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SHORT COMMUNICATION

Characteristics of individuals who prefer branded innovator over generic medicines: a New Zealand general population survey

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Abstract

Background Although generic medicines provide a safe and economical treatment for many illnesses, negative attitudes towards generics are common and branded innovator drugs are often preferred to generic drugs.

Objective The current study examined differences between individuals preferring branded innovator drugs compared with individuals preferring generic drugs or having no preference. We investigated differences in terms of demographics, perceived sensitivity to medicines, symptom burden, and other clinical variables.

Methods A representative general population sample ($n = 1000$) was recruited using random digit dialling. In a telephone interview, participants were asked about their preferences for and attitudes toward innovator versus generic drugs, perceived sensitivity to medicines, recent symptoms, and other clinical variables, such as the number of general practitioner (GP) visits, and medicine-related information-seeking behaviour.

Results Univariate logistic regression analyses showed that individuals preferring branded innovator medicines reported lower levels of education, more negative attitudes toward generic medicines, higher perceived sensitivity to medicines, a greater symptom burden and more frequent GP visits. There were no between-group differences in whether participants were currently prescribed drugs, or in participants' medicine-related information-seeking behaviour. Entering all variables into a multivariate logistic regression model confirmed the findings of the univariate models, apart from perceived sensitivity of medicine and symptom burden. The multivariate analysis also confirmed non-European NZ ethnicity and having no current medication prescription to be significantly associated with a preference for branded medicines.

Conclusions Clinicians should be especially aware that the preference for a branded innovator medicine is higher in patients with lower education, higher perceived sensitivity to medicines, higher levels of symptom burden, higher levels of healthcare utilization and not currently taking any prescription medication.

Introduction

Prescribing generic instead of branded innovator drugs has become more common in most healthcare systems. Pressure on health expenditure has increased worldwide, and health authorities have generally encouraged the use of generic medications as a way of containing drug costs, as generics typically offer cost savings of between 30 and 60% of the price of branded innovator medicines [1]. New Zealand has kept expenditures on medicines controlled by applying cost-containment strategies that restrict the list of medicines available for subsidized prescribing and by using generic medicines [2]. While generics offer economic benefits, negative perceptions of generic medicines in the general population are common, with a recent systematic review suggesting that 31% of lay people consider generics to be less effective and 25% view generics to be of poorer quality than their branded counterparts [3]. The label 'generic' in itself has been associated with less efficacy and more side effects [4].

Little is currently known about what characterizes individuals who prefer branded innovator medications over their generic equivalents beyond demographic variables. Previous research has identified an older age [5, 6], lower educational level [5, 6], lower income and unemployment [7] as being associated with a preference for branded medicines. Men have also been shown to be prepared to buy cheaper drugs than women [5]. Beyond these demographic differences,

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there have been very few investigations of other factors that are associated with a preference for branded innovator drugs.

Recent work suggests that a higher level of perceived sensitivity to medicines and poorer general health may cause individuals to be more cautious about accepting generic medicines, but this has yet to be formally tested. Research has identified that a significant proportion of the population believe generics may be used for minor illnesses, but are not suitable to treat more serious conditions [8]. This suggests that patients with more symptom complaints and visits to doctors may be more reluctant to use generics than those in better health. Studies have also shown that over recent times the internet has become a source of information for patients seeking further material on their illness and treatment [9]. It seems likely that patients with more concerns about their drug therapy may also be more likely to look for material online or read package inserts for information about their medicines.

In this study, we investigated the demographic factors associated with a greater preference for branded innovator medicines in a large New Zealand general population sample. We also examined whether perceived sensitivity to medicines (defined as how sensitive individuals perceive themselves to be to the effects of medicine [10]), poorer general health, as evidenced by a greater symptom burden, and more general practitioner (GP) visits were also associated with a preference for innovator medicines. Finally, we examined whether individuals who typically sought medicine-related information on the internet or on medicine package inserts were more reluctant to use generic medicines.

