

Taiwanese Perceptions and Attitudes of Brand Name and Generic Medications

by

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ABSTRACT

Goal: The overall goal of the study was to explore consumer perceptions and attitudes about brand name drugs and generic drugs in Taiwan. Bivariate associations were investigated among perceptions, attitudes, anticipated actions (thoughts), knowledge, and experiences with brand name and generic drugs.

Methods: The sampling frame was three hospitals in Taiwan: Tri-Service General Hospital (TSGH); China Medical University Hospital (CMUH); and Chien-Yu Hospital (CYH). A non-disguised, self-administered survey questionnaire was used to collect data from patients at waiting areas near a pharmacy or clinic in these three hospitals that had heard of brand name or generic drugs. For subject recruitment, a 'Push' or 'Pull' strategy was used in purposive or judgmental sampling, with the researcher taking initiative to reach out to patients randomly or setting up a poster in the waiting area to invite potential survey participants, respectively. The sample size was determined based on the nonparametric contingency table analyses to accomplish study goals. Respondents completed and returned the questionnaires onsite and were given a 7-ELEVEN gift card worth \$100 in Taiwan currency as a token. For statistical analysis, perceived effectiveness, perceived quality and attitudes were categorized dichotomously to 'favorable for brand name' and 'generics not inferior to brands.' Two separate categorizations were used to group respondents into low, medium, and high knowledge groups based on one set of 7 questions about characteristics and features associated with brand name or generic drugs and a second set of 4 questions related to similarities and differences between brand name and generic drugs.

Results: Data collection between March 19th and April 12th 2018 achieved 517 questionnaires for analysis (TSGH=200, CMUH=203, CYH=114). Only about 40 percent of the hospital patients contacted to participate reported that they had heard of brand name or generic drugs. The average age of respondents was 48 years old and more than half (53.0%) had no chronic disease prescriptions. Among respondents who could report whether or not they had had drugs prescribed for them, 235 (179) had experienced a brand name (generic) drug being prescribed and 45 (61) did not have experience. Among a subset of 91 respondents that had a brand name drugs ever switched to a generic drug, 55 reported same therapeutic effects and 57 reported no difference in adverse effects after the switch.

For perceived effectiveness, about 40 to 60 percent of respondents associated the effectiveness features or characteristics with brand name drugs and less than 10% associated those characteristics with generic drugs. For perceived quality, respondents were more likely to have the perspective that manufacturer's reputation (53.4%) and being produced in quality facilities (61.1%) were associated with brand name drugs. For attitudes, 57% to 65% of the respondents associated confidence, satisfaction and comfort with brand name drugs. For the knowledge questions about characteristics of drugs, about 70% knew that brand name drugs have higher prices or higher costs. About 60 and 65 % knew that brand name drugs go through R&D and more likely were made by foreign manufacturers, respectively. For knowledge questions on similarities and differences between brand name and generic drugs, approximately three-fourths of the respondents understood correctly that these two types of medications are therapeutically interchangeable. Slightly fewer, 59% and 63% agreed that the two have the same dosage and active ingredient, respectively.

In the bivariate analyses, perceptions and attitudes were significantly associated in expected directions, higher perceptions for effectiveness for brand name drugs matched higher perceptions for quality and positive attitudes toward brand name drugs. Perceptions or attitudes also were associated with knowledge and with corresponding anticipated actions about a generic switch (accept vs. not) or paying out-of-pocket costs for branded drugs. For experiences with having been prescribed brand name or generic drugs, only being prescribed brand name drugs was associated with attitudes (more favorable attitude with experience). Higher knowledge level based on questions about similarities and differences between brand name and generic drugs was associated with accepting a generic switch and not wanting to pay out-of-pocket costs for branded drugs. Respondents with higher knowledge also more often reported perceiving no subsequent difference in effectiveness or adverse effects after experiencing a generic switch.

Conclusion:

A considerable proportion of Taiwanese consumer respondents had positive perceptions of effectiveness and quality, plus attitudes toward brand name drugs and these perceptions and attitudes were also associated with corresponding anticipated actions about a generic switch or paying their own costs for branded drugs. However, there appears to be a substantial gap in consumer awareness and understanding of brand name and generic drugs. Governmental administrators in Taiwan may benefit from education and promotion to help consumers feel confident about using generic drugs.

CHAPTER 1

INTRODUCTION

Steadily climbing drug expenditures by the National Health Insurance (NHI) Administration in Taiwan have resulted in about 25% of the total healthcare expenditures being spent on drugs. Within the global budgeting framework used by NHI to pay for health care expenses, payments to hospitals and their affiliated clinics have not kept pace with the increasing cost for drugs. Hospital payments reflecting drug price cuts by NHI have resulted in a situation where hospitals, on average, receive 10% to 15% lower payments than the amount they request from the NHI.

Hospitals and clinics respond by developing strategies to achieve cost savings to remain profitable, especially given that prescribing and prescription drugs have been an important source of earnings for medical institutions in Taiwan. Hospitals have sought to achieve cost savings by negotiating purchase prices (lowest bid prices or asking for higher discounts) from manufacturers and by prescribing more generic drugs or making generic switches "to maintain a certain profit" with the reduced, fixed budget-based NHI payments. In such a situation, generic drug manufacturers may take advantage of cutting their price to meet competition, but brand name drug multinational manufacturers are not able to do so. That is why 70% of medications prescribed are generic drugs in Taiwan and the share of the brand name prescription drug market is decreasing¹. Over the past several years, many multinational pharmaceutical companies have left the Taiwan market partly due to the "trickle down" impact of the low payments and payment changes from the NHI. Some patients could face the problem of no medications available for treating their diseases in the future, affecting consumer opportunities to acquire brand name drugs. That led to an idea for the government to develop a new policy to remedy this issue.

In September 2015, the Ministry of Health and Welfare in Taiwan planned to launch a pilot program in 2016 that would let patients pay their own out-of-pocket expenses to acquire certain brand name drugs when generics are available ². The rationale offered for this pilot program was that it would give patients an opportunity to choose certain brand name drugs by paying the price gap between market price and price reimbursed from NHI. The ministry believed that having patients pay their own expenses for the price gap to obtain brand name drugs could be a way of preventing pharmaceutical firms from leaving Taiwan. The ministry does not think that there is a difference in quality between brand name and generic drugs. The pilot program was intended to respect some people who have more faith in certain brands, and give them an opportunity to have their own choices for their preferred medications.

Critics contended that the practice, called balance billing, pushed responsibilities of the cost containment to patients in Taiwan. Criticism and public reaction was that the “new pilot program to expand availability of brand name drugs could end up costing patients.” As a consequent, the pilot program was halted. The proposed pilot program increased awareness that consumers in Taiwan had attitudes about brand name drugs and generic drugs. The overall goal of this study is to learn more about consumer perceptions around brand name drugs and generic drugs.

CHAPTER 2

LITERATURE REVIEW

Studies of consumer perceptions about brand and generic drugs have been conducted. Selected relevant studies in a range of countries are highlighted in this chapter, along with some studies specific to Taiwan.

Patient perceptions of brand name and generic drugs from global studies

This section summarizes the previous research studies from other countries about patient knowledge, perceptions about brand name and generic drugs, as well as patient thoughts and experiences of generic switch. Patient perceptions of generic substitution for specific diseases will also be discussed.

Knowledge and information source

Patient confidence and knowledge pertaining to generic medicines use have increased over the past four decades, especially in developed countries. A narrative review of twenty studies from different countries conducted from 1970 to 2008 on consumer perceptions and views towards generic medicines was performed. In general, consumers showed mixed reactions towards the use of generic medicines. This was evident from the divergence of views observed by country development level, consumers' socioeconomic characteristics, drug product characteristics, pharmaceutical reimbursement system, and policy environment ³.

A cross-sectional study in Auckland found 51.6% of respondents had previous knowledge of generic medicines. A higher level of education had a direct relationship with having correct knowledge of generics. Attitudes of participants toward the use of generic medicines were compared according to their knowledge of generics, whether it was

recommended by a pharmacist and their type of illness. Participants were more prepared to change to a generic for a minor illness (79%) than for a major illness (59%). Those who had better knowledge were more likely than those with poor knowledge to say they would use a generic in major illness as well as minor illness. Previous positive experiences with generics also determined consumers' willingness to use generics ⁴.

In June 2013, Ireland introduced generic substitution and reference pricing for the first time. One study assessed how generic medicines were perceived amongst patients in the time leading up to the enactment of the new legislation. The results showed that 31 % of patients had no knowledge of generic medicines and 39 % of those exhibited confusion between the words 'generic' and 'genetic' ⁵.

Perceptions about brand name and generic drugs

The study in Ireland leading up to generic substitution and reference pricing also assessed consumer perceptions. Almost 24 % held the view that generics were of poorer quality than originators, while 18 % expressed the opinion that generics do not work as well as originator products. Approximately 30 % of patients believed that generics were manufactured to a poorer quality, with 29 % holding the view that generics are less expensive due to being of inferior quality ⁵.

There is also an interesting phenomenon that patients with positive perception or awareness of the benefits of generics did not equal preferences for personal use of generics. In a cross-sectional online survey in India, most respondents believed that generic drugs were as therapeutically effective as brand name drugs (72%) and less expensive (92%), but only 52% preferred to take generic drugs themselves. Approximately 62% of the respondents were willing

to take brand name drugs for chronic diseases. In contrast, 74% of respondents preferred to purchase over the counter generic drugs for general ailments such as headache, sore throat and fever ⁶. Similar findings from another study among women of childbearing age currently enrolled in U.S. TennCare (Medicaid) showed that most women believed that generic medications were less expensive (98%) and better value (61%) than brand name medications, but only 45% preferred to take generics themselves. About 23% believed that brand name medications were more effective than generics, 77% said the generics were as effective as the brand, whereas 13% believed that generics caused more side effects ⁷.

In one U.S. national survey among PBM enrollees, generally speaking, patients had positive perceptions about generic drugs ⁸. In another study, few patients reported concerns about the safety or side effects of generics, and only a minority believed that brand name drugs are more effective than generics. More than 70% of patients agreed that generics are less expensive and a better value than brand name drugs, and are just as safe. However, although 56% reported that Americans should use more generics, only 38% prefer to take generics ⁹.

A study in Australia demonstrated considerable mistrust of generic medicines. Many senior participants that required multiple medications for a range of chronic conditions highlighted their uncertainty about the extent of pharmaceutical companies' influence on health professionals, the mistrust of foreign generic manufacturers and skepticism in their equivalence. The substitution of generic medicines and variability in packaging added to the overall concern and reported poor compliance ¹⁰.

In one focus group study among 50 low-income women in Houston, Texas, most participants indicated that they perceived no difference between the health benefits of generic and brand name prescription drugs. Participants acknowledged that brand name drugs were

more expensive, and people assumed that something “cheaper is not as good.” A few participants indicated that they felt that generic drugs were different from brand name in terms of quality. Some participants indicated that people do not trust generic medication. There was an educational gap regarding the equivalence of generic and brand name prescription drugs ¹¹.

One study explored South African consumer perceptions from low and middle socio-economic groups as well as the elderly and teenagers. Like many other developing countries, South Africa provides free medicines through its public health care facilities. Generic medicines, as well as free medicines were considered to be poor quality and treated with suspicion ¹².

In a German survey study, nearly 64% of the patients stated that they knew of the difference between brand name drugs and generics. Of these patients, 37% expressed general skepticism towards generic drugs because of their lower price. This attitude was more frequent among those who had not been confronted personally with a generic substitution. Patients who had been skeptical when first confronted with a generic substitution were more frequently among those who considered inexpensive drugs to be inferior and they were frequently not satisfied with the information on substitution provided by their general practitioners ¹³.

To estimate savings needed for patients to choose generics over equivalent brand name medications, a cross-sectional mailed survey of 2,500 commercially insured individuals included hypothetical scenarios and asked about willingness to purchase generic medications. Few respondents would never buy a generic medication, although a greater proportion indicated that they would not buy a generic antidepressant (13%) than a generic cholesterol (6%) or back pain (6%) medication. Among patients willing to use a generic only if it were less expensive than a brand name medication, the median cost difference required each month to choose the generic

was \$25.50 (interquartile range \$18-\$50). The study concluded that efforts to increase generic medication use may be aided by increasing copayments for preferred brand name drugs or decreasing them for generics ¹⁴.

Brand name and generic substitution or switch

Having correct understanding and having experience were significantly associated with willingness to accept generic drug substitution. A Portugal survey study found 78% of respondents had consumed generic medicines and 89% (65%) were willing to accept drug substitution based on doctor's (pharmacist's) recommendation. ¹⁵.

A similar finding occurred for Finland, where policies of generic substitution were implemented. Overall, 71% of the respondents considered generic substitution a good law reform. The respondents also held the opinion that cheaper medicines are effective (81%) and that generic substitution does not cause any risk to drug safety (85%). Most of the respondents (88%) who had substituted their medicines had not noticed any difference between the previously used and substituted medicines. Two main reasons for substituting were a desire to save money and recommendation by pharmacists ¹⁶.

Information from their physician or the pharmacy increased chances of generic switch. One Norwegian study found that patients who reported to have received information from their physician or the pharmacy about generic substitution were more likely to have switched from brand name to generics. About half of the patients had experienced a generic switch. Altogether 36% of the patients who had experienced a switch reported one or more negative experiences connected to the substitution and 21% reported an overall negative experience after the change. The experiences of the patients were not related to age, gender, or number of medications or

information about generics from either the pharmacy or the physician. About 41% of the patients claimed they would not switch if they had no personal economic incentives ¹⁷.

Another similar finding about recommendation of generic drug use from a health professional was from a national mailed survey of a random sample of 2,500 commercially-insured adults in the US. Factor analysis was used to develop five multi-item scales from patient survey responses that measured: (1) general preferences for generics, (2) generic safety/effectiveness, (3) generic cost/value, (4) comfort with generic substitution, and (5) communication with providers about generics. In the fully adjusted model, only two scales were significantly associated with generic drug use: comfort with generic substitution and communication with providers about generic drugs ¹⁸.

However, not every study concluded that generic switch is acceptable. One study found disadvantaged people from the U.S. rural South had low trust of generics and increased reluctance to switch to generics. Barriers to generic medication use included perceptions that generics are less potent than brand name medications, require higher doses, and, therefore, result in more side effects; generics are not "real" medicine; generics are for minor but not serious illnesses; and poor people are forced to "settle" for generics ¹⁹.

In addition, 20 studies from various sources of the peer reviewed or original research articles in western countries published between 2000 and 2011 indicated that 33% of all patients were uneasy about having their drugs substituted generically. Between 8 and 34% of patients reported poorer effects and/or new side effects after a change—except for antiepileptic drug (AED) users from which the number of reports was even higher. Poor awareness of generic substitution caused confusion and reduced the patients' willingness and ability to take their medication as prescribed ²⁰.

For chronic diseases, generic substitution can be an additional factor in poor drug adherence. One Norwegian study found among more than 50% of the patients that had been using antihypertensive drugs for more than 10 years, 25% found it difficult to remember to take their medication every day, 33% said generic substitution made keeping track of their medications more demanding, 29% were anxious when they started to use a generically substituted drug, and 15% reported having new or more side-effects ²¹.

Patient perceptions of generic substitution for specific diseases

The therapeutic index (TI) is the range of doses at which a medication is effective without unacceptable adverse events. Drugs with a narrow TI (NTIDs) such as antiepileptics, antiarrhythmics, immunosuppressants and anticoagulants are major drug classes that have a narrow window between their effective doses and those at which they produce adverse toxic effects ²². Some voices from healthcare providers and consumers have expressed concern that bioequivalent generic and brand name NTID drugs may not be equivalent in their effects on various clinical parameters and proposed that generic substitution should not be applicable for NTIDs. For example, one study found that more than 92% of patients agreed that switching between forms of the same AEDs may cause an increase in seizures or adverse effects ²³. In addition, more than 70% of the patients were concerned about the effectiveness of generic AEDs and 68% were not comfortable receiving generics. Further, 87% of the patients thought that their AEDs should only be substituted with a generic with their consent and 64% believed that substitution should only take place by the consent with their doctors ²⁴. In a study in the Midwestern U.S., 34% reported side effects due to the switch, and 31% returned to a brand name AED as a result ²⁵. Patients who had never switched were more concerned about generic

substitution than those who had already switched ²⁶. Even perceptions among physicians, as well as patients do not always align with the FDA position that generic AEDs have the same clinical effect and safety profile as branded AEDs. Physicians (88%) were concerned about an increase in breakthrough seizures in patients switched from a brand AED to a generic or among generics. Two-thirds of physicians have linked breakthrough seizures to generic AED substitution ²⁷. However, the available evidence from randomized clinical trials does not suggest an association between loss of seizure control and generic substitution of at least three types of AEDs (the aggregate odds ratio =1.1 (95% CI 0.9, 1.2)) ²⁸.

Similar findings occurred from research in other narrow therapeutic-range agents such as immunosuppressants or anticoagulants. A United Arab Emirates survey study found 31% of the patients felt that generic immunosuppressants were not equivalent or only sometimes equivalent to branded medicines. Nearly half (47%) stated they would refuse generic substitution of cyclosporine ²⁹. The findings from one Canadian study showed that overall, only 33% of respondents agreed or strongly agreed that they would feel comfortable taking generic warfarin, a commonly used anticoagulant ³⁰.

Patient perceptions of brand name and generic drugs in Taiwan

This section summarizes the previous Taiwanese studies about patient knowledge, perceptions, attitudes and thoughts about brand name and generic drugs, as well as thought about generic switch.

Knowledge and information source

One research study in 2005 among college student participants explored how brand knowledge affected perceived risk and purchase intention. Twenty-five over-the-counter brands of cold and cough remedy medicines were included in the study. The results from a factorial design experiment showed that when consumers purchased a cough and cold medicine, high brand knowledge effectively reduced consumer perceived risk (symptoms not relieved, adverse effects, etc) and increased their purchase intention. The analytical results showed that the effect of brand knowledge is moderated by the personal information source ³¹.

