health-related information.^{11,28} However, it is uncertain whether these factors influence interest and use of WMI.

This study aimed to investigate patient factors, which influence patients' reading and seeking of WMI. More specifically, the objectives of this study were to investigate the influence of the following factors on patients' reading and seeking of WMI: disease state, health locus of control, coping style, health literacy and demographics.

Methods

Sampling frame

As there is some evidence to suggest that symptoms such as pain are an important impetus for patients to seek medical help,¹³ it is postulated that patients who experience a symptomatic condition will respond differently to their condition as opposed to patients with an asymptomatic condition. This difference may also extend to their use of WMI. To examine this, patients with rheumatology/pain conditions (group 1) and patients with hypertension (group 2) were chosen for inclusion in this study. Group 1 comprised patients with a chronic

condition which is usually accompanied by symptoms including pain, tenderness, inflammation and/or stiffness.²⁹ Group 2, chosen for comparison, comprised patients with an asymptomatic but chronic condition.

Sample size

The average proportion of patients who reported reading WMI in previous studies was used for sample size calculation (40–89% from international studies¹⁰ and 64.1% from an Australian study.³⁰) Using the standard error of proportions equation,³¹ based on a 60% readership, at a 5% degree of precision, a total of approximately 400 patients were required for the study.

This sample size was also sufficient to allow for the regression models to be generalizable to the whole population. Approximately 15–20 subjects per variable is recommended.^{32,33} With 15 independent variables, and 20 subjects per variable, a minimum of 300 patients were required.

Recruitment

Two different settings were used to recruit patients with each of the disease states specified in the sampling frame. Group 1 participants were recruited from Rheumatology Clinics and group 2 participants were recruited from community pharmacies. To maintain consistency, the same researcher recruited and interviewed patients in both settings. In order to be eligible for the study, participants had to be:

- 1 eighteen years old or over;
- 2 able to take part in the study without the help of a translator; and
- 3 currently taking at least one prescription medication for arthritis/pain condition (group 1) or hypertension (group 2).

Group 1 was recruited from the Rheumatology Departments of three geographically distinct major teaching hospitals in Sydney, Australia. The researcher approached all patients while they were awaiting their appointment in the

Rheumatology/Pain Clinics. Eligible and consenting patients were interviewed in a quiet area.

Group 2 was recruited from 40 consenting community pharmacies from a random sample of 160 community pharmacies in metropolitan Sydney. With the assistance of pharmacists-on-duty, consecutive patients on anti-hypertensive medications were identified. Consenting patients were then interviewed in a quiet area.

Questionnaire

The structured questionnaire administered by the researcher consisted of six sections, five of which are reported in this study: interest in WMI; health locus of control;¹⁷ coping style;^{34,35} health literacy;³⁶ demographic data. (Results from the remaining section is reported elsewhere³⁷).

In the first section, four horizontal rating scales (1a–1d) were used to measure the participant's interest and likelihood of reading and seeking information. Questions 1a and 1d (which measured the participant's interest and likelihood of 'reading' WMI) were summed to form the 'reading' scale, while questions 1b and 1c (which measured the participant's interest and likelihood of 'seeking' WMI) were summed to form the 'seeking' scale. As these scales were not normally distributed, to allow multivariate analyses to be conducted, these scales were dichotomized based on the midpoint of the scale. Patients scoring above the midpoint were classified as 'interested' in reading and seeking information respectively. The remainder of patients were classified as 'not interested'.

The Multidimensional Health Locus of Control (MHLC) Scales, a published, validated scale for measuring health locus of control (HLC)¹⁷ constituted the second section of the questionnaire. Participants were required to score each of 18 statements (which consisted of six statements for each dimension – internal, powerful, other or chance HLC) along a 6-point Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (6). Scores corresponding to each dimension of the MHLC were summed.