Methods

Participants and procedure

A representative sample of the New Zealand population ($n = 1000$) was recruited in 2013 using random digit dialling. Eligible participants were required to be aged 18–64 years and proficient in English. The purpose of the interviews was to assess the frequency of symptoms and attitudes towards medications in the general population. In our sample, 509 (50.9%) participants were female, 430 (43.0%) were aged < 40 years, 372 (37.2%) had an academic degree, and 391 (39.1%) were currently taking a prescription medicine. For a more detailed description of the study procedure see Petrie et al. [11]. Participants provided verbal informed consent.

Measures

Participants were asked if they would rather take a generic version of a medicine, a branded version, or have no preference. Using 5-point scales, participants were also asked to rate the expected safety (1 = much less safe; 5 = much safer), effectiveness (1 = much less effective; 5 = much more effective) and side effects (1 = many more side effects; 5 = many less side effects) of a generic medicine compared with a brand-name version. These three ratings intercorrelated significantly (Cronbach's $\alpha = 0.66$) and were summed, with low values of this total score indicating a negative attitude towards generic medicines.

In order to assess the *severity of symptoms,* participants were read a list of 46 symptoms and were asked if they had experienced any of these in the past week, and, if so, whether the symptom was mild, moderate or severe using a 4-point scale (0 = not present; 3 = severe). This list of symptoms included 36 items from the General Assessment of Side Effects (GASE) Scale [12] and 10 other common symptoms frequently found in other scales (see Petrie et al. [11]). One sex-specific item (painful/irregular menstruation) was excluded. For the current analyses, we added up the 45 item ratings to compute a symptom severity score. A Cronbach's α of 0.90 shows a high internal consistency in the current sample and is consistent with the α-value found for the validation study of the original GASE ($\alpha = 0.89$) [12].

Medication sensitivity was assessed using the 5-item Perceived Sensitivity to Medicines (PSM) Scale [10]. In the current sample, the PSM Scale demonstrated a high internal consistency ($\alpha = 0.85$). Participants were asked about the *number of GP or family doctor visits* during the past year and if they were *currently taking a prescribed medication* to treat an illness. They were also asked if they would obtain *medicine-related information* about a prescribed new drug from the packed information sheet and on the internet using a 5-point scale (1 = always; 5 = never). Because both ratings were intercorrelated ($r = 0.42$; $p < 0.001$), they were summed to provide a total score indicating a general tendency to obtain medicine-related information. *Demographic information* was collected on participants' sex, age, region of residence in New Zealand, relationship status, employment status, education, and ethnicity.

Statistical analyses

Statistical analyses were conducted using IBM SPSS Statistics 24 (IBM Corporation, Armonk, NY, USA). Descriptive frequency information was calculated for each preference group. For further analyses, the medicine preference groups were dichotomized into a branded medicine preference group and a group who preferred generics or had no preference.

Univariate logistic regression analyses (Table 1) were performed in order to explore whether demographic variables, attitude towards generic drugs, symptom severity, perceived sensitivity to medicines, the tendency to obtain

Table 1 Univariate logistic regression models predicting the preference for a branded version of a medicine vs. a generic drug or no preference

Univariate predictors[a]	OR [95% CI]	*p* value[b]
Sex	0.99 [0.77, 1.28]	0.940
Age	0.88 [0.68, 1.14]	0.330
Region of residence in NZ	1.11[0.86, 1.44]	0.422
Relationship status	0.98 [0.74, 1.30]	0.877
Occupational status	1.12 [0.83, 1.53]	0.463
Educational level	1.44 [1.10, 1.89]	**0.008**
Ethnic group	0.84 [0.62, 1.13]	0.238
Attitude toward generic medicine	4.09 [2.81, 5.95]	**< 0.001**
Severity of reported symptoms (past week)	0.99 [0.97, 1.00]	**0.028**
Perceived sensitivity to medicines	0.97 [0.94, 1.00]	**0.043**
Obtaining medicine-related information	1.00 [0.89, 1.11]	0.935
Number of general practitioner visits (past year)	0.97 [0.95, 0.99]	**0.013**
Current medication prescription	1.05 [0.81, 1.36]	0.731