Another study from an academic and industry collaboration aimed to investigate the differences in knowledge and attitudes between generic and brand name drugs from two groups of populations (347 patients and 82 physicians) in 2007. The survey results showed approximately 30% of medications that physicians in hospitals prescribed were brand name drugs, while physicians in clinics always prescribed generic medicine. The results also showed that patients overall were less knowledgeable about generic and brand name drugs. Patients who had some knowledge tended to disagree that brand name drugs were more effective than generic drugs ³².

Similar results were obtained from a governmental project conducted from 2009 to 2010. Simple random sampling from phone books for a phone interview survey (RDD, random digit dialing) among ordinary people over the age of 50 was used. The results showed less than 35% of people had knowledge about both generic and brand name drugs, but the younger respondents (such as age of 50 – 54) showed higher level of understanding than the older people (such as 70 years or above). The people of higher educational degrees or higher social economic status had more experiences of switching from brand name drugs to generics. About 68% of the

interviewees were not aware of receiving prescriptions with generic substitutes, and about 50% were not willing to take generic substitutes (versus 36% of those who were willing) ³³.

Consumer perceptions

One study conducted from 2009 to 2010 used an evidence-based approach to find the factors that affect physicians' prescription behaviors and understand the policy of drug utilization in a health services organization. Questionnaires were sent to 469 physicians as well as his/her patients (N=1,449, one physician with 3 of his/her patients) from different medical institutions (medical centers, regional hospitals, local hospitals and clinics). For the results from physicians, 92 % responded that they had been asked by their patients to prescribe brand name drugs (36% rarely, 50% occasionally, 7% frequently). Physicians perceived 25%, 64% and 11% of their patients overall had high, average and low satisfaction of generic drugs, respectively. The results from patients indicated that 47% of the patients were aware of both brand name and generic drugs, and 59% of patients were prescribed brand name and 41% were prescribed generics. Only 18% have asked their physicians to prescribe a brand name drug for them. For patient willingness to use generic drugs, only 9% said yes, 16% said no and 75% had no comments. For effectiveness, 37% perceived brand name drugs were more effective than generic drugs, 3% perceived generic drugs were more effective, 18% said there was no difference, and 43% did not know. If the providers did not have the brand name drugs of their choices, 20% of patients switched to other providers ³⁴.

The collaborative academic and industry study found 55% of patients perceived brand name drugs were more effective than generic drugs, 14% disagreed and 31% perceived no difference for both ³². Other similar results occurred in the governmental project; overall 60%

considered brand name or off-patent branded drugs to be superior to generics, and 50% disagreed that generics had similar therapeutic effects to the brand name counterparts ³³.

One focus group study investigated the decision-making process of 40 hypertensive patients from different tiers of medical facilities (community, regional hospitals, and medical centers) in southern Taiwan (including Kaohsiung City and Pingdong County) and whether out-of-pocket payments influenced decision-making. Southerners perceived brand name drugs as better quality. Some participants visiting at higher tiers of medical facilities thought the “quality” of drug is important and believed that “the higher the tier of medical facilities, the better the quality of the drug” and “the higher the drug cost, the better the drug quality.” Some participants preferred brand name drugs to generic drugs, because they had the impression that they could get brand name drugs easier at higher tiers of medical facilities, whereas they could get only generic drugs at physician clinics according to previous experiences, and thus they distrusted the quality of drugs supplied at physician clinics and community pharmacies ³⁵. The population in southern Taiwan is generally understudied compared with the population in the capital city, Taipei, yet they may better represent the general population in Taiwan because of its unique socioeconomic diversity ³⁶. According to one qualitative study ³⁷, the clinical practice and medical utilization patterns in the southern (Kaohsiung City and Pingdong County) branch were found similar to those in other regions in Taiwan ³⁵.

Brand name drug switch to generics

In a national survey "Patient awareness of treatments and medication use for serious diseases", staff from "The Journalist" magazine collaborated with the Taiwan Indicators Survey Research company in 2012. Via phone interviews, they surveyed 1,201 Taiwanese of age 20

years above and an Internet survey sampled 306 healthcare professionals from members of an online job search site. The survey found that 70% of people were willing to purchase brand name drugs, but 45% did not know the differences between brand name drugs and generic drugs, and 63% thought that the efficacy of brand name drug is more stable. In addition, of all the respondents, 43 % said they would not be willing to switch to generic drugs after initially taking brand name drugs, while only 30 % said that they would consider switching ³⁸. Furthermore, 61% of the population and up to 85% of healthcare professionals worried that the brand drugs replaced by generic drugs will cause side effects. The survey found that the percentage of healthcare professionals who prefer brand drugs, is almost twice that for the general population^{38,39}.

Patient backgrounds and drug choices

Patients' backgrounds might influence physicians' prescribing choice of brand-name or generic drugs. One study with a longitudinal analysis of 1,000,000 NHI enrollees for 1998-2008 found patients with medical training background had 1.37 times greater odds of being prescribed brand name instead of generic oral hypoglycemic agents compared with general patients. Patients' diabetes severity, prescribers' level of experience, medical setting characteristics (publicly owned, higher accreditation level, and located in a higher urbanized area), lower market competition, and earlier dates of prescription were positively associated with receiving a brand name prescription drug ⁴⁰.

Gaps in literature

A limited number of studies can be found about patient perceptions and attitudes toward medications in Taiwan, especially for brand name and generic drugs. Most of these studies available are in the form of governmental projects or reports for policy analysis rather than journal articles. Although these studies could provide information about the current status on consumer use of brand name and generic drugs, the results were more descriptive. The area that has not been explored or under-explored is the associations among cognitive factors of perceptions, attitudes and thoughts about brand name and generic drugs for Taiwanese consumers.

CHAPTER 3

OBJECTIVES AND RESEARCH QUESTIONS

Objective

The overall goal of the study is to get a better understanding of how consumers think and have experienced brand name and generic drugs in Taiwan. Compared to consumers who have overall positive evaluations of generic drugs in the U.S., the issue of choosing between brand name and generic drugs has not been discussed in Taiwan until approximately 10 years ago when NHI started facing the financial constraint. More favorable views towards generic drugs in the U.S. are due to several factors. Regulations in the U.S. for generic drugs were established in the early 1980s; consumers have been educated and shown confidence about taking generic drugs. They perceive generics are as effective as brand name counterparts. Another factor to nudge American consumers to turn to generic drugs is the limited payments or lack of coverage for brand name drugs if generic substitutes are available. Prescription drugs are not commodities that consumers can experience easily. The goal of prescription drugs is to treat diseases or relieve symptoms, different from the utility of pleasure that other consumer commodities provide. Brand name and generic prescription drugs are typically obtained from physicians who are usually decision makers for their patients about which medications to prescribe. Consumers mostly do not have desire to acquire information about medications until they have needs.

The research objective for this study is to focus on understanding perceptions, thoughts and experiences from the patient perspective about brand name and generic drugs in Taiwan. This study will investigate associations among patient perceptions, attitudes, anticipated actions (potential reactions under different scenarios), knowledge, and experiences of brand name and generic drugs to identify the factors that may influence consumer preferences for both

medications. This study can provide valuable information to help the government design health related policies to provide benefits to both people and the society.

Definition of key concepts

Below briefly explains the definition of the keywords in this study, perception and attitudes.

Perception

According to Kotler (2009)⁴¹, perception is “the process by which people select, organize, and interpret information inputs to create a meaningful picture of the world. The key point is that it depends not only on the physical stimuli, but also on the stimuli’s relationship to the surrounding field and on conditions within each of us.” That means one person might have different perception than the other under the same stimulus. Stimuli (such as sight, hearing, smell, taste and touch) are units of inputs from objects that are perceived by any one of the five senses - vision, sound, touch, taste and smell ⁴².

Attitude

According to Kotler (2009)⁴¹, attitudes are, “a person’s enduring favorable or unfavorable evaluations, emotional feelings, and action tendencies toward some object or ideas.” People can have attitudes on almost everything. Attitudes put on a frame on people’s minds like a snapshot. This picture stays our mind and makes us like or dislike an object, so we may go forward with it or stay away from it. Attitudes also guide us to remain in a coherent way through

other similar subjects. Because attitudes save our energy and thought, they can be very difficult to change ⁴¹.

Conceptual Model

Figure 1 illustrates the concept map including possible relationships among the study contents or variables, to help understand this study in a whole picture. This is not a theoretical model and this diagram does not explain the causal relationships among the variables, but rather provides guidance on what elements of interest could have associations.

The key variables in this study include knowledge, perceptions and acceptability (attitudes) about brand name and generic drugs, the experiences of generic switch, whether been prescribed brand name /generic drugs, and perceived changes (effectiveness or adverse effects) after generic switch. However, the causal relationships in the diagram above won't be examined, the associations among these variables were to be tested.

The outcomes variables or dependent variables of the interests in the analysis are:

- A. Perceptions or attitudes which could be affected by knowledge, experiences (ever been prescribed generic or brand name drugs, generic switch (including perceived changes, it is a small subset), paying out-of-pocket costs), or thoughts which is presented as a form of perceptions or attitudes.
- B. Anticipated actions or thoughts about generic switch or paying out-of-pocket costs for brand name drugs, those thoughts are forming from their knowledge, perceptions, attitudes or experiences.

- C. Perceived changes in effectiveness and adverse events after generic switch, this would relate to consumer use of brand name drugs and experience whether there are changes in the therapeutic effects or experience adverse events.
- D. Knowledge level could be a result from experiences prescribed generic or brand name drugs, generic switch (including perceived changes, or paying out-of-pocket costs).

Research questions

Objective 1: Explore the relationships between perceptions and attitudes

Research Question 1.1: Whether perceptions or attitudes of brand name and generic drugs relate to each other.

Objective 2: Examine the associations of perceptions/attitudes with knowledge, thoughts and experiences

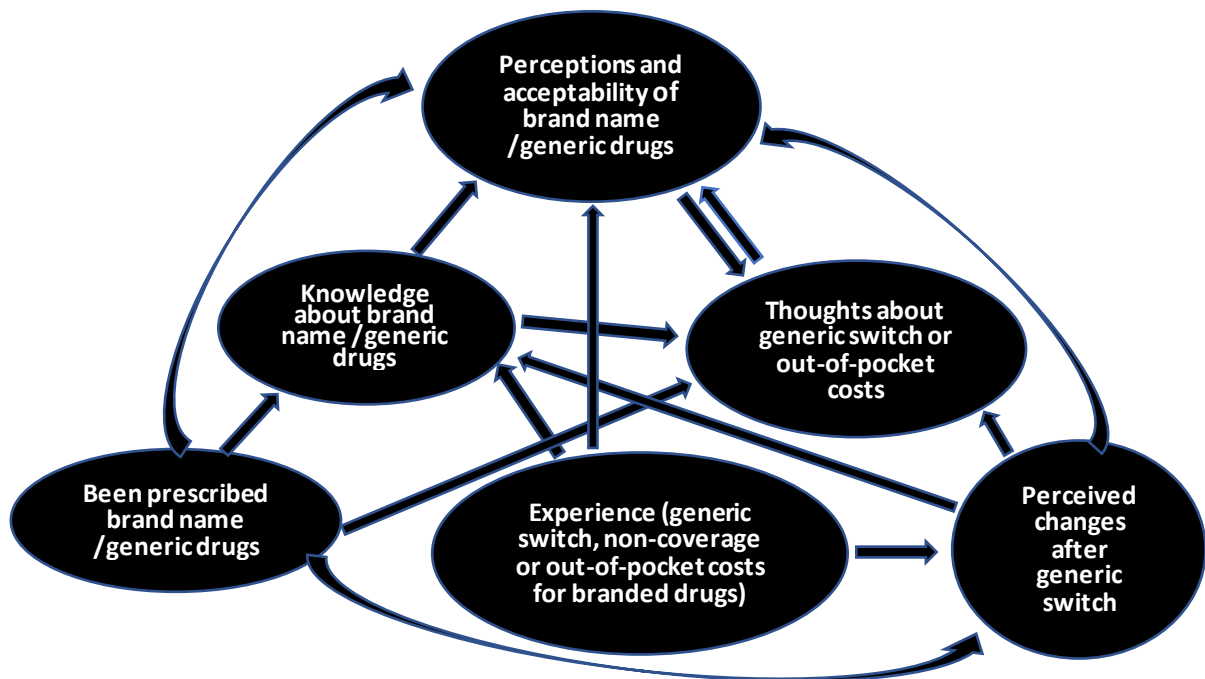
Research Question 2.1: Whether perceptions or attitudes have associations with consumer knowledge about brand name and generic drugs

Research Question 2.2: Whether perceptions or attitudes have associations with whether have been prescribed brand name drugs or generic drugs

Research Question 2.3: Whether perceptions or attitudes have associations with thoughts (anticipated actions) about generic switch or paying out-of-pocket costs for brand name drugs

Research Question 2.4: Whether perceptions or attitudes have associations with the experiences of generic switch and perceived at least no differences in both effectiveness and adverse effects after generic switch

Figure 1. Conceptual model with the study contents and possible associations



Objective 3: Examine the associations of knowledge with thoughts and experiences

Research Question 3.1: Whether patient knowledge of brand name and generic drugs is associated with experience of being prescribed brand name or generic drugs

Research Question 3.2: Whether patient knowledge for brand name and generic drugs is associated with thoughts about generic switch or paying out-of-pocket for brand name drugs

Research Question 3.3: Whether patient knowledge for brand name and generic drugs is associated with their perception of no differences in effectiveness and adverse events after a generic switch

Objective 4: Examine relationships between consumer thoughts about pay out-of-pocket cost for brand name drug and experiences

Research Question 4. Whether consumer 'thoughts (anticipated actions) about paying out-of-pocket for a brand name drug' is associated with 'their experiences having a switch and perceiving no differences in effectiveness or adverse events after the switch'

CHAPTER 4

METHODOLOGY

Target population and sampling method

The target population was consumers in Taiwan, especially consumers that have at least heard about brand name or generic drugs. For the survey sampling approach, purposive sampling (or judgmental sampling/selective sampling) was used because it could facilitate recruitment. It was more efficient and could enhance the response rate with a large sampling frame where randomization might prove difficult to perform.

It was decided to conduct the survey in hospitals, anticipating that it would be easier to find respondents of interest from hospital patients. For example, patients who waited outside the pharmacy window for their prescription drugs or physician offices for physician services were more likely to be qualified. They were more likely to have heard about or know something about brand name drugs or generic drugs than the general population (especially more likely for patients who received pharmacy services).

Choice of hospitals

At present, medical institutions in Taiwan are divided into different levels: clinics, local hospitals, municipal hospital, regional hospitals, and medical centers. Simply speaking, hospitals in higher tiers establish a broader range of medical services, more advanced medical equipment, and they handle patients with more complicated diseases. Medical centers or regional hospitals are the largest medical institutions and attract patients from diverse regions. Large hospitals are located in urban concentrated areas or a suburban area, but traveling to medical centers or regional hospitals is usually not a big problem for visitors. These hospitals charge slightly higher fees than lower tiered hospitals. To many patients, it is still affordable and it is worth the value.

In general, higher tiers of hospitals have larger patient volumes, such as medical centers or regional hospitals, providing better opportunity to get more respondents to participate the survey.

Specific hospitals selected for the study were based on where the researcher had personal connections that could help gain entry for the study to be conducted. The hospitals and the individuals that helped gain access for the study are described below.

Characteristics of the hospitals, connections between researcher and PI:

1. China Medical University Hospital (CMUH) is a teaching hospital which provides educations and clinical services in both Chinese and Western medicine. It is also one of the largest hospitals in the central part of Taiwan, Taichung City. As a teaching hospital affiliated with a medical school and pharmacy school, CMUH has specialized departments and clinics that serve a range of patients and a high volume of patients daily. A CMUH, Yu-Chieh (Jack) Chen, is the Director of the Division of Clinical Pharmacy within the Department of Pharmacy. On behalf of the researcher and the IRB application and approvals, he served as the local “host” and PI for the study at this hospital. Jack was a former graduate student at UW-Madison, and he shared the same advisor with the researcher, Dr. David Kreling.
2. Tri-Service General Hospital (TSGH) is a military hospital in Taipei City. TSGH is an urban medical center hospital with a variety of specialty departments and clinics that serve both military and other government employees and retirees, plus the general population. TSGH is the hospital where the researcher was employed as a pharmacist before starting his graduate program. The researcher’s prior employment provided personal connections with the pharmacy directors and staff members. Jue-Zong Yeh is a pharmacist and served as the PI

for the IRB approvals and local host for the study. He did have not prior connection with the researcher prior to the IRB submission for this study, but was connected via Ya-Hue Chin who was the director of the pharmacy at the hospital when the researcher was working as a pharmacist (for about four years). Ms. Chin had no human subject or ethics related training courses on clinical trials, so she helped identify other pharmacists who would have enough related training credits to be involved with the IRB processes. Jue-Zong Yeh was one of the few pharmacists who were qualified and he agreed to be the PI for this study.

3. Chien-Yu Hospital (CYH) is a local hospital in the researcher's home town, Kaohsiung, in the southern region of Taiwan. CYH is a smaller hospital primarily serving patients in the local city and close outlying areas. Yi-Lang Hsu is the current Dean of the hospital and a good friend of the researcher's father. Through his father's relationship, the researcher gained access and approval to conduct the study. At CYH, a formal IRB process was not needed, the Dean reviewed the research design and questionnaire and provided approval and authorization to conduct the survey in the hospital.

Selecting these hospitals provided diversity in the regional location and the types of patients that would be encountered for administering the survey. A description of the IRB approval processes is given in Appendix 1.

Sample size determination

Since this was a survey using purposive sampling (non-probability sampling), the sample size determination might not be appropriate with probability sampling which is the common method that many other studies have used. The sample size was best determined from the goal of the analyses that were used. For example, in nonparametric analyses, the sample size for

carrying out a Chi-squared test for a contingency table requires that 25% of the cells have expected frequencies of no less than 5. The analyses for subgroups of interests in our study used more Chi-squared test because most of the data collected were categorical variables. For example, we could evaluate which data might have extremely skewed distribution for a dichotomous or trichotomous variable and we could get a sense from the results of previous studies.