The third section consisted of the shortened version of the validated Miller Behavioural Style

Scale (MBSS) designed to assess an individual's coping disposition.³⁵ The shortened version had previously been validated in a separate study.³⁴ In this section, the participant was required to tick all responses that would best describe how he/she would respond to two hypothetical stress-evoking scenarios (dental visit and news about potential retrenchment). Based on their responses, the participant was classified as a 'high monitor' (or 'monitor'; coped by taking in information; score \geq median in the total monitoring score) or 'low monitor' (or 'blunter'; coped by avoiding information; score $<$ median in the total monitoring score) (M. Rodoletz, personal communication, October 14, 2002).

The fourth section was taken from the short-form Test of Functional Health Literacy in Adults (S-TOFHLA).³⁸ The abbreviated form of S-TOFHLA is a 36-item timed reading comprehension test consisting of two passages from the health care setting.³⁶ The passages are based on the Cloze procedure³⁹ and four options are given for each missing word. Participants were given 7 min to complete the test. As established by previous studies, patients were classified as having inadequate (0–16), marginal (17–22) or adequate health literacy (23–36) based on their scores (one point per correct item).³⁸

Finally, the last section collected patient demographic data including gender, age, main language spoken at home, highest level of education, occupation, duration of disease of interest and current prescription medications.

Data analysis

The Statistical Package for Social Sciences (Release 10.0.5, 1999; SPSS Inc., Chicago, IL, USA) was used for data analysis. Descriptive statistics were compiled to examine the demographic characteristics of the sample and the distribution of scores for the dependent variables.

Univariate analyses were initially conducted to determine the relationship between the independent variables and interest in reading and seeking WMI. The Mann–Whitney *U*-test was used for all continuous variables (health locus of

control, duration of disease and number of medications) and Chi-square test (with continuity correction) was used for all categorical variables (all other independent variables). Based on results from univariate analysis, logistic regression was performed to determine the factors influencing interest in WMI.

Direct logistic regression was performed by entering all predictors into the equation simultaneously. This is considered the method of choice when there are no specific hypotheses about the importance or order of the independent variables.⁴⁰ Despite the robustness of logistic regression, cross-tabulation was performed at the univariate level to ensure sampling adequacy, the resulting models were checked for potential multicollinearity and several diagnostic statistics were evaluated to identify potential outliers or influential cases.

As mentioned earlier, disease state was used to examine whether patients living with chronic symptoms (in this case pain) used WMI differently from those with a chronic asymptomatic disease or not. The two different settings presented feasible options for recruitment, however, it was not possible to recruit only patients with hypertension without any symptomatic co-morbidities (especially pain). Hence, to further confirm that the observed results supported the proposed theory, the groups were reclassified based on the presence of pain as a symptom. This was determined by the presence of analgesics and/or medication for musculoskeletal conditions obtained from the demographic data. Univariate and multivariate analyses were conducted and the results were compared with the initial analysis.

At the univariate level, a significance level of $P < 0.1$ qualified independent variables for inclusion as predictors in logistic regression. However, at the multivariate level, a statistical significance level of $P < 0.05$ was adopted for all statistical analyses.

Ethics approval

This study was approved by the Human Research Ethics Committees of the University of Sydney and all participating hospitals.

Results

Response rate

A total of 479 patients ($n = 625$, 77% overall response rate) were recruited from March to November 2003. Of these, 217 ($n = 268$, 81% response rate) were from the hospital clinics (group 1) and 262 ($n = 357$, 73% response rate) were from the community pharmacies (group 2).

All sections of the questionnaire were completed by group 1 participants. However, in group 2, depending on the patient's time constraints, the questionnaire was completed to varying degrees [interest in WMI, and demographic data: 100% ($n = 262$); MHLC: 96% ($n = 251$); MBSS: 40% ($n = 104$); S-TOFHLA: 58% ($n = 152$)].

Patient demographics

There was a higher proportion of females in the sample and the median age was 67 years (Table 1). The majority of patients were born in Australia, spoke mainly English at home and had attained at least secondary education. There were more patients with white-collar than blue-collar occupations¹ and homemakers; however, the majority of the sample were retired. The median duration as diagnosis of the disease of interest (pain/rheumatology for group 1 and hypertension for group 2) was 10 years.