Coding of the dependent variable: 0 = preference for branded innovator drug, 1 = preference for generic drug

NZ New Zealand, *OR* odds ratio, *CI* confidence interval

[a]Coding of categorical predicting variables: sex: 0 = male, 1 = female; age: 0 = < 40 years, 1 = ≥ 40 years; region of residence in New Zealand: 0 = rural areas (< 200,000 residents), 1 = bigger cities (≥ 200,000 residents; Auckland, Christchurch, Wellington); relationship status: 0 = no current relationship, 1 = current relationship; occupational status: 0 = unemployed, 1 = employed; education status: 0 = no academic degree, 1 = academic degree; ethnic group: 0 = New Zealand European, 1 = other than New Zealand European (e.g. Maori, Pacific Islander, Asian); currently prescribed medication: 0 = no, 1 = yes

[b]Bold values indicate statistical significance

medicine-related information, number of GP visits, and a current prescription with medication were associated with the preference for a branded medicine in comparison to the generic medicine or no preference. Multivariate hierarchical logistic regression models were applied to test for the incremental variance of the preference ratings explained by demographic, attitudinal and clinical variables. In the first step of the hierarchical analysis, the seven demographic variables were included; in the second step the attitude towards generic medication was added; and, in the third step, five additional clinical variables were entered (Table 2). An α value of 0.05 and two-tailed tests were used to test for the significance of the results of the univariate and multivariate regression analyses.

Results of univariate and multivariate regression models were reported as odds ratios (ORs), which indicate the change in odds of the outcome associated with a 1-unit change in the predicting variable. ORs > 1 indicate the outcome is more likely; ORs < 1 indicate the outcome is less likely. Ninety-five percent confidence intervals (CIs) are reported for the ORs. Significance of an OR is indicated if the CI excludes 1. Significance of the regression models was tested using the Chi-square test. Nagelkerke's R^2 was reported as indicator variance explained by the predicting variables.

Results

Of the total sample ($n = 1000$), 38.0% ($n = 380$) preferred taking a branded innovator medication, 34.4% ($n = 344$) had no preference, and 27.6% ($n = 276$) preferred taking a generic medication.

Univariate logistic regression analyses

The univariate logistic regression analyses showed no differences in the demographic variables between the preference groups, apart from the level of education ($p = 0.008$) [Table 1]. Participants preferring branded innovator drugs tended to have lower levels of education and were less likely to have an academic degree than the group preferring generics or having no preference.

The preference groups were validated by showing that participants who preferred branded innovator drugs over generic counterparts perceived significantly more negative attributes of generic drugs (including the expectation of less safety and effectiveness, and more side effects) relative to individuals preferring generics or having no preference ($p < 0.001$) [Table 1]. We also examined differences in perceived sensitivity to medicines and other clinical variables (Table 1). We found that participants preferring branded innovator medicines reported a higher perceived sensitivity to medicines ($p = 0.043$). Those preferring

Table 2 Multivariate hierarchical logistic regression models predicting the preference for a branded version of a medicine vs. a generic drugs or no preference