Several criteria affected the estimation of final sample size. First, it was important to identify the variables in the survey questions likely to have unbalanced distribution of responses, especially based on results in published studies. For example, in one governmental project survey, 6% of respondents in the phone survey had experienced a generic switch; 25% did not, and 69% replied 'not applicable' (N/A). That accounted for about 20% of respondents (i.e., 6/31) who experienced a generic switch among the respondents who answered the question with a valid response³³. This presumes that respondents who answered 'not applicable' had not or were not taking medications in the survey. This could be a proxy to estimate the proportion of patients who had generic switch for our study.

Second, the cell count must be larger than 5 to conduct a Chi-squared test. There were a lot of categorical variables in responses to be used in a 2 x 2, 2 x 3 or 3 x 3 table for analyses in this study.

In addition, it is important to have an understanding about the proportion of respondents who have at least some knowledge about brand name and generic drugs. Respondents would find it difficult to answer some of the questions without some knowledge about these two drugs. According to a survey in a previous Taiwanese study, about 45% of the respondents did not know the differences between brand name drugs and generic drugs³⁸. The results from another

Taiwanese study found 47% of the patient respondents were aware of both brand name and generic drugs ³⁴.

Number to sample

To approximate the sample size, the relevant proportions from previous studies that might occur were considered. The proportion who experienced generic switch derived from the government study was 20 percent of respondents. The collaborative academic and industry study found 14% of patients disagreed that perceived brand name drugs were more effective than generic drugs ³². In addition, assume 50% of respondents knew about brand name and generic drugs. If at least 5 respondents for each cell for a 2 x 2 x 2 (perception x experience x know about) contingency table, the minimum sample size would be $5 / (14\% \times 20\% \times 50\%) = 357$. These statistics in previous research are relevant to the study, and they especially reflected the unbalanced distribution of responses that might occur (most of statistics planned for this study are not available in previous studies done in Taiwan).

This sample size estimation above was adopted as a plan and more surveys were collected in case some of the questionnaires back from respondents did not meet the quality standard, with missing data, inconsistency of their input across sections of the questionnaire, or to reach a certain level of numbers for the subpopulation of interests, etc. Consequently, 200 completed surveys was set as a goal for each of the three hospitals where data collection occurred.

Instrumentation

The general approach for data collection was an undisguised self-administered survey questionnaire which was printed on both side of B3 (13.9 x 19.7 inches) paper, so it could be folded into a four-page booklet (page 1 and 4 on the same side, page 2 and 3 on the other side).

Building the survey items

The items for this survey were based on the results of the literature search on the keywords of consumer behaviors (i.e. perceptions, attitudes, etc.) and brand name/generic drugs from previous studies, especially the papers or articles involving survey research on consumers from both Taiwan and foreign countries. These research articles helped identify the dimensions or domains of perceptions on effectiveness, quality and attitudes.

Other important sources of information to identify characteristics and features of brand name/generic drugs were Internet searches for past or present Taiwanese news, news releases/presses, articles, current trends/topics or TV news video clips. The keywords searched (brand name/generic drugs, consumer/patient, perception/attitudes) in Chinese identified a lot of issues of brand name/generic drugs on their similarities/differences, patient perceptions/attitudes, or even policy implementations, etc. The relevant information from an Internet article search on these characteristics and features between brand name/generic drugs were summarized to be used for building the questionnaire for this study.

The categories of chronic diseases were obtained from a Taiwanese healthcare website ⁴¹. According to the governmental statistics in 2007, the prevalence of some common chronic diseases in Taiwan are hypertension (23%), hyperlipidemia (18%), metabolic syndrome (19%), diabetes (8%), chronic kidney disease (10%), etc ^{43, 44, 45}.

Survey contents (Structure/Sections)

The survey contained two parts, a separate cover letter was given to respondents before administering the questionnaire. The cover letter included a thank you statement, brief description of the study, expected time to complete the survey, statement of confidentiality, and a financial incentive for completing the survey. Respondents checked the box on the bottom of the letter if they would like to participate the survey, also there was some contact information about the researcher and the local PI if participants had something to say or any comments about the survey. English and Chinese cover letter for each hospital are presented in Appendix 2 to Appendix 7.

The questionnaire was divided into four sections. The questionnaire was given in closed-ended format for almost all the questions, including a list of predetermined answers from which participants could choose. The survey questionnaire in English is in Appendix 8 and the questionnaire in Chinese is in Appendix 9.

The first section of the survey form contained questions of patient disease conditions, number of medications taken and how respondents evaluated information sources about medications they receive. The questions covered sources of information that consumers have ever used, sources of most important and most trustworthy to the respondents.

The second section pertained to consumer perceptions and attitudes toward some characteristics or features of medications more likely to be associated with either a brand name drug or a generic drug (or both). Both perceptions and attitudes about brand name and generic drugs that consumers had could form a complex connection with their knowledge and actions. Some of the items capturing whether characteristics were associated with a brand or generic drug

were used as a measure of knowledge; the characteristics correctly would be associated with one or the other type of drug.

The third section covered the specific aspects of consumer knowledge about brand name and generic drugs as well as their opinions of and experiences with generic switches. First, a list of knowledge questions on similarities and differences between brand name and generic drugs was presented. Then, items were included to capture consumer thoughts or anticipatory actions related to scenarios where a physician proposed a switch or if medications were not covered. Scenarios allowed all to respond, even though a small proportion actually might have had a switch or coverage withheld. A series of questions also explored whether the respondent consumer ever experienced a switch or out of coverage situation for brand name drugs and sequelae including paying out-of-pocket costs and its burden, and comparisons of generic switched products in terms of effectiveness and adverse effects.

The questions in the final questionnaire section captured respondent socioeconomic or demographic characteristics, such as gender, age, education, income, and the administrative geographic area that the participants lived.

The three items 'Appropriate for serious diseases', 'More prescribed in clinics' and 'More prescribed in hospitals' would be left in 'miscellaneous' category and were not scored. They were to be used as exploratory items to see if they related to other responses in the survey or matched previous reported views.

Table 1 lists the questionnaire elements grouped by research domains and contents. This table provides a useful guideline to get an overview and the details of the survey domains and contents.

Table 1: Questionnaire domains and contents

Patient idiosyncratic factor	<ul style="list-style-type: none"> • Number of chronic diseases • Number of prescription drugs for chronic diseases
Information/ Knowledge	<p>Information sources:</p> <ul style="list-style-type: none"> • information sources consumers (1) have used, (2) the most helpful, (3) the most reliable <p>Knowledge about brand name and generic drugs (items that objectively should be ‘true’ about similarities and differences):</p> <ul style="list-style-type: none"> • Extrinsic factors – general conceptions about brand name and generic drugs (9 questions): <ul style="list-style-type: none"> ○ Have been on the market longer ○ Strict approval process (licensing) ○ Need R&D to produce ○ Has gone through clinical trials ○ Higher prices in the market ○ Higher costs to me ○ More likely made in domestic manufacturers ○ More likely made in international manufacturers ○ Monopoly of manufacturers • Intrinsic factors – comparison between brand name and generic drugs (5 questions): <ul style="list-style-type: none"> ○ The similarities or differences (ingredient, dosage, excipient, etc)
Perceptions	<p>Perceived effectiveness about brand name and generic drugs:</p> <ul style="list-style-type: none"> • Relieve more symptoms/episodes • Have higher potency/strength • Consistent performance • Minimize risk of treatment adverse effect <p>Perceived quality about brand name and generic drugs:</p> <ul style="list-style-type: none"> • Sensory – if looks and feels (shape, color, etc) like a good product • Produced in monitored/ quality facilities • Higher quality of non-active content • Made by reputable manufacturers

Attitudes	Acceptability: <ul style="list-style-type: none"> • Be overall satisfied • Be confident in treating • Be comfortable to take • Higher familiarity <p>Miscellaneous:</p> <ul style="list-style-type: none"> • Appropriate for serious diseases • More prescribed in (clinics or hospitals)
Generic switch	<p>Experiences:</p> <ul style="list-style-type: none"> • Prescribed generic drug (y/n) or brand name drug (y/n) • Brand name drug(s) not been covered <ul style="list-style-type: none"> ○ Ever paid out-of-pocket expenses and ○ The perception of burden for out-of-pocket expenses • Brand name drugs switched to generics <ul style="list-style-type: none"> ○ The summary of the differences for patient perceive effectiveness and adverse events post generic drugs switch if reported. <p>Thoughts/responses (Anticipated actions):</p> <ul style="list-style-type: none"> • If physician proposes switching to generic drugs <ul style="list-style-type: none"> ○ Be against, reserved, unsure, or open-minded about switch • If brand name drugs will not be covered/ paying out-of-pocket costs <ul style="list-style-type: none"> ○ Pay own expenses for choice of brand (strong brand attachment) ○ Accept a different brand that is covered (moderated brand attachment) ○ Accept generics (weak brand attachment)

Grouping for perceptions or attitudes

Each domain of perceived effectiveness, perceived quality or attitudes had four questions, so their grouping algorithm was consistent. Respondents selected from one of the three response items for each question to be grouped: 'More likely Brand name', 'More likely Generics' or 'Both'.

If respondents chose 'Brand name' for one of these four questions, then one point was given to 'Brand name.' If respondents chose either 'Generics' or 'Both the same' then one point was given to 'Generics' because 'Both the same' implied consumers who considered having the same perception or attitude for generic drugs perceived them not inferior to brand name drugs.

If the total points for this domain that respondents checked for 'Brand name' more than 'Generics', such as 3 for 'Brand name', or 2 for 'Brand name' but 1 or 0 for 'Generics', they were considered to have better perceptions or attitude to brand name drugs. Otherwise, respondents were grouped to 'generic drug' because they considered 'accepting' generic drug, including 'Brand name' and 'Generics' having the same points. Table 2 illustrates how groups were made based on the comparison of the points between 'Brand and 'Generics.'

Table 2 – The Grouping Algorithm Based on the Number of Items Chosen for ‘Brand Name’ and ‘Generics’

Number of questions respondents choose ‘Brand name’	Number of questions respondents choose ‘Generics’ or ‘Both the same’	Decision
3 or all 4	1 or 0	‘Brand name’
2	1 or 0	‘Brand name’
1	0	‘Brand name’
0	1	‘Generics’
1 or 0	2	‘Generics’
1 or 0	3 or all 4	‘Generics’
2	2	‘Generics’
1	1	‘Generics’
0	0	undecisive

Scoring algorithms for knowledge

Different from the scoring the perception or attitudes, respondents have had the correct responses for knowledge items to get credits. Some of knowledge questions were from the first part of Section 3. Knowledge was calculated as a score for the purpose of data analysis based on the number of items answered correctly, 1 point for each correct answer. Scores were analyzed for two different knowledge parts, 9 questions from Section 2 for knowledge measure based on the characteristics and features associated with brand name or generic drugs and 5 questions related to similarities and differences between brand and generic drugs (question 3A of Section 3).

Pretest of survey questionnaire

The draft of survey questionnaires in Chinese was given to 29 Taiwanese for the pretest. Participants included fellow graduate students from Taiwan, students in Taiwanese Student Association of UW-Madison, and family and friends who were living or have lived in Taiwan.

The goal of the pretest was to identify if the questions measured what the survey contents or constructs were supposed to measure. Another important thing to be checked included language issues, in particular, anything potential participants didn't understand or were unclear or words people may misunderstand. This process is similar to cognitive interview. Another goal was to find if there were any concepts, constructs or ideas that were not covered in the questionnaire.

1. One important part was to conduct backward translation of the Mandarin version of questionnaire back to English. This process was to make sure the consistency of the both versions in language and contents. A fellow graduate student from Taiwan helped translate the Mandarin version of questionnaire back to English, the process of translation was

recorded, and the audio file was reviewed by the researcher and the researcher's advisor to verify if the contents in Mandarin version matched the English version.

2. The researcher met in person or talked by phone with several people to go through the questionnaire, including the researcher's relatives, a fellow graduate student, two Taiwanese students from Taiwanese Student Association from UW Madison, and two former coworkers at work. The testers filled out the questionnaire and then identified whether instructions/questions were unclear or difficult to understand, any language or wording issue in each section. They also provided feedback the questions they thought could be improved.
3. To test "in the field," the researcher distributed the survey by networking with relatives or friends. The questionnaires were sent out in MS Word or PDF which respondents could fill out and the returned by email attachment.

The results of survey questionnaire pretest did not change the major structure of the questionnaire. The main finding was to modify a few questions which were unclear to the testers, such as minor language issues or response items that testers suggested being added, changed or deleted.

Data Collection

The sample population was selected patients who had visits to the hospitals that the researcher had access and permission for survey implementation in Taiwan on the same day the researcher delivered the survey questionnaire. To intercept patients and administer the survey, the researcher contacted people randomly onsite at the hospitals to ask if they would like to participate the survey. If they agreed, they were given a paper copy of the questionnaire to complete. This was similar to the concept of mall-intercept interview. Several days were chosen

to conduct the survey in each hospital. To be able to catch more qualified respondents, the ideal location inside a hospital was the waiting area by the pharmacy because patients who had prescriptions were likely to be more knowledgeable about medications in general than people not receiving medications.

The procedure for approaching patients fit with the normal process of patient visits ⁴⁶. The process starts with patient making an appointment. After that, they show up for their physician visits. When physicians finish seeing patients, they give patients a hard copy of a prescription with a stamp of the physician name on it; the prescription can have multiple medications included. Then patients take the prescription form to the accounting office for payment and staff stamp the form noting drugs were ordered and paid. For the last step, patients take the sheet to the pharmacy to get their medications. Pharmacists check both stamps to make sure the patient has had a physician visit and has paid the fees. Then the pharmacist gives the medications to the patient. Usually patients get their prescriptions then leave the hospitals.

The best time to reach out to patients was the time they were waiting for being called up for their prescriptions. The waiting time is usually 10-15 minutes but could vary depending on the patient volume on that day. However, the pharmacy wait area did not always work well for sampling, especially when fewer patients waited there and the wait time was short. The pharmacy is usually the last stop before patients leave the hospital; if the wait time was short, patients were less likely willing to do the survey. Therefore, when this happened or more rejections from respondents occurred, the researcher would move to the waiting area outside the clinics or physician offices to do survey. Efficient sampling was desired to maximize recruitment, saving time and energy, and incurring fewer rejections. Timing to catch respondents was important, that means picking the better time to survey patients (such as when

there would be longer wait times.) Another strategy used was providing questionnaires to multiple respondents at the same time. Usually 25-30 questionnaires were obtained per day. Sometimes the patient volume was lower. If the line in front of the pharmacy was cleared quickly, fewer patients were at pharmacy wait area. In this case, the researcher switched the survey location to the physician clinics wait areas where there were more people waiting.

Criteria and process for survey questionnaire delivery

There were two strategies to get patients to participate in the survey. An active “push” strategy involved the researcher soliciting respondents. A passive “pull” strategy involved using posters as recruitment vehicles.

Active “Push” Recruitment

The researcher reached out to patients in the waiting area. This was the primary approach for recruitment and was more efficient since the researcher took initiative. Patients were reached out to randomly but filtered by asking two screening questions.

There was a script for initial conversation used for each person being contacted, the goal was to have people accept the survey invitation. The researcher started simple conversation with “Hello, I am a graduate student who is collecting survey data for my dissertation, could you help me do a questionnaire? It would take less than 10 minutes, majority of the questions require only for you to mark/check on the blanks.” In addition, the researcher did not mention the gift certificate from the conversation because it was written in the survey cover letter. This strategy was to assure that respondents really wanted to do the survey without being influenced by the incentive. If the researcher faced rejection, then he looked for next person.

To provide a visual aid for potential respondents to understand the recruiting criteria and research topic “brand name or generic drugs”, the researcher made a cardboard with a miniature of the pull strategy poster attached. The visual effect was easier than using verbal explanations, it could work efficiently to communication and help lessen misunderstanding, since most of them rarely actively touched this topic before.

The research topic was used to screen potential respondents: “Have you heard about generic drugs or brand name drugs?” If people who were contacted never heard about both of these two types of drugs, then the researcher looked for next person, too. Some respondents that had heard of either brand name or generic drugs were invited, anticipating that they could still answer when they knew one of them and could make relative comparison when they read the questions. Since the individuals contacted were at the clinic or pharmacy, being a patient was a kind of default inclusion criterion. The majority of persons recruited were patients although some companions of patients also may have been invited, not knowing their accompanying role at that visit. Effectively, the screening questions served as the inclusion/exclusion criterion.

Recruitment focused on patients thought most likely open to a request to participate in the survey. The researcher sought to recruit by means that would be minimally disturbing to potential participants. Respondents primarily were selected if they were sitting or standing at wait area and they were doing nothing but waiting, except for patients who were visibly distressed or they looked sick, tired or had their eyes closed resting. The researcher also picked those who were reading books, magazines, or newspapers. There were many patients who used their smartphones while waiting for prescriptions or physician visits, the researcher would select those who used their phones on and off or those who did not focus much on their phones.

The researcher would skip people who were physically difficult to reach such as those who sat in the middle seats with two ends were occupied (if there were multiple rows with tight space), or narrow aisles. People in sloppy dress (dirty clothes, bad smell, sweat, etc.) or in wheelchair (physically fragile) were less likely to be selected because they were viewed as less likely to participate from the researcher's judgement; these people were very small proportion of the population by observation.

If respondents accepted the survey invitation and had heard about generic or brand name drugs, they were qualified for doing the survey. If the respondents agreed to participate, the researcher briefly described what was covered in each section of the questionnaire and asked them to read the cover letter. The cover letter included a check box indicating their understanding and willingness to participate (or decline). The cover letter also noted that they could get the researcher's help with completing the survey if they needed help reading.

The respondents usually were able to read and able to self-administer the survey questionnaires. However, for those who could not do the questionnaire on their own, either the researcher was able to help complete the questionnaire or family members were enlisted to read out the questions and help respondents answer (if a family member accompanied the patient).