Interest and likelihood in reading and seeking WMI

The majority of patients were interested (question 1a) and very likely (question 1d) to read WMI about their prescription medicines (Table 2). However, not many were likely to

¹This classification was based on the Australian Bureau of Statistics, whereby white-collar occupations (managers and administrators, professionals and associate professionals, clerical workers, sales and service workers) are 'predominantly associated with higher education and specific skills or with lower-skilled jobs that are mainly social rather than physical' and blue-collar occupations (tradesperson, production and transport workers, labourers and related workers) are 'predominantly associated with trades and lower-skilled jobs that are often physical'.⁴¹

Table 1 Demographics of study sample, *n* = 479

Characteristics	<i>n</i> (%)
Gender	
Female	279 (58.2)
Male	200 (41.8)
Age – median; IQR (<i>n</i> = 479)	67 years; 54–76 years
Country of birth	
Australia	307 (64.1)
Other	172 (35.9)
Main language spoken at home	
English	391 (81.6)
Other	88 (18.4)
Highest level of education	
Primary or below	87 (18.2)
Secondary or above	391 (81.6)
Missing	1 (0.2)
Occupation	
White-collar	291 (60.8)
Blue-collar	108 (22.5)
Homemaker	75 (15.7)
Miscellaneous (student, no occupation)	4 (0.8)
Missing	1 (0.2)
Employment status	
Working (full or part time)	106 (22.1)
Not working (retired or unemployed)	372 (77.7)
Missing	1 (0.2)
Number of medications – median; IQR	4; 3–6
Duration of disease of interest – median; IQR (<i>n</i> = 438)	10 years; 3–20 years

Table 2 Interest and likelihood in reading and seeking written medicine information (*n* = 479)

Question	Range	Median	IQR
1a. How interested would you say you are in reading written information about your prescription medicines?	1–5	4	3–5
1b. How likely are you to seek written information about your prescription medicines?	1–5	1	1–5
1c. Typically, how often would you seek written information about your prescription medicines?	1–5	1	1–3
1d. How likely are you to read written information about your prescription medicines?	1–5	5	3–5
'Reading' scale = 1a + 1d	2–10	9	6–10
'Seeking' scale = 1b + 1c	2–10	2	2–8

seek WMI (question 1b) and not many frequently sought WMI (question 1c). The distribution of the 'reading' and 'seeking' scales mirrored this pattern, hence the 'reading' scale had a very high median whereas the 'seeking' scale had a very low median. Cronbach's alpha for the 'reading' and 'seeking' scale was 0.90 and 0.94, respectively, indicating very high internal consistency.

When the 'reading' and 'seeking' scales were dichotomized for the purposes of multivariate analysis, the results were similar to that observed for the scales. Hence, the majority of patients were classified as interested in reading WMI (*n* = 336, 70.1%) but not interested in seeking WMI (*n* = 328, 68.5%).

Factors predicting interest in reading and seeking WMI

The univariate analyses for interest in reading WMI and interest in seeking WMI are summarized in Tables 3 and 4, respectively. Based on these results, logistic regression was performed to determine patient variables, which predicted interest in reading and seeking WMI (Tables 5 and 6, respectively). All variables demonstrated sampling adequacy. In both models, no significant outliers were detected, no cases exerted undue influence and multicollinearity was not evident.

The model for interest in reading (Table 5) was statistically reliable and accounted for approximately a fifth of the observed variance. The Hosmer and Lemeshow test statistic indicated that the model's estimates fit the data at an acceptable level. The model performed poorly in predicting patients who were not interested in reading WMI (17.6% correct predictions) but performed well in predicting patients who were interested in reading WMI (95.8%). Overall, the model successfully predicted 77.0% of the cases.