Independent variables[a]	OR [95% CI]	*p* value[b]
Step 1: Demographic variables		
$\chi^2(7) = 11.96$, $p = 0.102$, Nagelkerke's $R^2 = 0.018$		
Sex	0.94 [0.71, 1.23]	0.639
Age	0.83 [0.63, 1.11]	0.205
Region of residence in NZ	1.08 [0.82, 1.42]	0.582
Relationship status	1.03 [0.76, 1.40]	0.841
Occupational status	1.24 [0.88, 1.74]	0.222
Educational level	1.51 [1.13, 2.01]	**0.005**
Ethnic group	0.82 [0.60, 1.14]	0.242
Step 2: Attitude towards generics		
χ^2 (8) = 98.15, $p < 0.001$, Nagelkerke's $R^2 = 0.140$		
Sex	1.00 [0.75, 1.34]	0.994
Age	0.91 [0.67, 1.22]	0.517
Region of residence in NZ	1.04 [0.78, 1.39]	0.785
Relationship status	1.06 [0.77, 1.47]	0.713
Occupational status	1.28 [0.90, 1.83]	0.175
Educational level	1.55 [1.15, 2.09]	**0.004**
Ethnic group	0.70 [0.50, 0.99]	**0.044**
Attitude toward generic medicine	5.49 [3.58, 8.43]	**< 0.001**
Step 3: Other clinical variables		
χ^2 (13) = 109.02, $p < 0.001$, Nagelkerke's $R^2 = 0.155$		
Sex	1.08 [0.80, 1.45]	0.616
Age	0.84 [0.62, 1.15]	0.281
Region of residence in NZ	1.02 [0.76, 1.37]	0.877
Relationship status	1.04 [0.75, 1.45]	0.806
Occupational status	1.38 [0.95, 1.99]	0.091
Educational level	1.49 [1.09, 2.02]	**0.011**
Ethnic group	0.69 [0.49, 0.98]	**0.037**
Attitude toward generic medicine	5.59 [3.63, 8.62]	**< 0.001**
everity of reported symptoms (past week)	0.99 [0.97, 1.01]	0.335
Perceived sensitivity to medicines	0.99 [0.96, 1.04]	0.972
Obtaining medicine-related information	1.01 [0.88, 1.15]	0.928
Number of general practitioner visits (during the past year)	0.96 [0.93, 0.99]	**0.021**
Currently prescribed medication	1.44 [1.03, 2.01]	**0.032**

Coding of the dependent variable: 0 = preference for branded innovator drug, 1 = preference for generic drug

NZ New Zealand, *OR* odds ratio, *CI* confidence interval

[a]Coding of categorical predicting variables: sex: 0 = male, 1 = female; age: 0 = <40 years, 1 = ≥40 years; region of residence in New Zealand: 0 = rural areas (< 200,000 residents), 1 = bigger cities (≥ 200,000 residents; Auckland, Christchurch, Wellington); relationship status: 0 = no current relationship, 1= current relationship; occupational status: 0 = unemployed, 1 = employed; education status: 0 = no academic degree, 1 = academic degree; ethnic group: 0 = New Zealand European, 1 = other than New Zealand European (e.g. Maori, Pacific Islander, Asian); currently prescribed medication: 0 = no, 1 = yes

[b]Bold values indicate statistical significance

branded medicines also had higher ratings of symptom severity over the past week ($p = 0.028$) relative to individuals preferring generics or having no preference. Differences were also apparent in the use of medical care, with participants who preferred branded medicines having more appointments with their GP over the past year compared with the other group ($p = 0.013$). There was no difference between the groups on whether they were currently taking a prescribed medication or on how often they looked up information about a prescribed new medicine (Table 1).

Multivariate logistic regression analyses

The first model of the hierarchical logistic regression analysis including demographic information as predicting variables was not significant ($p = 0.102$), and explained only a small amount of variance of the preference rating (1.8%) [Table 2]. Educational attainment was the only variable that was significantly associated with the preference rating (OR 1.51, 95% CI 1.13, 2.01; $p = 0.005$) [Table 2], which confirms the finding from the univariate analyses that individuals with an academic degree prefer generic drugs.

Adding the attitude towards generic medicines in the second step resulted in a significant regression model ($p < 0.001$), and the variance explained by the independent variables increased significantly (14.0%) (Table 2). The educational level (OR 1.55, 95% CI 1.15, 2.09; $p = 0.004$) remained significantly associated with the preference rating. Additionally, European ethnicity (OR 0.70, 95% CI 0.50, 0.99; $p = 0.044$) and a positive attitude towards generics (OR 5.49, 95% CI 3.58, 8.43; $p < 0.001$) were associated with a preference for generic medicines (Table 2).