About 80%-90% of the respondents who participated self-administered the survey, but the researcher provided assistance to respondents who had anything unclear in the questionnaire if necessary. While respondents were self-administering the survey, the researcher reached out for other patients for participations; there was no need to wait for individual respondents to finish. For those who had vision issues but forgot to bring reading glasses with them, the researcher read the questionnaire to them and marked the answer for them. There was an advantage to doing the one-on-one survey in person; feedback and comments from respondents

were helpful in evaluating the questionnaire, especially to reveal parts that were unclear or where respondents had different thoughts. The interaction with respondents was a valuable experience for the researcher. Their personal feedback and comments did not influence the results of the survey; these discussions were outside the scope of the survey. They simply wanted to express what they thought about the research topic and some of their ideas and this helped the researcher understand various or diverse opinions and potential context for the survey responses.

Passive “Pull” Recruitment

A poster was set up in the waiting area to invite potential survey participants. The poster had key points for recruitment: “Do you want to do a survey questionnaire while you wait? We are doing a research study on generic medicines and brand name drugs. If you are interested, please come to the researcher wearing white clinical uniform for the survey.” The poster could catch people’s attention at the survey site. This strategy was for those who were not approached by the researcher, they could come over voluntarily to do the survey if they were qualified. Survey respondents recruited via the “pull” strategy were not asked the screening questions, under the assumption that respondents saw the survey intent and topic from the poster.

Survey Administration Processes

On average, 150-200 patients were to be sampled from each hospital. Data collection would be from March 19th to April 12th 2018, thus the plan was to collect at least 25 surveys from respondents per day for seven to eight days in each hospital.

Because it was difficult to predict the proportion of usable responses and complete questionnaires from the respondents, it was important to monitor the data collected onsite. The

researcher checked respondent inputs from the first 25-30 questionnaires returned on the first survey day to quickly look for a lot of unusual responses such as 'I don't know' throughout the whole questionnaire. If there were many cases like that, efforts would be needed to recruit more patients that had some understanding about brand name and generic drugs rather than everyone in the wait area.

The researcher also paid attention to some key variables, where specific responses were expected to be relatively small (i.e. experiences of generic switch). Inspecting survey responses could help make adjustments for the following days for the survey. If the researcher found the responses from these variables were fewer than expected so the sample size might end up not large enough for the analysis, the researcher would survey additional patients beyond those planned.

To thank the participants, a financial incentive was provided as a token of appreciation for survey completion. A 7-ELEVEN gift certificate valued at NTD \$100 (US\$ 3.30) was used as the token, anticipating that participants could use it easily. Taiwan has the highest density of convenience stores in the world, with more than 10,000 in total, one per 2,300 people ⁴⁷. Respondents were given that small gift when the survey was returned. Respondents could also request a summary of the results for the survey by contacting the researcher with the email address on the cover letter. To protect private information, the researcher let respondents know the survey was anonymous from the initial conversation for the recruitment.

Issues in Survey Administration

Several issues affected how the researcher administered the survey onsite:

The wait time for patients to receive services mattered whether they would like to do a survey. Patients were more likely to not participate in the survey if the wait time for

prescriptions or physician visits is short. This was the most common reason that people declined from the researcher's observation, especially when they were waiting for their prescription drugs because it is the last step in hospital visit; people usually wanted to leave the hospitals sooner after visiting the pharmacy.

Conducting the survey without a badge issued and given by the hospital administrator was a small challenge to gain trust from potential subjects. Although the researcher was granted approval from the IRBs and permission to implement the survey, having a hospital name badge could increase the likelihood of participation. People are usually cautious/vigilant when strangers approach them. Putting on white clinician clothes worked to facilitate survey distribution by the researcher. People in Taiwan are afraid of scams (especially from phone calls) and telecom fraud is common happening in Taiwan. Some potential participants still were fearful about confidentiality even though their names, phone numbers, and address were not required.

The volume of patients at the wait area, varied by time and days of the week. Sometimes the morning clinics were busier than the afternoon clinics and days such as Monday to Wednesday usually had large patient volumes, especially depending on the popularity of physicians (e.g., there was one physician that saw more than 370 patients one day at CMUH, seeing patients from morning to the night). Patient volume varied by weekday, usually higher Monday to Wednesday, fewer in Thursday and Friday.

Time also was a factor for patient willingness to participate. Times when people were ready for leaving were more challenging to recruit subjects. For example, in early morning (patients who had to go back to work), as time approached noon (people were hungry) or in the late afternoon to evening (people were ready to rush home, or pick up kids from school). During

night clinics (18:30-21:00) people wanted to get home as early as possible. These time slots were not good to ask subjects to stay to complete a survey.

In a smaller wait area or a wait room there were spill-over effects. If the survey request was declined by the first patient, then other patients around would be likely to say no because the first rejection was overheard and could spill over, be contagious or spread out. In a smaller area, everybody could hear the conversation and first rejection could become presumptive for other potential participants to say no to the survey request no matter what they knew from or about the first rejection.

The researcher had to adjust strategy while facing more rejections during the survey implementation. The response rate changed along with each modification of the recruitment methods. In the beginning of the survey, the researcher used an original recruiting plan and script. Facing a lot of declines, he then had to find better ways to survey by gradually changing strategies. First was to use a cardboard highlighted with the messages the researcher wanted to deliver to the potential respondents. The visual aid can help subjects understand the research topic and recruiting criteria better than verbal communication. Second, the script for conversation was changed to use an emotional appeal with the words "I am a graduate student, please help me do a survey for my dissertation...". Also, the researcher learned to keep smiling or talking slowly as possible. Later, the researcher attached the IRB permission letter to the back side of the scaled down cardboard poster and intentionally showed the hospital title on the letter to potential respondents, hoping this could remedy for lack of a hospital name badge.

Operational Variables

Predictive variables or independent variables were of interest:

- A. Knowledge level could also be a predictive variable for several variables.
 - a. Perceptions or attitudes about generic or brand name drugs, perceptions or attitudes cannot be formed without some understanding of the topics.
 - b. Thoughts about issues regarding generic switch or paying out-of-pocket for brand name drugs, it requires maybe a little thinking or cognition to form the ideas about the thoughts around the topics.
- B. Perceptions or attitudes about generic or brand name drugs could also be a predictive variable for thoughts about issues regarding generic switch or paying out-of-pocket for brand name drugs. Perceptions or attitudes could be consolidated to a process of complexity of the thoughts.
- C. Respondents who understand whether they have been prescribed generic drugs or brand name drugs implies that they were aware at least about the medications that they received. If aware they could care about the medications that they used, and they could help connect how their knowledge levels are, their experiences and thoughts via intermediate predictors.
- D. Perceived changes in effectiveness and adverse events after generic switch helps realize their thoughts about paying out-of-pocket costs for brand name drugs. If consumers perceived no changes they could have positive or better perceptions or attitudes about generic drugs.
- E. Experiences of being prescribed generic and brand name drugs, switch or out-of-pocket costs would help evaluate and form their perceptions, thoughts and attitudes.

Other variables were obtained in the survey that could be relevant but not specifically included in the conceptual model. These variables included:

- Consumer experiences of paying out-of-pocket costs for brand name drugs:
 - Whether they reported paying out-of-pocket costs (yes/no)
 - Burden of paying out-of-pocket costs (low/medium/high)
- Demographic or socioeconomic status variables such as age or educational levels.
- Patient characteristics related factors:
 - Number of chronic diseases (and number of prescriptions treated)
 - Source of information (used, helpful, and reliable)

Statistical Analysis

The first level of analysis was a description of survey responses. The numbers and percentages for responses to each question were tabulated, including some breakdowns for subpopulations among the respondents as shown in Table 3 and demographic information.

The descriptive analysis also included a description of patient generic switch from their own experiences. The analyses covered the proportion of patients who reported their brand name drugs not being covered, the proportion that had ever paid out-of-pocket expenses, and their perceptions of burden for brand name drugs on their own expenses.

The second level of analysis was bivariate analyses to explore relationships between categorical variables derived from survey items, such as consumer perceptions and attitudes more likely to be related to either brand name or generic drugs, whether consumers have been prescribed generic drugs (yes/no), or brand name drugs (yes/no), etc. Chi-squared tests were

used for these analyses. The bivariate analyses were designed to explore the research questions described below.

Table 3. Categories of Subgroups for Statistical Analysis

Variable or Construct
1. Patient knowledge level about branded and generic drugs (categorical variable: high/medium/low)
2. Perceive brand name or generic drugs to be more effective
3. Perceived brand name or generic drugs to have better quality
4. Acceptance/positive attitudes more likely to be (brand name /generic drugs)
5. Patient thoughts about accepting generic switch or not
6. Patient thoughts about agree paying out-of-pocket costs for brand name drugs or not
7. Patients experienced being prescribed generic drugs (yes/no)
8. Patients experienced being prescribed brand name drugs (yes/no)
9. Patients experienced generic switch and perceived at least no differences in effectiveness and adverse effects (yes/no)

CHAPTER 5

RESULTS

Sampling frame

The size of sampling frame for three hospitals varied. TSGH and CMUH were medical centers with CMUH having the largest volume, over 9,000 patients visiting the pharmacies per day on average. TSGH had 3,000-4,000 pharmacy visits per day and CYH had fewer than 1,000 visits per day. Therefore, the number of patients surveyed from CMUH and TSGH were larger than CYH; only about half were surveyed there compared to the other two hospitals.

Sample responses

The number of people the researcher approached varied by hospitals. The rate of patients agreeing to participate was about 40% from the initial request by the researcher; among this 40%, about half had heard about brand name or generic drugs¹. This is similar to the "Journalist" survey mentioned earlier where 45.1% had not heard of both. More than half of the people (50.3%) had heard the term "brand name drugs," but only 24% heard "generic drugs."⁴⁸ The proportion of respondents from TSGH that seemed to have heard or know about brand name or generic drugs was a little higher than from CMUH and CYH, but TSGH patients were more vigilant about the survey request so that the decline rate was a little higher than other two hospitals. The respondents from CMUH were less defensive to the researcher's request, but the

¹ The specific number approached and declined was not computed because the researcher multitasked for data collection, including observing whomever just arrived at the wait area, looking for appropriate potential participants to recruit, monitoring if respondents had finished and picking up the questionnaires from them, and giving subjects the incentive, etc. Keeping track of the numbers of individuals contacted, refusing, and for other aspects of the data collection processes was not very feasible.

percentage that heard or knew about brand name or generic drugs was lower than TSGH. For CYH, the decline rate was a little lower than the other two hospitals, only about 1 out of 5 heard or knew about brand name or generic drugs, perhaps due to lower education levels in the region.

Female respondents were higher in number; perhaps they were more willing to participate than males, but also partly because females were less likely in the workforce compared to males so that they could have time for hospital visits on weekday basis.

CYH had a slightly higher percentage of healthcare workers/staffs or healthcare professionals with educational backgrounds in the survey. Several noted they saw the poster about the survey in the hospital hallway (at the smaller hospital, it was easy for people to spot the researcher's work).

Descriptive analysis

Table 4 summarizes the survey responses of characteristics of respondents with total patient counts and counts by hospitals. This is a condensed table in summary for some items; more details on demographics and other responses are presented in Appendix 10. Patients from TSGH had a higher number of chronic diseases, consistent with the notion that patients in medical centers usually have more severe conditions and symptoms. Patients at TSGH generally were older because many of their customers are veterans (not obviously seen from the sample population in this survey).

About half of the respondents overall had no chronic diseases, and correspondingly, a little more than half (53.0%) of the respondents had no chronic disease prescriptions. Younger respondents were more likely to have heard about brand name and generic drugs than the elders,

and they usually did not have chronic diseases. For chronic diseases, high blood pressure, diabetes, high cholesterol, and cardiovascular disease were more prevalent (Appendix 10).

There were two 'perceived' knowledge questions in Table 4, 'How much do you know about brand name drugs?' and 'How much do you know about general drugs?' In general, more respondents knew about brand name drugs more than generic drugs, especially more reported 'not at all' for generic drugs and more reported 'some' in brand name drugs.

The average age of respondents was less than 50 years old (48.2). Overall, patients who were younger or with higher education were more likely to hear or know about these two types of medications. The elderly respondents had more diseases, especially chronic types, and were knowledgeable because of their histories and experiences with medications. In addition, from the researcher's observation, younger participants were more open-minded about survey participation and more likely to accept the request to participate than older people.

Participants with education backgrounds or work experiences related to medical, nursing, healthcare or pharmacy were more likely to participate the survey because they probably knew about the research topics much better. Even the respondents who didn't have such backgrounds or experiences themselves, but their family or friends had, they still were more likely to have that advantage to be eligible for the survey.

Table 4. Summary of Key Demographics or Characteristics of Survey Respondents (N, %)

	Total N=517 (100%)	TSGH N=200 (38.7%)	CMUH N=203 (39.3%)	CYH N=114 (22.0%)
Number of Chronic Diseases				
None	256 (49.5)	86 (43.0)	103 (50.7)	67 (58.8)
1	148 (28.6)	63 (31.5)	57 (28.1)	28 (24.5)
2	66 (12.8)	34 (17.0)	20 (9.8)	12 (10.5)
3	34 (6.6)	12 (6.0)	16 (7.9)	6 (5.3)
4 or more	13 (2.5)	5 (2.5)	7 (3.5)	1 (0.9)
Number of Rx for chronic diseases				
No prescriptions	274 (53.0)	89 (44.5)	111 (54.7)	74 (64.9)
1-2 prescriptions	142 (27.5)	67 (33.5)	54 (26.6)	21 (18.4)
3-5 prescriptions	73 (14.1)	33 (16.5)	25 (12.3)	15 (13.2)
6 or above	27 (5.2)	11 (5.5)	13 (6.4)	3 (2.6)
Unknown	1 (0.2)	0 (0)	0 (0)	1 (0.9)
How much do you know about brand name drugs?				
Not at all	49 (9.5)	14 (7.0)	9 (4.4)	26 (22.8)
A little	221 (42.7)	84 (42.0)	92 (45.3)	45 (39.5)
Some	228 (44.1)	92 (46.0)	98 (48.3)	38 (33.3)
A lot	13 (2.5)	5 (2.5)	4 (2.0)	4 (3.5)
Unknown	6 (1.2)	5 (2.5)	0 (0)	1 (0.9)
How much do you know about generic drugs?				
Not at all	87 (16.8)	28 (14.0)	26 (12.8)	33 (28.9)
A little	214 (41.4)	84 (42.0)	90 (44.3)	40 (35.1)
Some	197 (38.1)	78 (39.0)	84 (41.4)	35 (30.7)
A lot	12 (2.3)	5 (2.5)	3 (1.5)	4 (3.5)
Unknown	7 (1.4)	5 (2.5)	0 (0)	2 (1.8)
Age (mean, standard deviation)	48.2 (14.4)	48.3 (14.5)	47.4 (12.8)	49.5 (16.7)
Gender				
Male	227 (43.9)	79 (40)	103 (50.7)	45 (39.5)
Female	270 (52.2)	110 (55)	99 (48.8)	61 (53.5)
Unknown	20 (3.9)	11 (5)	1 (0.5)	8 (7.0)
Monthly family Income				
≤NT\$30,000	84 (16.2)	25 (12.5)	30 (14.8)	29 (25.4)
NT\$30,001 – NT\$60,000	182 (35.2)	41 (20.5)	79 (38.9)	62 (54.4)

NT\$ 60,001 – NTS 90,000	99 (19.2)	48 (24.0)	37 (18.3)	14 (12.2)
>NT\$ 90,001	126 (24.4)	71 (35.5)	47 (23.1)	8 (7.1)
Unknown	26 (5.0)	15 (7.5)	10 (4.9)	1 (0.9)
Education				
High school or below	153 (29.6)	58 (29.0)	51 (25.1)	44 (38.6)
Associated Bachelor	109 (21.1)	32 (16.0)	56 (27.6)	21 (18.4)
Bachelor	188 (36.3)	80 (40.0)	64 (31.5)	44 (38.6)
Masters/PhD	66 (12.8)	29 (14.5)	32 (15.8)	5 (4.4)
Unknown	1 (0.2)	1 (0.5)	0 (0)	0 (0)
Region				
residents of the city	409 (79.1)	132 (66.0)	177 (87.2)	100 (87.7)
contiguous area	65 (12.6)	42 (21.0)	18 (8.9)	5 (4.4)
remote area	37 (7.1)	23 (11.5)	8 (3.9)	6 (5.3)
Unknown	6 (1.2)	3 (1.5)	0 (0)	3 (2.6)
Marital status				
single (never married)	130 (25.2)	56 (28.0)	48 (23.7)	26 (22.8)
married	357 (69.1)	135 (67.5)	145 (71.4)	77 (67.5)
separated / divorced / widowed	28 (5.5)	8 (4.0)	10 (4.9)	10 (8.8)
Unknown	2 (0.4)	1 (0.5)	0 (0)	1 (0.9)
Have had any medical / healthcare / pharmacy related work experiences	108 (20.9)	39 (19.5)	35 (17.2)	34 (29.8)
Have had any medical / healthcare / pharmacy related educational background	103 (19.9)	43 (21.5)	34 (16.8)	26 (22.8)
Any family members, friends have worked in medical / healthcare / pharmacy related work experiences	282 (54.6)	110 (55.0)	116 (57.1)	56 (49.1)
Any family members, friends who have medical / healthcare / pharmacy related educational backgrounds	286 (55.3)	105 (52.5)	120 (59.1)	61 (53.5)

Table 5 shows the summary of the survey items that were included to capture consumer perceptions, attitudes and knowledge about brand name and generic drugs. Overall, respondents had diverse responses across survey items, indicating diverse and less concordant opinions. This section was more difficult for some of the respondents, so they were encouraged to answer every question because they could answer 'I don't know' and they were not forced to check Yes/No if they really did not know how to answer that question. They were told that the questions were not testing them like an exam, the goal was to understand their thoughts or comments about brand name and generic drugs. This was hoped to reduce their anxiety about doing this part of the questionnaire. When scoring or categorizing subject responses into brand or generic perceptions or attitudes, the criterion for "generic" was a less strict rule. Items, by intent, were slanted toward brand name as the main idea and responses associating characteristics or features with generics or both the same were deemed "favorable" towards generics; at least "non-inferior" to brand name drugs.