Coping style, health literacy and occupation reliably predicted patients who were interested in reading WMI. The odds of 'monitors' being interested in reading WMI were more than twice their counterparts, the 'blunters'. There was a threefold greater odds of being interested in

Table 3 Univariate statistics for interest in reading written medicine information

Independent variables	Interested		Not interested		P-value
	<i>n</i>	%	<i>n</i>	%	
Disease state*					
Hypertension	168	64.1	94	35.9	0.002
Pain/rheumatology	168	77.4	49	22.6	
Coping style*					
Blunter	83	69.7	36	30.3	0.042
Monitor	135	80.8	32	19.2	
Health literacy*					
Inadequate/marginal	35	49.3	36	50.7	<0.001
Adequate	231	79.4	60	20.6	
Gender*					
Male	122	61.0	78	39.0	<0.001
Female	214	76.7	65	23.3	
Age*					
≤60 years	138	76.7	42	23.3	0.021
≥61 years	198	66.2	101	33.8	
Country of birth*					
Australia	228	74.3	79	25.7	0.011
Overseas	108	62.8	64	37.2	
Main language spoken at home*					
English	285	72.9	106	27.1	0.008
Other	51	58.0	37	42.0	
Highest level of education*					
≤Primary	51	58.6	36	41.4	0.015
≥Secondary	282	72.5	107	27.5	
Occupation*					
White-collar	213	73.2	78	26.8	0.001
Blue-collar	58	53.7	50	46.3	
Homemaker	61	81.3	14	18.7	
Employment status*					
Working	75	71.4	30	28.6	0.838
Not working	261	69.8	113	30.2	
Health locus of control [†]					
Internal HLC	Median 25 IQR 22–28		Median 26 IQR 22–28		0.948
Chance HLC	Median 19 IQR 15–23		Median 20 IQR 16–24		0.052
Powerful other HLC	Median 24 IQR 19–27		Median 25 IQR 21–28		0.010
Number of medications [†]	Median 4 IQR 3–6		Median 4 IQR 3–6		0.778
Duration of disease (years) [†]	Median 10 IQR 3–20		Median 8 IQR 2.9–17.6		0.201

*Chi-square test; [†]Mann–Whitney *U*-test; HLC, health locus of control.

reading WMI for patients with adequate health literacy levels than for those with inadequate or marginal health literacy levels. Finally, the odds of patients with blue-collar occupations being interested in reading WMI were approximately fourfold less than for homemakers.

The model for seeking WMI (Table 6) was statistically reliable and accounted for 15% of the observed variance. The Hosmer and Lemeshow test statistic indicated that the model's estimates fit the data at an acceptable level. The model performed relatively well in predicting

Table 4 Univariate statistics for interest in seeking written medicine information

Independent variables	Interested		Not interested		P-value
	n	%	n	%	
Disease state*					
Hypertension	61	23.3	201	76.7	<0.001
Pain/rheumatology	90	41.5	127	58.5	
Coping style*					
Blunter	43	36.1	76	63.9	0.509
Monitor	68	40.7	99	59.3	
Health literacy*					
Inadequate/marginal	10	14.1	61	85.9	<0.001
Adequate	117	40.2	174	59.8	
Gender*					
Male	56	28.0	144	72.0	0.192
Female	95	34.1	184	65.9	
Age*					
≤60 years	77	42.8	103	57.2	0.001
≥61 years	74	24.7	225	75.3	
Country of birth*					
Australia	103	33.6	204	66.4	0.241
Overseas	48	27.9	124	72.1	
Main language spoken at home*					
English	132	33.8	259	66.2	0.036
Other	19	21.6	69	78.4	
Highest level of education*					
≤Primary	15	17.2	72	82.8	0.003
≥Secondary	133	34.2	256	65.8	
Occupation*					
White-collar	103	35.4	188	64.6	0.016
Blue-collar	22	20.4	86	79.6	
Homemaker	24	32.0	51	68.0	
Employment status*					
Working	45	42.9	60	57.1	0.007
Not working	106	28.3	268	71.7	
Health locus of control†					
Internal HLC	Median 25 IQR 22–28		Median 26 IQR 23–28		0.282
Chance HLC	Median 18.5 IQR 15–22		Median 20 IQR 16–24		0.033
Powerful other HLC	Median 22 IQR 17–26		Median 24 IQR 21–28		<0.001
Number of medications†					
	Median 4 IQR 2–6		Median 4 IQR 3–6		0.390
Duration of disease (years)†					
	Median 10 IQR 4–20		Median 9 IQR 3–20		0.166