The third logistic regression model was significant ($p < 0.001$) and explained 15.5% of the variance (Table 2). Additional to the significant independent variables from the second regression model, the number of GP visits (OR 0.96, 95% CI 0.93, 0.99; $p = 0.021$) and being currently prescribed with a medication (OR 1.44, 95% CI 1.03, 2.01; $p = 0.032$) were significant (Table 2). These results suggest that seeing a GP less frequently and currently taking a prescribed medication are associated with the preference for a generic medicine. The test statistics of the multivariate regression models are summarized in Table 2.

Discussion

The study found preference for branded innovator medication was associated with experiencing more negative attributes (e.g. less safety and effectiveness, and more side effects) about generic drugs, lower levels of education, belonging to a non-European ethnic group, having no current medication prescription, and more frequent visits to a GP. Interestingly, perceived sensitivity to medicines and the severity of reported symptoms were no longer significantly associated with the preference for branded medication after controlling for demographic and other clinical variables in a multivariate regression model.

In contrast to other studies [5, 6], we did not find any differences in age and sex with regard to preference for branded medicines. We also did not find any greater propensity to seek out information on prescribed medication in those preferring branded medication, relative to those who had no preference or preferred generics.

Our finding of lower education levels among those who prefer branded medication is consistent with previous studies [5, 6]. It may be that this group is more resistant to information explaining the comparability of generics and branded products. Alternatively, they may be more tied to using product branding as heuristic for determining quality. However, the current study was unable to determine what may lie behind the importance of lower education levels.

Our finding that a higher rate of medical visits, perceived sensitivity to medicines and symptom reporting are factors significantly explaining the preference for branded medicines can be interpreted in the context of previous work on these constructs in other areas. Webster and colleagues [13] recently found perceived sensitivity to medicine was associated with an increased likelihood of attributing symptoms to medication following taking a placebo described to participants as a 'well-known tablet'. Moreover, Petrie and colleagues [14] found an association with perceived sensitivity to medicines and greater symptom reporting after a vaccination. It seems likely that higher perceived sensitivity to medicines influences reluctance toward generics by elevating specific concerns about the likelihood of potential adverse events [10]. In a study of chronic medicine users, Svensberg and colleagues [15] found that patients who took generic drugs were less likely to describe themselves as sensitive to medicines. Our finding that individuals who were currently taking a prescription medication have a more positive attitude towards generic medicines also fits with previous research work in this field. Sundell, Andersson and Jönsson [16] demonstrated that the frequent use of prescribed medicine seems to be associated with more positive medication beliefs in general.

Although the findings of our study are based on a large and representative sample, there are some limitations of the study design that should be considered. First, we used only self-reported measures in order to assess preference to branded innovator or generic medicine rather than any specific behavioural test. Second, the survey was cross-sectional and does not allow for analysis of the direction of association between variables. Third, due to the fact that the frequency of prescribing generic medication has increased, public attitudes of patients towards generics may have changed since the survey was completed. Fourth, we have no information about participants' previous experience with taking a prescribed innovator versus generic drug.

Bearing these limitations in mind, the results suggest that clinicians should consider and explore negative attitudes towards generic medicines, increased healthcare utilization, perceived sensitivity to medicines and symptom

burden as factors that may help identify patients likely to have more difficulty accepting generic medicines. We know from previous research that negative attitudes about medication reduce the intention to take a medication [17] and increase non-adherence [18]. Future interventions for improving attitudes towards generic drugs should provide patients with information about how generics work and also their bioequivalence to branded medication. Prescribers should also be aware that branding and price carry connotations of quality, and this can also influence patients' views of generic medication.

Compliance with ethical standards

Conflict of interest Maria Kleinstäuber, Kate MacKrill and Keith J. Petrie declare no conflicts of interest.

Ethics statement Participants provided verbal informed consent. This research was approved by the University of Auckland Human Participants Ethics Committee (reference number 9294).

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