For perceived effectiveness, about 40 to 60% of respondents associated the effectiveness features or characteristics with brand name drugs and less than 10% associated the characteristics with generic drugs. About a quarter to a third of respondents picked 'both the same' for the effectiveness items. Therefore, with the broader categorization for generic responses, responses were approximately split between generics and brand name drugs and comparable in potency, relief of symptoms and performance. However, 57.8% of respondents agreed that brand name drugs had less risk of treatment adverse effect associated with them, the most positively favored effectiveness characteristic for brand name drugs.

For perceived quality, respondents were more likely to have the perspective that manufacturer's reputation and being produced in quality facilities were associated with brand

Table 5. Features and Characteristics Associated with Brand Name or Generic Drug

Characteristics/features	More likely to be associated with? N (%)				
	Brand named drug	Generic drug	Both the same	I don't know	missing
Perceived Effectiveness:					
Relieve more symptoms/episodes	238 (46.0)	32 (6.2)	183 (35.4)	60 (11.6)	4 (0.8)
Have higher potency/strength	210 (40.6)	48 (9.3)	132 (25.5)	120 (23.2)	7 (1.4)
have consistent performance	216 (41.8)	23 (4.5)	196 (37.9)	73 (14.1)	9 (1.7)
Minimize risk of treatment adverse effect	299 (57.8)	28 (5.4)	102 (19.7)	85 (16.5)	3 (0.6)
Perceived Quality:					
Looks and feels like a good quality (shape, color, etc)	198 (38.3)	29 (5.6)	139 (26.9)	141 (27.3)	10 (1.9)
Produced in monitored/ quality facilities	316 (61.1)	10 (1.9)	141 (27.3)	42 (8.1)	8 (1.6)
Made by reputable manufacturers	276 (53.4)	19 (3.7)	180 (34.8)	39 (7.5)	3 (0.6)
Higher quality of non-active content	173 (33.5)	74 (14.3)	84 (16.2)	180 (34.8)	6 (1.2)
Attitudes:					
I am comfortable to take	317 (61.3)	19 (3.7)	155 (30.0)	23 (4.5)	3 (0.6)
Will make me satisfied	297 (57.5)	10 (1.9)	151 (29.2)	56 (10.8)	3 (0.6)
I have confidence in treating me better	336 (65.0)	9 (1.7)	139 (26.9)	28 (5.4)	5 (1.0)
Higher familiarity	255 (49.3)	94 (18.2)	101 (19.5)	61 (11.8)	6 (1.2)
Knowledge:					
Have been on the market longer	266 (51.4)	70 (13.5)	112 (21.7)	63 (12.2)	6 (1.2)
Higher prices in the market	382 (73.9)	21 (4.1)	27 (5.2)	80 (15.4)	7 (1.4)
Higher costs to me	369 (71.4)	19 (3.7)	40 (7.7)	84 (16.2)	5 (1.0)
Need R&D to produce	328 (63.4)	37 (7.2)	106 (20.5)	42 (8.1)	4 (0.8)
Has gone through the process of clinical trials	216 (41.8)	26 (5.0)	210 (40.6)	51 (9.9)	14 (2.7)
Strict approval process (licensing)	278 (53.8)	19 (3.7)	187 (36.2)	27 (5.2)	6 (1.2)
made by foreign manufacturers	318 (61.5)	27 (5.2)	84 (16.2)	83 (16.1)	5 (1.0)
made by domestic Taiwan manufacturers	78 (15.1)	232 (44.9)	97 (18.8)	105 (20.3)	5 (1.0)
Monopoly of manufacturers	240 (46.4)	73 (14.1)	61 (11.8)	135 (26.1)	8 (1.6)
Miscellaneous:					
Appropriate in treating serious diseases	308 (59.6)	22 (4.2)	121 (23.4)	62 (12.0)	4 (0.8)
more often prescribed by clinics	49 (9.5)	256 (49.5)	88 (17.0)	118 (22.8)	6 (1.2)
more often prescribed by large hospitals	240 (46.4)	74 (14.3)	128 (24.8)	69 (13.3)	6 (1.2)

name drugs. Many respondents did not know how to associate the quality items about the non-active content of the drugs and what it looks and feels like. Quality is difficult to define and a brand name is most likely to be used as an indicator of quality if no other information can be referred. More respondents responded with the 'I don't know' response for the non-active content or excipient of medication; that was a less well-known aspect of drugs. Because brand name drug manufacturers do not have to release the information other than the active ingredient, generic manufacturers would do their research to make the products so that composition of non-active contents or excipients would likely to be different from those of the originals.

For attitudes, 57% to 65% of the respondents associated confidence, satisfaction and comfort with brand name drugs, implying patients had a stronger attitude toward brand name than generic drugs. Compared to perceptions of effectiveness and quality, the consumer attitudes toward generic and brand name drugs can be less ambiguous so that respondents less often chose the 'both the same' option.

Frequency counts for perceptions and attitudes

Back in Table 2, the scoring algorithms for study domains were presented. Table 6 shows the distributions for perceived effectiveness, perceived quality and attitudes when respondents were categorized. The criteria applied to scoring of brand name drugs were more rigorous and the criteria for generic drugs were less strict, so the counts for generic drugs (as "not inferior" to brands in perceptions and attitudes) might be considered generous attributions. These categorizations were used for the bivariate analyses. After applying the grouping algorithms, the proportions of respondents were distributed approximately evenly between brand

Table 6. The Frequencies for Perceived Effectiveness, Perceived Quality and Attitudes

Category	counts	percentage
Perceived Effectiveness:		
Perceived effectiveness for brand names drugs	252	48.7%
Perceived generic drugs not inferior to brands in effectiveness	256	49.6%
Unknown	9	1.7%
Perceived Quality:		
Perceived quality for brand names drugs	263	50.9%
Perceived generics not inferior to brands in Quality	246	47.6%
Unknown	8	1.6%
Attitudes:		
Perceived attitudes for brand names drugs	311	60.1%
Perceived generics not inferior to brands in attitudes	201	38.9%
Unknown	5	1.0%
Total population (N=517)		

name and generics for perceptions, but the proportions for attitude were strongly slanted to brand name drug.

For the three miscellaneous items, they could belong to multiple domains or not be unique to one and only domain, such as perceptions or attitudes. There were respondents that basically gave expected answers; nearly half associated generics with being prescribed in clinics and more brand name drugs found in hospitals, and about 60% saw brand name drugs for serious diseases.

The two sections of knowledge questions presented different formats to assess respondent capabilities. Nine questions asking general knowledge about the characteristics/features more likely to be associated with brand or generic drugs were mixed in with the preference and attitude items. Those results are included in Table 5. The other knowledge measure provided more direct comparisons between brand name and generic drugs by asking whether respondents agreed with potential similarities or differences between these two types of medications; those responses are summarized in Table 7. In planning the survey, these two types of knowledge questions were thought potentially to be analyzed by putting them together or considering them separately.

For the knowledge component based on features and characteristics associated with brand name or generic) drugs (Table 5), about 70% knew that brand name drugs have higher prices or higher costs. About 60 and 65 % knew that brand name drugs go through R&D and more likely made by foreign manufacturers, respectively. Other questions had diverse responses, such as questions about going through clinical trials or strict approval process.

Table 7. Thoughts about Similarities/Differences in Brand Name Drug and Generic Substitute

Brand name drug and its generic substitute...	Agree	Disagree
are therapeutically interchangeable	345 (77.2)	102 (22.8)
have same dosage	220 (58.8)	154 (41.2)
have the same absorption rate in the blood stream	156 (48.9)	163 (51.1)
have the same active ingredient	228 (63.3)	132 (36.7)
have the same excipient (non-active part)	159 (55.6)	127 (44.4)

Table 7 presents the responses for questions that asked about the similarities or differences in brand name drug and generic substitute. NHI requests that generic manufacturers provide the test results of generic substitutes if they have the same active ingredient, same dosage and same absorption rate in the blood stream (bioavailability/bioequivalence) to match the brand name drugs in effectiveness. Approximately three-fourths of the respondents understood correctly that these two types of medications are therapeutically interchangeable. Slightly fewer, 59% and 63% agreed that the two have the same dosage and active ingredient, respectively. Only 48.9% agreed they have the same absorption rate in the blood stream. This could mean they didn't agree that generics were equal, as a "poor quality" perception. For the question of non-active components, only 44.4% disagree they have the same excipient. Branded and generics might not have the same excipients which are part of the copyright from brand name drug manufacturers that does not provide this information when the patents expire.

Table 8 presents the correct answers (marked by 'X') for questions about knowledge by aligning relevant information from Table 5 and Table 7. The knowledge score was determined by tallying the correct answers. From the nine knowledge questions in Table 5, seven would be kept for later analysis after removing two questions in which respondents seemed confused and did not answer well: 'The strict approval process (licensing)' and 'Monopoly of manufacturers' ('The strict approval process' could define both brand name and generic drugs, given that both must be approved, either with clinical trials for brand name drugs or bioequivalence data for generic drugs. Patent protection as a characteristic associated with brand name drugs was known by respondents better than the term 'Monopoly of manufacturers'.) The questions with the strike throughs in the table would not be used for analysis.) For the five knowledge questions, the 'Have the same excipient (non-active part)' question would not be used in analysis because many

Table 8. The “Correct” Answers on the “Knowledge Test” by Aligning Table 4 and Table 5

Knowledge from Section 2: “Characteristics/features more likely to be associated with...”		Brand name drug	Generic drug
1	Have been on the market longer	X	
2	Higher prices in the market	X	
3	Higher costs to me	X	
4	Need R&D to produce	X	
5	Has gone through the process of clinical trials	X	
6	made by foreign manufacturers	X	
7	made by domestic Taiwan manufacturers		X
8	Strict approval process (licensing)	✗	✗
9	Monopoly of manufacturers	✗	
Knowledge from Section 3A: “Brand name drug and its generic substitute....”		Agree	Disagree
1	are therapeutically interchangeable	X	
2	have same dosage	X	
3	have the same absorption rate in the blood stream	X	
4	have the same active ingredient	X	
5	have the same excipient (non-active part)		✗

respondents did not answer it successfully. Later in the bivariate analysis, these two different versions of knowledge would be used.

Grouping for knowledge level categories

Different from the analyses for perceptions, attitudes, thoughts or experiences, the analyses with knowledge were a little complicated. First, knowledge could be a continuous or categorical variable based on the respondent's knowledge scores; it was decided to be presented as a categorical variable to keep it simple and consistent throughout the study. Second, there were several sections to investigate consumer knowledge about brand name and generic drugs in the questionnaires discussed earlier, such as knowledge related questions from 'Associated features and characteristics' of Section 2, and questions from 'Thoughts about similarities/differences' in Section 3. Two self-report knowledge questions in the first part of the questionnaire (Section 1A): 'How much do you know about brand name drugs?' and 'How much do you know about generic drugs?' obtained 'perceived' knowledge of respondents. However, whether or how the knowledge measures were consistent was unknown, thus the associations between the knowledge measures was explored by cross-tabulating respondents after grouping them based on their knowledge levels.

Table 9 shows the grouping algorithms. The rationale to group by this scoring algorithm was to try to divide up the distribution of score ranges in meaningful explanations of 'Low', 'Medium' and 'High' knowledge. For the seven knowledge questions about characteristics associated with brand or generic drugs, respondents were categorized as 'Low' knowledge if scores were smaller than or equal to 2, 'Medium' if scores were between 3 and 5, and 'High' if scores were between 6 and 7. For the four knowledge questions about differences between

Table 9. The Grouping by Number of Correct Answers for the 4 or 7 Knowledge Questions and Perceived Knowledge Questions

Category	The number of correct answers for 7 knowledge questions	The number of correct answers for 4 knowledge questions	Responses for perceived knowledge questions
Low	0, 1, 2	0, 1	'Not at all' or 'A little' for both brands and generics
Medium	3, 4, 5	2, 3	Either of the two responses: (1) 'Not at all' or 'A little' for brands, 'Some' or 'A lot' for generics, or (2) 'Some' or 'A lot' for brands, 'Not at all' or 'A little' for generics
High	6, 7	4	'Some' or 'A lot' for both brands and generics

brand and generic drugs, respondents were categorized as 'Low' knowledge if scores were smaller than or equal to 1, 'Medium' if scores were 2 or 3, and 'High' if scores were 4. For 'perceived' knowledge, they would be 'Low' knowledge if respondents answered 'Not at all' or 'A little' for both brands and generics, 'High' knowledge if answered 'Some' or 'A lot' for both, 'Medium' if other combinations of responses occurred.

In order to decide how the knowledge levels would be used in the analysis, a test of association was conducted to find out how respondents in certain categories from one definition matched the corresponding category from another definition. Table 10 to Table 12 present the 3x 3 table of association tests, where respondents were categorized 'Low', 'Medium' and 'High' for each knowledge measure type based on the grouping algorithms in Table 9. Overall, the relationships among the three knowledge definitions were weak. For example, in Table 10 the low knowledge respondents do not match perfectly (7 questions versus 4 questions), the counts are not heavily weighted across the diagonal matrix, instead the counts distribute all over the nine cells, implying these knowledge definitions are not similar to each other.

Based on the results from the knowledge level confirmatory analyses, it was decided to abandon the perceived questions for further analysis because they relied heavily on how respondents self-reported their knowledge levels which were broad and generous, and not identified from more refined criteria, like the characteristics or similarities knowledge items in Section 2 or Section 3A of the survey. Because the 4 and 7 question knowledge measures did not align, combining into an overall knowledge measure was not done for the bivariate analyses. In addition, these both ask questions in different contexts. The 7 questions cover the characteristics or features about brand name and generic drugs in Section 2 of questionnaires. The 4 knowledge questions in Section 3A reflect how consumer understand the similarities or

Table 10. The Cross-Tabulation for ‘Low’, ‘Medium’ and ‘High’ Knowledge between 7 Knowledge Questions and 4 Knowledge Questions

4 knowledge questions					
	Count Pct %	Low	Medium	High	Total
7 knowledge questions	Low	58 11.22	33 6.38	17 3.29	108 20.89
	Medium	129 24.95	96 18.57	54 10.44	279 53.97
	High	54 10.44	47 9.09	29 5.61	130 25.15
	Missing=9				
Total		241 46.62	176 34.04	100 19.34	508

Table 11. The Cross-Tabulation for ‘Low’, ‘Medium’ and ‘High’ Knowledge between 7 Knowledge Questions and Perceived Knowledge Questions

perceived knowledge questions					
	Count Pct %	Low	Medium	High	Total
7 knowledge questions	Low	64 12.60	15 2.95	25 4.92	104 20.47
	Medium	142 27.95	31 6.10	102 20.08	275 54.13
	High	47 9.25	16 3.15	66 12.99	129 25.39
	Missing= 9				
Total		253 49.80	62 12.20	193 37.99	508

Table 12. The Cross-Tabulation for ‘Low’, ‘Medium’ and ‘High’ Knowledge between 4 Knowledge Questions and Perceived Knowledge Questions

		perceived knowledge questions			
	Count Pct %	Low	Medium	High	Total
4 knowledge questions	Low	120 23.62	33 6.50	84 16.54	237 46.65
	Medium	83 16.34	21 4.13	70 13.78	174 34.25
	High	50 9.84	8 1.57	39 7.68	97 19.09
	Missing= 9				
Total		253 49.80	62 12.20	193 37.99	508

differences between brands and generic substitute. Using a combined knowledge item based on adding both knowledge scales was deemed not meaningful for results and explanations.

Table 13 shows the responses for the scenario in the survey that had questions inquiring about patient thoughts about a brand to generic drug switch. The first two questions were about the preferences between brand name drug and generic substitute, whether respondents were fine with a substitute or whether they only want the prescribed brand name drug. Since many patients respected what their physicians prescribe for them, their brand name and generic drug perceptions didn't necessarily concur with the potential actions based on the situation in the scenario. That is why there were diverse responses about agreeing or disagreeing and even conflicting responses to some of the questions. Table 14 shows a cross-tabulation between the first and second question ('whether they were fine with a substitute' or 'only wanted the brand name') to assess whether the responses were consistent (agree with first and disagree with the second). The cross-tabulation showed that 186 subjects were fine if their physicians prescribed a generic substitute and did not demand on having a brand name drug for them if a generic switch was proposed. These were 'accepting generic' substitution consistent responses. On the other hand, 111 subjects only wanted brand name drugs and would not accept a generic substitute; these were 'rejecting generic' substitution responses. Respondents with these consistent answers comprise a subset of respondents with clear notions of attitude about favoring brand or accepting generics that were used in subsequent bivariate analyses.

Table 13. Thoughts about Brand Name to Generic Drug Switch (Results for Scenario 1)

	Agree	Disagree	I don't know	missing
I am fine if my physician prescribes a generic substitute for me.	256 (49.5)	216 (41.8)	40 (7.7)	5 (1.0)
I only want Drug X, will not accept anything else.	155 (30.0)	270 (52.2)	81 (15.7)	11 (2.1)
I'd like to ask another doctor for different opinion or more information.	470 (90.9)	23 (4.5)	17 (3.3)	7 (1.4)
I would like to ask my doctor about why he/she proposes (the switch).	339 (65.6)	114 (22.1)	55 (10.6)	9 (1.7)

Table 14. Thoughts about Brand Name to Generic Drug Switch – Cross Tabulation for First Two Questions - Fine with a Generic Substitute vs. Not Accepting Generic Substitute

I only want Drug X, will not accept anything else						
	Count Row Pct %	Agree	Disagree	I don't know	Missing	Total
I am fine if my physician prescribes a generic substitute for me	Agree	37 14.5	186 72.7	27 10.6	6 2.3	256 49.5
	Disagree	111 51.4	75 34.7	30 13.9	0	216 41.8
	I don't know	7 17.5	8 20.0	23 60.5	2	40 7.7
	Missing	0	1	1	3	5 1.0
	Total	155 30.0	270 52.2	81 15.7	11 2.1	517

From what several respondents said during the survey, the inconsistent responses could be due to the reasons that they favored brand name drugs but would accept a generic drug if they have tried them out or if physicians recommended it. Therefore, patients did not have absolute choices for generic switch and their options don't have to be mutually exclusive. Patients would respond with 'I don't know' which might also reflect this situation.