*Chi-square test; †Mann–Whitney U-test, HLC, health locus of control.

patients who were not interested in seeking WMI (89.3% correct predictions) but performed poorly in predicting patients who were interested in seeking WMI (27.6%). The predictive success of the entire model was 68.0%.

Disease state, powerful other health locus of control and health literacy predicted patients who were interested in seeking WMI. The odds of rheumatology/pain patients being interested in seeking WMI are approximately twice their

Table 5 Logistic regression for interest in reading written medicine information ($n = 282$)

Independent variables	OR	CI
Disease state – hypertension, pain/rheumatology (ind.)	1.62	0.84–3.14
Chance HLC	0.98	0.92–1.04
Powerful other HLC	0.96	0.90–1.03
Coping style – blunter, monitor (ind.)	2.19	1.17–4.10
Health literacy – inadequate/marginal, adequate (ind.)	2.86	1.16–7.05
Gender – male, female (ind.)	1.50	0.77–2.92
Age (years) – ≤ 60 , ≥ 61 (ind.)	1.12	0.57–2.18
Country of birth – other, Australia (ind.)	1.68	0.78–3.60
Main language spoken at home – other, English (ind.)	0.65	0.25–1.71
Highest level of education – \leq primary, \geq secondary (ind.)	1.15	0.46–2.88
Occupation		
Homemaker, white (ind.)	0.47	0.17–1.32
Homemaker, blue (ind.)	0.28	0.09–0.88

Model chi-square test: $\chi^2 = 36.77$, d.f. = 12, $P < 0.001$; Hosmer and Lemeshow test: $\chi^2 = 9.43$, d.f. = 8, $P = 0.307$; Nagelkerke R^2 : 0.18. OR, odds ratio; CI, confidence interval; ind., indicator category; HLC, health locus of control.

Table 6 Logistic regression for interest in seeking written medicine information ($n = 356$)

Independent variables	OR	CI
Disease state – hypertension, pain/rheumatology (ind.)	1.84	1.11–3.05
Chance HLC	1.01	0.96–1.06
Powerful other HLC	0.95	0.90–0.99
Health literacy – inadequate/marginal, adequate (ind.)	2.74	1.17–6.39
Age (years) – ≤ 60 , ≥ 61 (ind.)	0.75	0.42–1.31
Main language spoken at home – other, English (ind.)	1.07	0.51–2.27
Highest level of education – \leq primary, \geq secondary (ind.)	1.49	0.72–3.09
Occupation		
Homemaker, white (ind.)	1.09	0.55–2.14
Homemaker, blue (ind.)	0.71	0.32–1.60
Employment status – retired/not working, working (ind.)	0.99	0.51–1.94

Model chi-square test: $\chi^2 = 41.71$, d.f. = 10, $P < 0.001$; Hosmer and Lemeshow test: $\chi^2 = 6.11$, d.f. = 8, $P = 0.635$; Nagelkerke R^2 : 0.15. OR, odds ratio; CI, confidence interval; ind., indicator category; HLC, health locus of control.

counterparts, the hypertension patients. Increasing scores on the powerful other HLC scale predicted a decrease in interest in seeking WMI. Lastly, as for interest in reading WMI, there was a threefold greater odds of being interested in reading WMI for patients with adequate health literacy levels than for those with inadequate or marginal health literacy levels.

Following the substitution of ‘disease state’ by ‘presence of pain’ as an independent variable, factors predicting interest in reading WMI were found to be identical (model not shown). Factors predicting interest in seeking WMI were similar; however, presence of pain was not statistically significant at the $P < 0.05$ level ($P = 0.08$; model not shown).