Table 15 shows the responses for the scenario that had questions relating to patient thoughts about paying own out-of-pocket cost for a brand name drug that was not covered by insurance. Overall, higher proportions of respondents agreed with all of the potential actions subsequent to a brand name drug not being covered and, similar to the switching scenario, diverse responses resulted.

A cross-tabulation between the first and third question ('would pay \$500 and not accept anything else' or 'whether they accept a generic substitute') was done to check for consistent responses (i.e. agree with first and disagree with the third). This cross-tabulation is shown in Table 16; 144 respondents agreed with paying NT\$500 (approximately US\$16.70) for their original brand name drugs and would not accept a generic substitute. In contrast, 132 respondents did not agree with paying NT\$500 for their original brand name drugs and they accepted generic drugs. These "consistent" cases will be used for further analyses (as above with accepting generics.)

Table 15. Thoughts about Paying Own Out-of-Pocket Cost for Your Brand Name Drugs (Results for Scenario 2)

	Agree	Disagree	I don't know	Missing
I would pay out-of-pocket costs \$500 for brand name drug (Drug Y) even though Drug Y is not covered by NHI. I would not accept anything else.	301 (58.2)	174 (33.7)	41 (7.9)	1 (0.2)
I would accept a different brand name drug as long as it is covered by NHI.	352 (68.1)	115 (22.2)	42 (8.1)	8 (1.6)
I would accept a generic substitute (replace Drug Y)	280 (54.2)	177 (34.2)	52 (10.1)	8 (1.6)
I would consider looking for the brand name drug (Drug Y) covered by NHI in other hospitals or pharmacies.	338 (65.4)	127 (24.6)	45 (8.7)	7 (1.4)

Table 16. Thoughts about Out-of-Pocket Costs for Brand Name Drug — Cross Tabulation for First and the Third Question - Would Pay Out-of-Pocket Costs NT\$500 for Brand Name Drug vs. Fine with a Generic Substitute

I would accept a generic substitute (replace Drug Y)						
	Count Row Pct %	Agree	Disagree	I don't know	Missing	Total
I would pay out-of-pocket costs NT\$500 for brand name drug even though Drug Y is not covered by NHI. I would not accept anything else	Agree	129 42.9	144 47.8	24 8.0	4 1.3	301 58.2
	Disagree	132 75.9	31 17.8	8 4.6	3 1.7	174 33.7
	I don't know	19 46.3	2 4.9	20 48.8	0	41 7.9
	Missing	0	0	0	1	1 0.2
	Total		280 55.0	177 34.8	52 10.2	8

An additional cross-tabulation of responses is shown in Table 17, comparing responses to the question about paying \$500 for the prescribed brand name drug and the question about accepting a different, covered brand name drug. There were 182 patients that agreed with both potential actions (paying NT\$500 for their original brand drugs but they also would accept another brand name drug). There also were respondents that would not pay for the non-covered drug but would accept a different brand name drug. These 182 and 145 responses represent favorable perceptions toward brand name drugs, but mixed views towards having to pay for them

Tables 18 through 21 present responses for survey questions about experiences with having brand name and generic drugs dispensed and what transpired if respondents were faced with non-coverage of a brand name drug. More respondents recognized that they had been prescribed brand name drugs (235, 45.5%) than generic drugs (179, 34.6%). That was similar to the findings (consumers know more about brands than generics) from the questions in the beginning of the survey, “How much do you know about brand name drugs/generic drugs?” During the survey process, some respondents said onsite that they had heard about brand name drugs more than have heard about generic drugs.

Table 17. Thoughts about Out-of-Pocket Costs for Brand Name Drug — Cross Tabulation for First Two Questions – Would Pay Out-of-Pocket Costs \$500 for Brand Name Drug vs. Accept a Different Brand Name Drug as Long as It Is Covered by NHI

I would accept a different brand name drug as long as it is covered by NHI						
	Count Row Pct %	Agree	Disagree	I don't know	Missing	Total
I would pay out-of-pocket costs \$500 for brand name drug even though Drug Y is not covered by NHI. I would not accept anything else	Agree	182 60.5	95 31.6	19 6.3	5 1.7	301 58.2
	Disagree	145 83.3	19 10.9	8 4.6	2 1.2	174 33.7
	I don't know	25 61.0	1 2.4	15 36.6	0	41 7.9
	Missing	0	0	0	1	1 0.2
Total		352 68.1	115 22.2	42 8.1	8 1.6	517 100

Table 18. Patient Experiences of Brand Name and Generic Drugs

	Yes	No	I don't know	Missing
Ever been prescribed generic drug(s)?	179 (34.6)	61 (11.8)	274 (53.0)	3 (0.6)
Ever been prescribed brand name drug(s)?	235 (45.5)	45 (8.7)	223 (43.1)	14 (2.7)

Among the 235 respondents who had been prescribed brand name drugs, 125 (53.2%) reported they had experienced a brand name drug(s) not covered by NHI (Table 19). There also were 125 who reported that they had ever paid for brand name drug(s) at their own expense.

Among the 125 who have ever paid for the brand name drug(s) at their own expenses (Table 20), 66 (52.8%) perceived medium financial burden, followed by high burden (21.6%) and low burden (17.6%). Further, among those that had paid for brand name drugs at their own expense, 52.0 % said the reason to pay out-of-pocket was that brand name drugs were more effective, followed by 43.2% for physician recommends and 39.2% for better quality as the top 3 reasons (Table 21).

Table 22 through 24 present the results related to whether respondents had experienced a brand name drugs ever having been switched to a generic and their views on subsequent outcomes. Of the 235 respondents that had been prescribed a brand name drug, 91 (38.7%) reported that they had experienced generic switch. Among those 91 respondents, 56 (61.5%) reported that therapeutic effects were the same or better (Table 23) and 63 (69.2%) reported no different or less often occurrence of adverse effects (Table 24) before and after the generic switch.

Table 19. Brand Name Drug(s) Covered or Not and If Pay Own Expenses for Brand Name Drug *

prescribed brand name drug (N=235)	Yes	No	don't know	N/A
Have any brand name drug(s) not been covered by NHI?	125 (53.2)	60 (25.5)	43 (18.3)	7 (3.0)
Have ever paid for this (these) brand name drug(s) on your own expenses?	125 (53.2)	75 (31.9)	19 (8.1)	16 (6.8)

* N= 235 from Table 18 'Ever been prescribed brand name drug(s)?'

Table 20. Burden to Pay Own Expenses for Brand Name Drug *

OOP for brand name drug (N=125)	Low	Medium	High	I don't know
burden to pay own expenses for this (these) brand name drug(s)	22 (17.6)	66 (52.8)	27 (21.6)	10 (8.0)

* N= 125 from Table 19 'Have ever paid for this (these) brand name drug(s) on your own expenses?'

Table 21. Reasons for Burden to Pay Own Expenses for Brand Name Drug *

Reasons OOP for brand name drug (N=125)	
more effective	65 (52.0)
physician recommends	54 (43.2)
better quality	49 (39.2)
prior experiences	28 (22.4)
less adverse effects	20 (16.0)
better value	1 (0.8)
comfortable	1 (0.8)
lifetime medication	1 (0.8)

*N= 125 from Table 19 'Have ever paid for this (these) brand name drug(s) on your own expenses?'

Table 22. Patient Experiences of Brand Name Drugs Ever Switched to Generics

prescribed brand name drug (N=235)	Yes	No	don't know	N/A
Has brand name drugs ever switched to generics?	91 (38.7)	63 (26.8)	78 (33.2)	3 (1.3)

Table 23. How Therapeutic Effects Changed Before and After the Generic Switch *

Ever had generic switch (N=91)	worse	No different	better	N/A
Therapeutic effects	30 (33.0)	55 (60.4)	1 (1.1)	5 (5.5)

*from 91 'Yes' respondents in Table 22

Table 24. How Adverse Effects Changed Before and After the Generic Switch *

Ever had generic switch (N=91)	less often	No different	more often	N/A
Adverse effects	6 (6.6)	57 (62.6)	18 (19.8)	10 (11.0)

*from 91 'Yes' respondents in Table 22

Bivariate analysis

For bivariate analysis, the analyses were based on the grouping algorithms for perceived effectiveness, perceived quality and attitudes in Table 1 and Table 2. The scoring algorithm in Table 9 divides up the knowledge measures into ‘Low’, ‘Medium’ and ‘High’ categories. The groupings for other variables such as the grouping for thoughts and experiences will be introduced later in the chapter of the results. Bivariate analyses included everyone, except for those patients that had inconsistent responses in anticipated actions (thoughts) and those who reported not having experiences of being prescribed brand name/generic drugs or generic switch. The bivariate analysis results are organized as four objectives:

Objective 1: explore the relationships between perceptions and attitudes

Objective 2: examine the associations of perceptions or attitudes with knowledge, experiences and thoughts

Objective 3: examine the associations of knowledge with experiences and thoughts

Objective 4: examine relationships between consumer thoughts about “pay out-of-pocket costs for brand name drug” and experiences “perceived no differences in effectiveness and adverse events from a generic switch”.

Results for Objective 1 (Research Question 1.1): explore the relationships between perceptions and attitudes

Objective 1 examined how consumer perceptions or attitudes of brand name and generic drugs relate to each other. Table 25 shows whether consumer perceptions of quality for generic drugs were related to their attitudes. Perceiving generics as not inferior to brands in quality had a strong relationship with similar attitudes for generics, 60.2% of those who perceived generics as not inferior had similar attitudes for generics, higher than 39.8% who had positive attitudes toward brand names. Perceived quality for brand name drugs also had a strong relationship with positive attitudes for brand name drugs, 68.0% of those who had positive attitudes toward brand names had similar perceived quality for brand names, higher than 32.0% who had perceived generics as not inferior to brands. Similar findings were found for perceived effectiveness versus attitudes (Table 26) and for perceived effectiveness versus perceived quality (Table 27).

Table 25. Perceived Quality vs. Attitudes between Brand Name and Generic Drugs

Positive Attitudes				
	Count Row Pct % Col Pct %	Attitudes toward generics not inferior to brand names	Positive attitudes for brand names	Total
Perceived Quality	Perceived generics not inferior to brands in quality	148	98	246
		60.2	39.8	48.6
		74.0	32.0	
Perceived quality for Brand names	Perceived effectiveness for brand names	52	208	260
		20.0	80.0	51.4
		26.0	68.0	
Total	Total	200	306	506
		39.5	60.5	100.0
		Frequency Missing = 11		
		Statistic	Value	Prob
		Chi-squared	85.3004	<.0001

Table 26. Perceived Effectiveness vs. Attitudes between Brand Name and Generic Drugs

Positive Attitudes				
	Count Row Pct % Col Pct %	Attitudes toward generics not inferior to brand names	Positive attitudes toward brand names	Total
Perceived Effectiveness	Perceived generics not inferior to brands in effectiveness	163	92	255
		63.9	36.1	50.5
		81.9	30.1	
Perceived effectiveness for brand names	Perceived effectiveness for brand names	36	214	250
		14.4	85.6	49.5
		18.1	69.9	
Total	Total	199	306	505
		39.4	60.6	100
		Frequency Missing = 12		
		Statistic	Value	Prob
		Chi-squared	129.654	<.0001

Table 27. Perceived Effectiveness vs. Perceived Quality between Brand Name and Generic Drugs

Perceived quality				
	Count Row Pct % Col Pct %	Perceived generics not inferior to brand names in quality	Perceived quality for brand names	Total
Perceived Effectiveness	Perceived generics not inferior to brands in effectiveness	169 66.5 69.3	85 33.5 32.8	254 50.5
	Perceived effectiveness for brand names	75 30.1 30.7	174 69.9 67.2	249 49.5
	Total	244 48.5	259 51.5	503 100
	Frequency Missing = 14			
		Statistic	Value	Prob
		Chi-squared	66.753	<.0001

Results for Objective 2: examine the associations of perceptions or attitudes with knowledge, experiences and thoughts

Research Question 2.1. Perceptions or attitudes vs. knowledge: The results for the associations between perceptions and attitudes with knowledge about brand name and generic drugs are shown in Table 28 to Table 30 (for 7 knowledge questions) and Table 31 to Table 33 (for 4 knowledge questions). The hypothesis was that low knowledge was associated with higher perceptions and positive attitudes about brand name drugs and higher knowledge is associated with better perceptions and attitudes about generic drugs as not inferior to brands.

Knowledge was assessed in two ways 1) based on characteristics or features associated with brand or generic drugs (7 knowledge questions) and 2) based on similarities and differences between brand and generic drugs (4 knowledge questions). How knowledge level was associated with perceptions and attitudes was examined for both knowledge measures, with knowledge levels categorized into low, medium, and high as described previously in Table 9.

The results show that categories defined by knowledge levels from the 7 questions of characteristics or features about brand name and generic drugs in Section 2 of the questionnaire had associations with perceived effectiveness (Table 28), with perceived quality (Table 29), and with attitudes (Table 30).

For perceptions of effectiveness (Table 28) and quality (Table 29), the 'Low' knowledge group (20% of the study population) tended to view generics as not inferior to brand name drugs. That was likely because these respondents were less knowledgeable about brand name and generic drugs based on characteristics or features. The respondents chose incorrect or "less optimal" answers because they likely did not know the answers; they could tend to choose both are the same or 'I don't know'.

For attitudes, all three knowledge levels were consistent in having higher attitude toward brand name groups. The 'Low' knowledge group had a slightly higher percentage of respondents with positive brand name attitudes. More of the medium and higher knowledge respondents had positive attitudes toward brands. These indicate that patients had strong positive attitudes regardless of their knowledge levels

For the 'High' knowledge group (25% of the study population), more of them had positive perceptions and attitudes toward brand name drugs, perhaps because most of the correct answers which point to brand name drugs, respondents who voted for brand name drugs might cause them to have positive feeling toward brand name drugs.

There were discrepancies in the results for respondents in the 'Medium' knowledge level group. For perceived effectiveness, more respondents were more favorable for generics (52.0%), but for perceived quality the direction changed to have slightly more respondents favorable toward to brand name drugs (53.4%). For attitudes, even more respondents tended to favor brands (58.8%).

Table 28. Knowledge Level from 7 Questions (in Section 2) vs. Perceived Effectiveness

Knowledge level from the 7 questions in section 2	Count	Perceived effectiveness for Brand names	Perceived generics not inferior to brand names in effectiveness	Total
	Row Pct % Col Pct %			
Knowledge level from the 7 questions in section 2	Low	41 39.4 16.3	63 60.6 24.6	104 20.5
	Medium	132 48.0 52.4	143 52.0 55.9	275 54.1
	High	79 61.2 31.3	50 38.8 19.5	129 25.4
	Total	252 49.6	256 50.4	508 100.0
	Frequency Missing = 9			
		Statistic	Value	P-value
		Chi-squared	11.5824	0.0031

Table 29. Knowledge Level from 7 Questions (in Section 2) vs. Perceived Quality

Knowledge level from the 7 questions in section 2	Count	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
	Row Pct % Col Pct %			
Knowledge level from the 7 questions in section 2	Low	37 36.3 14.1	65 63.7 26.4	102 20.0
	Medium	148 53.4 56.3	129 46.6 52.5	277 54.4
	High	78 60.0 29.6	52 40.0 21.1	130 25.6
	Total	263 51.7	246 48.3	509 100.0
	Frequency Missing = 8			
		Statistic	Value	P-value
		Chi-squared	13.6370	0.0011

Table 30. Knowledge Level from 7 Questions (in Section 2) vs. Attitudes

	Count	Positive attitudes	Attitudes toward	Total
	Row Pct %	for brand names	generics not inferior	
	Col Pct %		to brand names	
Knowledge level from the 7 questions in section 2	Low	53 51.5 17.1	50 48.5 24.9	103 20.1
	Medium	164 58.8 52.7	115 41.2 57.2	279 54.5
	High	94 72.3 30.2	36 27.7 17.9	130 25.4
	Total	311 60.7	201 39.3	512 100.0
Frequency Missing = 5				
		Statistic	Value	P-value
		Chi-squared	11.4665	0.0032

Tables 31 to 33 show parallel results for the relationship of knowledge with perceptions and attitudes in Tables 28 to 30 but using the knowledge level based on the questions in Table 7 ('thoughts about similarities/differences in brand name drug and generic substitute'), and categorized as per Table 9. Like the knowledge levels based on 7 questions, the results from the set of 4 questions show that knowledge level was associated with perceived effectiveness (Table 31), with perceived quality (Table 32), and with attitudes (Table 33). However, different from the results using the 7 questions from Table 28 to Table 30, the results from 'Medium' and 'High' knowledge levels based on the 4 questions demonstrate higher proportions of respondents with better perceptions for generics.

The 'Low' knowledge group (the larger group, about 46% of the respondents) always leaned toward brand name drugs in perceptions and attitudes. It is likely these patients knew little about the similarities and differences between brands and generics, so their default preference is the brands.

Like the analysis for knowledge levels based on 7 questions, the discrepancies in proportions of respondents with effectiveness perceptions favoring brand name and generics are smaller in 'Medium' level knowledge groups. They contribute little to the significance of the results.

For the 'High' knowledge group (about 20% of the study population), the proportions of respondents with favorable (not inferior to brands) perceptions and attitudes towards generic drugs were higher, perhaps because the respondents knew generics could be substitutes for corresponding brand name drugs.

The results from the knowledge levels based on 4 questions, reflect consumer understanding of the similarities or differences between brands and generic substitutes helps

predict directions of perceptions and attitudes (not as occurred with the knowledge levels based on 7 questions).

Table 31. Knowledge Level from 4 Questions of Similarities and Differences vs. Perceived Effectiveness

	Count Row Pct % Col Pct %	Perceived effectiveness for Brand names	Perceived generics not inferior to brand names in effectiveness	Total
Knowledge level from the 4 questions in Section 3A	Low	137 58.6 54.4	97 41.4 37.9	234 46.0
	Medium	80 46.0 31.7	94 54.0 36.7	174 34.3
	High	35 35.0 13.9	65 65.0 25.4	100 19.7
	Total	252 49.6	256 50.4	508 100.0
Frequency Missing = 9				
		Statistic	Value	P-value
		Chi-squared	16.9336	0.0002

Table 32. Knowledge Level from 4 Questions of Similarities and Differences vs. Perceived Quality

	Count Row Pct % Col Pct %	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
Knowledge level from the 4 questions in Section 3A	Low	140 59.1 53.2	97 40.9 39.4	237 46.6
	Medium	82 47.4 31.2	91 52.6 37.0	173 34.0
	High	41 41.4 15.6	58 58.6 23.6	99 19.4
	Total	263 51.7	246 48.3	509 100.0
Frequency Missing = 8				
		Statistic	Value	P- value
		Chi-squared	10.6332	0.0049

Table 33. Knowledge Level from 4 Questions of Similarities and Differences vs. Perceived Attitudes

	Count Row Pct % Col Pct %	Positive attitudes for brand names	Attitudes toward generics not inferior to brand names	Total
Knowledge level from the 4 questions in Section 3A	Low	175 74.1 56.3	61 25.9 30.3	236 46.1
	Medium	93 52.8 29.9	83 47.2 41.3	176 34.4
	High	43 43.0 13.8	57 57.0 28.4	100 19.5
	Total	311 60.7	201 39.3	512 100.0
Frequency Missing = 5				
		Statistic	Value	P- value
		Chi-squared	35.6067	<.0001

Research Question 2.2. (1) Perceptions or attitudes vs. whether been prescribed

brand name drugs: Tables 34 to 36 present results for whether patients that have been prescribed brand name drugs have different perceptions and attitudes than patients with no brand name drugs prescribed. There were signals of associations in the results but some of the p-value statistics merely were close to marginal significance, likely due to the small sample size (N = 44) for 'Not' been prescribed brand name drugs (after excluding respondents that were 'unsure' about brand name prescribed experience).

Being prescribed brand name drugs had weak relationships with perceived effectiveness (p=0.0715 in Table 34) and perceived quality of brand name drugs (p=0.1114 in Table 35). Of the respondents that had been prescribed a brand name drug, 53.5% perceived brand names effective. Conversely, 61.4% of the respondents who had not been prescribed a brand name drug perceived generics as not inferior in effectiveness to brand name drugs.

For perceived quality in Table 35, only slightly more (51.7%) of the respondents who had been prescribed a brand name drug perceived brand names higher in quality. In contrast, 61.4% of the respondents who have not been prescribed brand name drugs did not perceive generics as lower quality than brand name drugs.

Table 36 shows the results of experience of being prescribed brand name versus attitudes; the association was statistically significant. Of the respondents who have been prescribed a brand name drug, 65.5% had a positive attitude toward brand name drugs. In the opposite, 59.1% of the respondents who had not been prescribed a brand name drug had attitudes that generics were not inferior to brand name drugs.

Table 34. Being Prescribed Brand Name Drugs vs. Perceived Effectiveness

	Count Row Pct % Col Pct %	Perceived effectiveness for brand names	Perceived generics not inferior to brand names in effectiveness	Total
Have ever been prescribed brand name drugs?	Yes	124 53.4 87.9	108 46.6 80.0	232 84.1
	No	17 38.6 12.1	27 61.4 20.0	44 15.9
	Total	141 51.1	135 48.9	276 100.0
Frequency Missing = 4				
		Statistic	Value	P-value
		Chi-squared	3.2473	0.0715

Table 35. Being Prescribed Brand Name Drugs vs. Perceived Quality

	Count Row Pct % Col Pct %	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
Have ever been prescribed brand name drugs?	Yes	120 51.7 87.6	112 48.3 80.6	232 84.1
	No	17 38.6 12.4	27 61.4 19.4	44 15.9
	Total	137 49.6	139 50.4	276 100.0
Frequency Missing = 4				
		Statistic	Value	P- value
		Chi-squared	2.5342	0.1114

Table 36. Being Prescribed Brand Name Drugs vs. Attitudes

	Count Row Pct % Col Pct %	Positive attitudes for brand names	Attitudes toward generics not inferior to brand names	Total
Have ever been prescribed brand name drugs?	Yes	154 65.5 89.5	81 34.5 75.7	235 84.2
	No	18 40.9 10.5	26 59.1 24.3	44 15.8
	Total	172 61.6	107 38.4	279 100.0
Frequency Missing = 1				
		Statistic	Value	P-value
		Chi-squared	9.5036	0.0021

Research Question 2.2. (2) Perceptions or attitudes vs. whether have been prescribed generic drugs: Tables 37 to 39 present how the experiences for patients who have been prescribed generic drugs are related to their perceptions and attitudes. The results show that being prescribed generic drugs had no relationship with perceived effectiveness of generics (Table 37), perceived quality of generics (Table 38), or positive attitudes to generics (Table 39). The proportions of patients that had and had not been prescribed generics were approximately evenly split between favorable perceptions of effectiveness and quality for brand name drugs and not inferior perceptions for generics. Also, regardless of whether patients who were prescribed generics or not, slightly higher, but similar proportions of respondents had higher attitudes toward brand names drugs.

Table 37. Being Prescribed Generic Drugs vs. Perceived Effectiveness

	Count Row Pct % Col Pct %	Perceived Effectiveness for Brand names	Perceived generics not inferior to brand names in effectiveness	Total
Have ever been prescribed generic drugs?	Yes	85 48.6 74.6	90 51.4 73.8	175 74.2
	No	29 47.5 25.4	32 52.5 26.2	61 25.8
	Total	114 48.3	122 51.7	236 100.0
Frequency Missing = 4				
		Statistic	Value	P-value
		Chi-squared	0.0192	0.8897

Table 38. Being Prescribed Generic Drugs vs. Perceived Quality

	Count Row Pct % Col Pct %	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
Have ever been prescribed generic drugs?	Yes	80 45.4 72.1	96 54.6 76.8	176 74.6
	No	31 51.7 27.9	29 48.3 23.2	60 25.4
	Total	111 47.0	125 53.0	236 100.0
Frequency Missing = 4				
		Statistic	Value	P-value
		Chi-squared	0.6931	0.4051

Table 39. Being Prescribed Generic Drugs vs. Attitudes

	Count Row Pct % Col Pct %	Positive attitudes for brand names	Attitudes toward generics not inferior to brand names	Total
Have ever been prescribed generic drugs?	Yes	101 56.4 71.6	78 43.6 79.6	179 74.9
	No	40 66.7 28.4	20 33.3 20.4	60 25.1
	Total	141 59.0	98 41.0	239 100.0
	Frequency Missing = 1			
		Statistic	Value	P-value
		Chi-squared	1.9486	0.1627

Research Question 2.3. (1) Perceptions or attitudes vs. generic switch: This analysis was to test perceptions and attitudes versus consumer thoughts (anticipated actions) about generic switch. In Table 14, 186 subjects accepted a generic substitute and did not insist having a brand name drug and 111 subjects only wanted brand name drugs and would not accept a generic substitute. Therefore, in this analysis, the former group is categorized as ‘Accept generic switch’ and the latter is considered ‘Don’t accept generic switch.’ When perceived effectiveness was tabulated with this ‘accept or not’ categorization (Table 40), the association was significant. A higher proportion of those who perceived generics not inferior to brands in effectiveness accepted generic switch (70.6%) and conversely a similar higher proportion of those that had positive perception of brand name drug effectiveness did not accept generic switch (69.1%). Similar findings were found for perceived quality (Table 41) and attitudes (Table 42), but with an even higher proportion of respondents with favorable brand name drug attitudes not accepting generic switch (82.7%).

Table 40. Whether Accept Generic Switch or Not vs. Perceived Effectiveness

	Count Row Pct % Col Pct %	Perceived effectiveness for Brand names	Perceived generics not inferior to brand names in effectiveness	Total
Accept generic switch	Yes	54 29.4 41.5	130 70.6 79.3	184 62.6
	No	76 69.1 58.5	34 30.9 20.7	110 37.4
	Total	130 43.8	164 55.2	294 100
	Frequency Missing = 3			
		Statistic	Value	P-value
		Chi-squared	44.0853	<.0001

Table 41. Whether Accept Generic Switch or Not vs. Perceived Quality

	Count Row Pct % Col Pct %	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
Accept generic switch	Yes	73 39.5 49.0	112 60.5 76.2	185 62.6
	No	76 68.5 51.0	35 31.5 23.8	111 37.4
	Total	149 50.3	147 49.7	296 100
	Frequency Missing = 1			
		Statistic	Value	P-value
		Chi-squared	23.3533	<.0001

Table 42. Whether Accept Generic Switch or Not vs. Attitudes

	Count Row Pct % Col Pct %	Positive attitudes toward brand names	Attitudes toward generics not inferior to brand names	Total
Accept generic switch	Yes	76 41.1 45.5	109 58.9 85.2	185 62.6
	No	91 82.7 54.5	19 17.3 14.8	110 37.4
	Total	167 56.6	128 43.4	295
		Frequency Missing = 2		
		Statistic	Value	P-value
		Chi-squared	48.7092	<.0001

Research Question 2.3. (2) perceptions or attitudes vs. paying out-of-pocket costs for brand name drugs: The following analysis was to test perceptions and attitudes versus consumer thoughts (anticipated actions) about paying out-of-pocket costs for brand name drugs. In Table 16, there were 132 subjects that accepted a generic substitute and did not insist paying out-of-pocket costs for a brand name drug and 144 subjects who'd rather pay out-of-pocket costs for a brand name drug and would not accept a generic substitute. Therefore, in this analysis, the former group is categorized as 'Don't Pay OOP for brands' and the latter is 'Pay OOP for brands.' When testing for the relationship with perceived effectiveness, the association was significant (Table 43). A higher proportion (65.7%) of respondents that perceived generics not inferior to brand in effectiveness were less likely to pay out-of-pocket costs for a brand name drug. A similarly higher proportion of respondents that perceived brand name drugs effectiveness favorable would pay out-of-pocket costs for a brand (69.0%). Similar findings occurred for perceived quality (Table 44) and attitudes (Table 45).

Table 43. Whether Pay Out-of-Pocket Cost or Not vs. Perceived Effectiveness

	Count Row Pct % Col Pct %	Perceived effectiveness for Brand names	Perceived generics not inferior to brand names in effectiveness	Total
Pay OOP for brands	Yes	98 69.0 68.5	44 31.0 33.8	142 52.2
	No	45 34.3 31.5	86 65.7 66.2	131 47.8
	Total	143 51.8	130 47.1	273 100
		Frequency Missing = 3		
		Statistic	Value	P- value
		Chi-squared	32.8227	<.0001

Table 44. Whether Pay Out-of-Pocket Cost or Not vs. Perceived Quality

	Count Row Pct % Col Pct %	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
Pay OOP for brands	Yes	89 62.2 61.8	54 37.8 41.5	143 52.2
	No	55 42.0 38.2	76 58.0 58.5	131 47.8
	Total	144 52.2	130 47.1	274 100.0
		Frequency Missing = 2		
		Statistic	Value	P-value
		Chi-squared	11.2469	0.0008

Table 45. Whether Pay Out-of-Pocket Cost or Not vs. Attitudes

	Count Row Pct % Col Pct %	Positive attitudes toward brand names	Attitudes toward generics not inferior to brand names	Total
Pay OOP for brands	Yes	108 75.5 65.5	35 24.5 32.1	143 52.2
	No	57 43.5 34.5	74 56.5 67.9	131 47.8
	Total	165 59.8	109 39.5	274 100.0
		Frequency Missing = 2		
		Statistic	Value	P-value
		Chi-squared	29.2483	<.0001

Research Question 2.4. Perceptions or attitudes vs. perceived no differences after generic switch: Here the analysis was to explore perceptions and attitudes versus experiencing a generic switch and perceiving no subsequent difference in effectiveness or adverse effects. Tables 46 to 48 present the results of how perceptions and attitudes toward brand name and generic drugs were related to whether patients whom experienced generic switch perceived differences in both effectiveness and adverse effects between brand name drugs and generic drugs or not. There was a subset of 91 respondents that had been prescribed brand name drugs and had a generic switch (Table 22), of which 81 had non-missing data for the follow-up questions about how therapeutic effects and adverse effects changed after the switch (not shown, related to Tables 23 and 24). Of these 81 respondents, 51 reported (1) no differences or better in effectiveness and (2) no differences or less in adverse effects after the generic switch; they were categorized 'Yes' for "no differences" and the remaining 30 respondents that reported either less effective or more side effects after generic switch were categorized 'No' for "no differences."

These 'Yes' and 'No' groups were compared for how their perceptions and attitudes varied. For perceived effectiveness there was a significant association. Respondents that experienced a generic switch and perceived at least no difference in both effectiveness and adverse effects (good experiences with generic drugs) after the switch were more likely to have non-inferior perception of effectiveness for generics (Table 46). Conversely, respondents that experienced a generic switch and did perceive a difference in both effectiveness and adverse effects were more likely to have favorable perception of effectiveness for brand name drugs. In a parallel comparison for perceived quality (Table 47), the association (p-value) was not statistically significant, but the comparison for attitudes (Table 48) was nearly significant.

Table 46. Experienced of Generic Switch and At Least No Differences In Both Effectiveness and Adverse Effects vs. Perceived Effectiveness

	Count Row Pct % Col Pct %	Perceived Effectiveness for Brand names	Perceived generics not inferior to brand names in effectiveness	Total
experiences of generic switch and Perceived at least no differences in both effectiveness and adverse effects	Yes	18 35.3 42.9	33 64.7 86.8	51 63.8
	No	24 82.8 57.1	5 17.2 13.2	29 36.2
	Total	42 52.5	38 47.5	80 100.0
Frequency Missing = 1				
		Statistic	Value	P-value
		Chi-squared	16.7014	<.0001

Table 47. Experienced of Generic Switch and At Least No Differences in Both Effectiveness and Adverse Effects vs. Perceived Quality

	Count Row Pct % Col Pct %	Perceived quality for brand names	Perceived generics not inferior to brand names in quality	Total
experiences of generic switch and Perceived at least no differences in both effectiveness and adverse effects	Yes	26 51.0 57.8	25 49.0 71.4	51 63.8
	No	19 65.5 42.2	10 34.5 28.6	29 36.2
	Total	45 56.3	35 43.7	80 100.0
Frequency Missing = 1				
		Statistic	Value	P-value
		Chi-squared	1.5875	0.2077

Table 48. Experienced of Generic Switch and At Least No Differences in Both Effectiveness and Adverse Effects vs. Attitudes

	Count Row Pct % Col Pct %	Positive attitudes for brand names	Attitudes toward generics not inferior to brand names	Total
experiences of generic switch and Perceived at least no differences in both effectiveness and adverse effects	Yes	29	22	51
		56.9	43.1	63.0
		55.8	75.9	
	No	23	7	30
		76.7	23.3	37.0
		44.2	24.1	
Total	52	29	81	
	64.2	35.8	100.0	
Frequency Missing = 0				
		Statistic	Value	P-value
		Chi-squared	3.2231	0.0726

For perceived quality (Table 47), among those that perceived generics at least no different in both effectiveness and adverse effects, the proportions of patients that perceived quality for brand names and perceived quality for generics not inferior to brand names were approximately evenly split (51.0% vs. 49.0%). This part of the results likely contributed to the statistically non-significant Chi-squared test. Probably it is because both effectiveness and adverse effects do not belong to perceived quality domain, but both are part of perceived effectiveness. This is why it is statistically significant for perceived effectiveness, not for perceived quality.

However, for those that experienced a switch and did not agree that there was no difference in effectiveness (less) or adverse reactions (more), nearly two-thirds (65.5%) of patients perceived better quality for brand names and only 34.5% perceived quality for generics not inferior to brand names. That is straightforward to understand.

For attitudes (Table 48), the p-value (0.0726) is close to marginal significance. For those that had a switch and perceived generics at least no different in both effectiveness and adverse effects, 56.9 % of respondents had positive attitudes toward brand name drugs. Similarly, for those that perceived differences for generics after a switch, over three-fourths (76.7%) had positive attitudes to brand names and less than one-fourth (23.3%) had attitudes that generics were non-inferior.

Results for Objective 3: examine the associations of knowledge with thoughts and experiences

Research Question 3.1. (1) Knowledge vs. whether have been prescribed brand name drugs: Table 49 shows the results that examine whether respondents having been prescribed brand name or generic drugs was associated with their knowledge level about these drugs. The association was not significant for being prescribed brand name drug with any knowledge levels (Tables 49 and 50). For the 7 knowledge questions in Table 49, among those who had been prescribed brand name drugs, 20% were in the low knowledge group and 80% were the medium or high knowledge group (the proportion for medium and high is around 50% vs. 30%). These proportions (low and medium/high) were in parallel compared to the respondents that had not been prescribed brand name drugs. In Table 50, there are very similar patterns of knowledge level distribution of respondents having and not having been prescribed branded drugs, but the proportion of both groups decreases as knowledge levels get higher.

Table 49. Knowledge Level from the 7 Questions (in Section 2) vs. Have Ever Been Prescribed Brand Name Drugs

Have ever been prescribed brand name drugs?				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 7 questions from section 2	Low	46 83.6 19.6	9 16.4 20.0	55 19.6
	Medium	127 85.8 54.0	21 14.2 46.7	148 52.9
	High	62 80.5 26.4	15 19.5 33.3	77 27.5
	Total	235 83.9	45 16.1	280 100.0
Frequency Missing = 0				
		Statistic	Value	P-value
		Chi-squared	1.0557	0.5899

Table 50. Knowledge Level from the 4 Questions (in Section 3A) vs. Have Ever Been Prescribed Brand Name Drugs

Have ever been prescribed brand name drugs?				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 4 questions in Section 3A	Low	99	18	117
		84.6	15.4	41.8
		42.1	40.0	
	Medium	94	14	108
		87.0	13.0	38.6
		40.0	31.1	
	High	42	13	55
		76.4	23.6	19.6
		17.9	28.9	
Total	235	45	280	
	83.9	16.1	100.0	
Frequency Missing = 0				
	Statistic	Value	P-value	
	Chi-squared	3.1481	0.2072	

Research Question 3.1. (2) Knowledge vs. whether have been prescribed generic drugs: There were no significant associations between whether having been prescribed a generic drug and knowledge levels (Tables 51 and 52). However, for knowledge levels based on the 4 questions about similarities and differences between brand and generic drugs, the relationship with whether having been prescribed a generic drug was near statistical significance (Table 52). For the association with the 4 question knowledge measure in Table 52, 62.6% of respondents that had been prescribed generics were in the medium or higher knowledge level groups (41.9%+20.7%), but only 45.9 % of the respondents not having been prescribed a generic were in those knowledge level groups (29.5%+16.4%). Correspondingly, the proportions of low knowledge respondents who had been prescribed a generic drug was lower than those whom had not been prescribed generics (37.4% vs. 54.1%, respectively).