Discussion

This is one of the first studies to focus specifically on potential patient factors that influence the way patients read and seek WMI. As written information forms an integral part of patient education, understanding the factors that influence the way patients use information will help to enhance the delivery and effectiveness of WMI.

From these results, reading and seeking WMI are two distinct activities associated with the use of WMI by consumers. The majority of patients were interested and likely to read WMI but most were not prepared to actively search for it. In seeking to explain a lack of proactivity in information seeking, it may be that patients

perceived no need to engage in information search because they could acquire the information passively, had sufficient information or that the effort involved in conducting a search outweighed the expected benefits.¹¹ It could also be that patients had been diagnosed with their conditions for a considerable length of time hence the information-seeking stage often associated with new diagnoses had passed. The implications of this relatively passive use of WMI are discussed below.

Besides the distinction between reading vs. seeking WMI, the study results identified several patient factors which influenced one or both of these activities. In this study, monitors expressed greater odds in terms of interest and likelihood reading WMI, but not seeking WMI. This suggests that they do want more information than blunders but are unprepared to actively find it for themselves. Compared with previous studies, such passivity is uncharacteristic of monitors.^{42,43} A possible explanation for this may be that these respondents had been diagnosed with their conditions for a considerable length of time hence the information-seeking stage often associated with new diagnoses had passed.

In addition to coping style, occupation was another patient factor associated with reading WMI in that the odds for patients with blue-collar occupations in reading WMI were lower compared with homemakers. The reason for this is unclear but is likely to be an interaction between several factors. A previous study identified blue-collar occupation as one of the characteristics associated with higher rates of inadequate health literacy;⁴⁴ this may be one contributing factor which explains the decreased interest and likelihood in reading WMI. Another contributing factor could be that homemakers are predominantly females, and according to Walker,⁴⁵ 'the female head of household views herself as the family's caretaker, "owning" the well-being of her children and/or spouse' (p. 12). Given this role of the family's carer, homemakers may be more interested and likely to use medicine information.¹⁰

Health literacy levels were found to influence both reading and seeking of WMI. There is a

plethora of evidence to substantiate the pervasive nature of inadequate health literacy levels on a patient's health.^{14-16,46-49} However, this is one of the first studies to show, albeit not surprisingly, that the odds for patients with inadequate or marginal health literacy levels to read as well as seek WMI is lower than for patients with adequate health literacy levels. This lack of motivation is most likely the direct result of poor literacy itself but undoubtedly, the prevalence of written material pitched beyond the literacy level of the general population⁴⁶ further complicates the matter.

The rheumatology/pain patients recruited from the hospital clinics had greater odds than the hypertension patients recruited from community pharmacies to seek WMI. Similar results were observed when disease state was reclassified by the absence or presence of pain. Although this has not been previously reported in the literature, there is evidence to suggest that symptoms play a key role in the initiation of seeking medical care.⁵⁰ Moreover, it is well-established that rheumatology/pain patients experience considerable physical symptoms that impinge on their ability to perform everyday tasks.^{12,13,51} Hence, it is plausible that the presence of symptoms encouraged these patients not only to seek medical care but also to seek medicine information, which enabled them to understand their condition and participate in their care.⁵²

Conversely, the asymptomatic nature of hypertension^{53,54} has been cited as a major reason for non-compliance or discontinuation of therapy among patients with hypertension.⁵⁵⁻⁵⁷ Hence, compared with rheumatology/pain patients, hypertension patients may have found that reading WMI sufficed, and were not as motivated or perhaps did not find it necessary to actively search for WMI.

Lastly, health locus of control was also found to influence the search for WMI. As scores on the powerful other HLC increased (indicating a higher reliance on powerful others), the interest and likelihood of seeking WMI decreased. Whilst it is not surprising that reliance on health professionals mitigates the need to seek information, the underlying reasons for this observation seem

more complicated. These patients seem to perceive no need to search for information because of their 'belief in the maxim that "doctor knows best"' (p. 910)²⁵ or because the health professional had provided sufficient verbal information.⁵⁸ However, the literature also suggests that some patients were concerned that health professionals might view patients' information seeking behaviour as violating their role as patients.²⁵

Although all care has been taken to ensure the validity and generalizability of the study results, caution is still required when interpreting the results due to several study limitations. Due to time constraints, not all sections were completed by all patients in group 2. However, as all of the sections were highly subjective and dependent on the individual patient, it was deemed inappropriate to replace these missing pockets of data. That said, the available data set contained more than sufficient numbers to run valid and generalizable multiple regression analyses and produced overall significant regression equations and significant relationships between the dependent variables and some of the predictors.

Nevertheless, the regression equations only explained some of the variance observed in the data. This is not surprising as there are many other potential factors, some of which were mentioned in the introduction, which can influence the way a patient reads or seeks WMI. Moreover, the magnitude of some of the relationships was small; also, the clinical significance of these results was outside the scope of this study and is largely unknown. Although the findings from this study provide a starting point, further work is needed, both to clarify some of the findings in this study, as well as to identify other factors that influence the way a patient reads or seeks WMI.

Conclusions and implications

The study revealed that certain patient factors influenced the reading and seeking of WMI. More specifically, coping style, health literacy and occupation influenced the way patients read WMI whilst symptomatic disease state, health locus of control and health literacy influenced

the way patients sought WMI. In addition, reading and seeking WMI were treated as two distinct independent activities that did not necessarily go hand-in-hand.

Several implications for health professionals arise from the study. The relatively passive use of WMI observed in the study suggests that health professionals play a crucial role in ensuring that patients are well-equipped with the necessary information to use their medicines optimally. This is especially important when WMI does not necessarily accompany a medicine package or bottle, as is the case in Australia, where package insert CMI is currently being phased out (D. Monk, personal communication, November 2, 2004). Hence, health professionals should take on the challenge of not only being prepared to provide information to patients, but being proactive at doing so.

It is also clear from the results of this study that not all patients utilize WMI in the same way. Hence, it is important to take account of this variation. The first and crucial step is to ask appropriate questions to ascertain the individual's information preferences and needs. Once this is known, health professionals may then consider some individual patient factors in tailoring the delivery of medicine information to suit the individual.

Patients with adequate health literacy levels, homemakers and/or 'monitors' may be more interested than their counterparts in reading WMI. Health professionals can encourage use of WMI in these groups of patients by actively offering WMI and ensuring access to reliable and appropriate sources of WMI. Adequate health literacy levels and presence of a symptomatic disease may indicate patients who are more interested in seeking WMI. Health professionals can further assist these patients by referring them to credible sources of WMI and being prepared to answer potential questions, which may arise from their information search.

Patients who are less motivated in reading and/or seeking WMI pose a greater challenge to health professionals. Understanding the reasons underlying the disinterest in WMI may help health professionals decide the best way to tailor

information for these patients. For example, the disinterest may be related to difficulty in understanding WMI, as is the case for patients with poor health literacy. In such cases, health professionals may have to rely more on simple verbal information, bearing in mind that patients with poor health literacy skills do not only struggle with written information but may also have poorer oral communication skills.^{59,60}

The disinterest may also be due to patients' own beliefs and perceptions. For example, some patients such as those with asymptomatic diseases may view their condition as innocuous. Hence, health professionals may be able to encourage these patients to use WMI by providing them with a realistic and balanced appraisal of their condition. Other patients may perceive the amount of information in WMI to be overwhelming and may benefit from small doses of subtle and initially non-threatening information. Yet others may not perceive a need for or realize the usefulness of WMI. Health professionals may assist these individuals by promoting WMI and taking the time to explain the information and how it may serve as a useful reference for the period of medication use.

In conclusion, findings from this study may be used to assist health professionals in assessing patients' interest in reading and seeking WMI, and thus aid in tailoring patient education to meet different patient needs.

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