Table 51. Knowledge Level from the 7 Questions (in Section 2) vs. Have Ever Been Prescribed Generic drugs

Have ever been prescribed generic drugs?				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 7 questions from section 2	Low	31 64.6 17.3	17 35.4 27.9	48 20.0
	Medium	97 77.0 54.2	29 23.0 47.5	126 52.5
	High	51 77.3 28.5	15 22.7 24.6	66 27.5
	Total	179 74.6	61 25.4	240 100.0
	Frequency Missing = 0			
		Statistic	Value	P-value
		Chi-squared	3.1670	0.2053

Table 52. Knowledge Level from 4 Questions of Similarities and Differences vs. Have Ever Been Prescribed Generic drugs

Have ever been prescribed generic drugs?				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 4 questions in Section 3A	Low	67 67.0 37.4	33 33.0 54.1	100 41.7
	Medium	75 80.7 41.9	18 19.3 29.5	93 38.7
	High	37 78.7 20.7	10 21.3 16.4	47 19.6
	Total	179 74.6	61 25.4	240 100.0
Frequency Missing = 0				
	Statistic	Value	P-value	
	Chi-squared	5.2613	0.0720	

Research Question 3.2. (1) Knowledge vs. thought about generic switch: The following analysis was to examine if knowledge levels were correlated with thoughts (anticipated actions) about generic switch (from Scenario 1 in Table 14). Tables 53 and 54 show how the 7 and 4 questions knowledge levels were correlated with thoughts (anticipated actions) about generic switch (accept or not). The results show only the 4 question knowledge level measure correlates with respondents' thoughts about generic switch; there was a significant Chi-squared result. That is because the 4 questions were asking about the similarities and differences between brand name and generic drugs. Since the 7 question knowledge measure was based on the characteristics and features associated with brand name or generic drugs, there was less of a connection about the switch issue (Table 53). The results in Table 54 imply higher understanding of similarities and differences between brand name or generic drugs helped consumers' thoughts toward accepting generic drugs. Patients who understood more about generic drugs being substitutes of brand name were more likely to accept a generic switch.

Table 53. Knowledge Level from 7 Questions (in Section 2) vs. Accept Generic Switch

Accept generic switch				
	Count	Yes	No	Total
	Row Pct %			
	Col Pct %			
Knowledge level from the 7 questions in section 2	Low	38	18	56
		67.9	32.1	18.8
		20.4	16.2	
	Medium	105	58	163
		64.4	35.6	54.9
		56.5	52.3	
	High	43	35	78
		55.1	44.9	26.3
		23.1	31.5	
	Total	186	111	297
		62.6	37.4	100.0
	Frequency Missing = 0			
		Statistic	Value	P-value
		Chi-squared	2.7516	0.2526

Table 54. Knowledge Level from 4 Questions of Similarities and Differences vs. Accept Generic Switch

Accept generic switch				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 4 questions in Section 3A	Low	50 41.7 26.9	70 58.3 63.1	120 40.4
	Medium	81 73.0 43.6	30 27.0 27.0	111 37.4
	High	55 83.3 29.6	11 16.7 9.9	66 22.2
	Total	186 62.6	111 37.4	297 100.0
	Frequency Missing = 0			
		Statistic	Value	P-value
		Chi-squared	39.6907	<.0001

Research Question 3.2. (2) Knowledge vs. paying out-of-pocket for brand name

drugs : For whether knowledge levels were correlated with thoughts (anticipated actions) about paying out-of-pocket costs for brand name drugs, similar findings to the cases of generic switch in Table 53 and 54 occurred. Knowledge levels related to consumer views on paying out-of-pocket costs for brand name drugs (based on survey results of scenario 2 in Table 16) are shown in Tables 55 and 56. For knowledge levels based on the 7 questions on features associated with brand or generic drugs, the results were not significant but for knowledge levels-based on the 4 questions on similarities and differences between brand name and generic drugs, there was a significant Chi squared test result. The results in Table 56 show that respondents who knew the similarities and differences were less likely to pay out-of-pocket costs for brand name drugs, reflecting consumers would likely to pay less for generics because both medications are substitutes. In Table 56, patients who would not pay out-of-pocket costs were more likely to have medium or high knowledge. Among the respondents who would consider paying, only 4.9% had high knowledge, compared to 31.1% of those who would not pay. On the contrary, those who consider paying out-of-pocket costs for brand name drugs, 63.2% had low knowledge, compared to 26.5% of those who would not pay.

Table 55. Knowledge Level from 7 Questions (in Section 2) vs. Pay OOP for Brands

Pay OOP for brands				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 7 questions from section 2	Low	27 57.5 18.7	20 42.5 15.1	47 17.0
	Medium	76 51.3 52.8	72 48.7 54.6	148 53.6
	High	41 50.6 28.5	40 49.4 30.3	81 29.4
	Total	144 52.2	132 47.8	276 100.0
Frequency Missing = 0				
		Statistic	Value	P-value
		Chi-squared	0.6425	0.7252

Table 56. Knowledge Level from 4 Questions of Similarities and Differences vs. Pay OOP for Brands

Pay OOP for brands				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 4 questions in Section 3A	Low	91	35	126
		72.2	27.8	45.7
		63.2	26.5	
	Medium	46	56	102
		45.1	54.9	36.9
		31.9	42.4	
	High	7	41	48
		14.6	85.4	17.4
		4.9	31.1	
Total	144	132	276	
	52.2	47.8	100.0	
Frequency Missing = 0				
	Statistic	Value	P-value	
	Chi-squared	49.5245	<.0001	

Research Question 3.3: Knowledge vs. perception of no differences after generic

switch: For whether knowledge had a relationship with the perception of no differences in effectiveness and adverse events after a generic switch (Tables 57 and 58). the comparisons were restricted to the 81 respondents that had experienced a switch and evaluated the subsequent effectiveness or adverse effects for the generic drug (as per Tables 22 to 24). Similar to the results from Tables 53 through 56, there was not a significant association for knowledge levels based on the 7 questions (Table 57), but there was a significant association with 4 knowledge questions which related to similarities and differences between brand and generic drugs (Table 58). For patients who perceived generic drugs having no differences in effectiveness and adverse effects after a generic switch, 74.5% were patients with medium (47.1%) and higher (27.4%) knowledge levels, much higher than the 36.7% (30.0%+6.7%) of patients who perceived differences after a generic switch.

Table 57. Knowledge Level from the 7 Questions (in Section 2) vs. Experiences of Generic Switch and Perceived At Least No Differences in Both Effectiveness and Adverse Effects

experiences of generic switch and Perceived at least no differences in both effectiveness and adverse effects				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 7 questions in section 2	Low	7	6	13
		53.9	46.1	16.1
		13.7	20.0	
	Medium	28	13	41
		68.3	31.7	50.6
		54.9	43.3	
	High	16	11	27
		59.3	40.7	33.3
		31.4	36.7	
Total	51	30	81	
	63.0	37.0	100.0	
	Frequency Missing = 0			
	Statistic	Value	P-value	
	Chi-squared	1.1216	0.5708	

Table 58. Knowledge Level from 4 Questions (in Section 3A) vs. Experiences of Generic Switch and Perceived At Least No Differences in Both Effectiveness and Adverse Effects

experiences of generic switch and Perceived at least no differences in both effectiveness and adverse effects				
	Count Row Pct % Col Pct %	Yes	No	Total
Knowledge level from the 4 questions in Section 3A	Low	13	19	32
		40.6	59.4	39.5
		25.5	63.3	
	Medium	24	9	33
		72.7	27.3	40.7
		47.1	30.0	
	High	14	2	16
		87.5	12.5	19.8
		27.4	6.7	
Total	51	30	81	
	63.0	37.0	100.0	
Frequency Missing = 0				
	Statistic	Value	P-value	
	Chi-squared	12.3273	0.0021	

Results for Objective 4: Perceived no differences in effectiveness and adverse events from a generic switch vs. pay out-of-pocket costs for brand name drugs

The results in Table 59 show that consumers who perceived no differences in effectiveness or adverse events after a generic switch were less likely to pay out-of-pocket costs for brand name drugs. Among patients who experienced at least no differences after a generic switch, 69.2% were not willing to pay for brand name drugs. For those who noted less effectiveness or more adverse events after a generic switch, 81.0% would be willing to pay for brand name drugs.

Table 59. Experienced of Generic Switch and At Least No Differences in Both Effectiveness and Adverse Effects vs. Pay Out-of-Pocket for Brands

Pay OOP for brands				
	Count Row Pct % Col Pct %	Yes	No	Total
Experiences of generic switch and perceived at least no differences in both effectiveness and adverse effects	Yes	8	18	26
		30.8	69.2	55.3
		32.0	81.8	
	No	17	4*	21
		81.0	19.0	44.7
		68.0	18.2	
Total	25	22	47	
	53.2	46.8	100.0	
Frequency Missing = 0				
		Statistic	Value	Prob
		Exact test		0.0010

* Fisher’s Exact test (for a nondirectional test) was used when the frequency count was smaller than 5.

CHAPTER 6

DISCUSSION

This chapter provides comments on some general, overall observations or reflections, comment on key findings particularly related to the research questions, comments on methods and the research process, and summarizes some limitations.

General Comments and Reflections

This study provides some insights to evaluate a current health policy issue. NHI covers over 99% of the Taiwanese population for their health care needs. In the early stage of NHI, there were no financial issues that raised concerns about cost saving by using more generic drugs or to substitute for brand name drugs. However, with a trend of soaring drug prices, some due to the high research costs from new drug development, NHI has faced a lot of cost containment pressures. Encouraging physicians to prescribe generics has been a recent issue for NHI to save costs. Also, NHI made changes to shift the cost burden of brand name drugs to consumers if and when a generic was available. This cost burden was met with some controversy and consumer backlash about access to brand name drugs. The government claims that brand name and generic drugs are both effective, both have the same in ingredient, dose and dosage, but without clinical trials to prove equivalence, there is no clear answer which is better; the dispute is going to remain.

In a traditional relationship between patients and physicians, even now, patients usually accept whatever treatment decisions are made by their physicians; they rarely challenge or disagree with what physicians prescribe for them. In addition, some physicians make

prescribing decisions as well as generic switch choices regardless how their patients think or feel, instead considering financial interests of the hospital or their own benefit.

This study explores aspects of this current brand name and generic drug situation from the consumer side and helps explore some research questions about their perceptions, attitudes, knowledge, thoughts and experiences. Understanding these can help the policy makers find a balance between cost saving and what consumers really feel and think about the medications that they receive. The goal for the government is to regulate generic drugs to provide the evidence that both generic and brand name medications are effective to help consumers feel confident about using generics.

A strength of this study was that primary information was collected about consumer perceptions, attitudes, knowledge, anticipated actions (thoughts), and experiences about brand name and generic drugs among Taiwanese consumers. The generic drug market in Taiwan is not highly regulated and there could be different voices about the pros and cons of generic drugs compared to brand name drugs. The complexity of perceptions, attitudes, thoughts and opinions between brand name and generic drugs from Taiwanese consumers forms an interesting research topic.

This is also the first study to investigate associations among multiple domains of psychological attributes or characteristics from Taiwanese consumers in self-report survey questionnaires about brand name and generic drugs, along with their experiences and knowledge about brand name and generic drugs. No studies have been done to understand the relationships of one or more these factors.

One realization from approaching subjects to gather data and from the data collected is that overall, there appears to be a substantial gap in awareness and understanding of brand and

generic drugs. This study screened people who had heard about brand name and generic drugs, and about half or less of the people contacted had heard about this topic. Further, only some of those had some knowledge when they self-reported their perceived knowledge level and when their knowledge was assessed by items in the survey questionnaire. This indicates that there is potential improvement from patient education initiatives so that consumers can understand these drugs and have confidence to use generics, especially when more generic switches occur when health care and drug costs are rising. In addition, compared to consumers in the USA, Taiwanese consumers have less incentive to understand brand name and generic drugs in considerations relative to whether insurance plans cover their drugs.

The inclusion criteria to be selected for the survey were generous. Potential respondents were qualified for doing the survey as long as they had heard about brand name drugs or generic drugs. Therefore, it was understandable that many respondents that answered the survey would not possess high knowledge. For example, many picked the incorrect answer or returned with 'I don't know' for some of the knowledge questions, both for features and characteristics associated with brand name or generic drugs and similarities and differences between brand and generic drugs.

Also, low proportions of respondents reported that they knew of ever being prescribed brand name or generic drugs. In Table 18, the proportions of respondents who reported 'No' was small, but as high as 43% to 53% of the respondents said 'I don't know'. This might be due to a recall issue; it could be a challenge for some respondents to remember whether they have been prescribed generic or brand name drugs. Many respondents said physicians did not tell them their drugs were brand name or generic, and that is why many did not know. For others, they

might have needed time for them to recall or they could have been hesitant to confirm they have had such experiences.

Key Findings and Research Questions

Previous studies focused on consumer knowledge or conceptions about brand name and generic drugs by surveying people either via phone or onsite survey. The questionnaire designs tended to cover more general consumer knowledge or conceptions about brand name and generic drugs; the study designs were less research oriented. This dissertation study was done to research patient thoughts from several cognitive perspectives.

This study had several findings that might be considered meeting preconceived expectations. For example, in general, a considerable proportion of respondents tended to have perceptions and attitudes that favored brand name drugs. The perceptions or attitudes that favored brand name or generic drugs were correlated with each other in the anticipated directions. The perceptions and attitudes were also strongly associated with corresponding anticipated actions about a generic switch or paying their own costs for branded drugs. Also, not many respondents actually experienced having their physician make a switch from a brand name to generic drug, and not a lot of patients even knew whether they had been prescribed brand name or generic drugs, especially for generics.

Objective 1: explore the relationships between perceptions and attitudes

Objective 1 tested the associations among attitudes, perceived quality and perceived effectiveness. It was expected that patient perceptions and attitudes would have strong

connections, especially a strong relation between perceived effectiveness and attitude, but less so for perceived quality and attitude. It could be because attitudes were formed over time and less likely to change, and effectiveness was easier to be perceived after using a medication. The analysis with perceived quality had less statistical power, probably because quality about medications was difficult to define and evaluate by patients.

Objective 2: Examine the associations of perceptions or attitudes with knowledge, thoughts and experiences

Perceptions or attitudes vs. knowledge: The results from the knowledge level measure based on 7 questions (Table 28 to Table 30) are consistent that higher knowledge has a relationship with perceived effectiveness, perceived quality or attitudes for brand names. It is possibly because the 7 knowledge questions asked about general characteristics or features of medications; the majority of the correct answers point to brand name drugs and this indirectly might have affected respondents to favor brand names. In addition, the underlying notions behind many items such as high prices, high costs, foreign manufacturers imply brand names with better quality or effectiveness which may have affected their attitudes as well.

Similarly, the statistics are also significant for the knowledge level measure based on the 4 questions about similarities and differences between brand name and generic drugs (Table 31 to Table 33). However, the relationships are in opposite directions between the results from 7 and 4 questions. For the 7 question knowledge measure, the higher knowledge scores were associated with higher perceptions and higher attitudes to brand name drugs. For the 4-question knowledge measure, high scores related to perceptions or attitudes that generics were not inferior to brand name drugs.

The divergent directions of these results may be because these two different knowledge sets tested knowledge from different perspectives. The 7 knowledge questions (Section 2) were more general items. Since correct answers for knowledge could be viewed as more favorable traditionally (higher prices, reputable manufacturer, etc.), respondents that chose correct answers had better perceptions of brand name drugs. For the 4 knowledge questions (Section 3A), the aim was to compare between generics and brand name drugs. The correct answers are closer to the conclusion that generics are more likely to substitute for brand name drugs, thus respondents who scored higher were more likely to perceive generics as equal to brand names in perceptions and attitudes. That might explain why the results from the 4 questions and the 7 questions are different.

Perceptions or attitudes vs. having been prescribed a brand name drug: Consumers had favorable attitudes to brand name drugs if they had ever been prescribed brand name drugs. For perceptions, experience was less influential, the p-values were not significant, but closer for perceived effectiveness ($p=0.0715$) than for perceived quality ($p=0.1114$). That occurred likely because patients that had not experienced being prescribed a brand name drug tended to hold an attitude that generics were not inferior to brands. It is likely that consumers who understood the types of medications (such as brand names) they have received, tended to be more aware about their medications; they could have more perceptions or attitudes than those who had not been prescribed those drugs.

Perceptions or attitudes vs. having been prescribed a generic drug: The statistics were non-significant for all the cross tabulations of perceptions and attitudes and whether respondents had been prescribed a generic drug (Table 37 to Table 39). The proportions of patients that had and had not been prescribed generics were split in irregular patterns between favorable

perceptions or attitudes. Both those that had and had not been prescribed generics were slightly higher in favorable attitudes for brands than generics (56.4% and 66.7%, respectively). On the contrary, both those that had and had not been prescribed generics also were slightly higher in perceiving generics non-inferior in effectiveness (51.4% and 52.5%, respectively). For quality, slightly higher perception of brands resulted for those had not been prescribed generics, and the other way around for those had been prescribed generics. There can be multiple explanations for these varying results. If patients had not used a brand name drug previously, there would be no comparisons so that they could judge perceptions/attitudes for generics depending solely on if generics worked well or not. If they had experienced a generic switch, they could compare before and after the switch, or they might use both brand name and generics for the same of different disease conditions. Physicians know patients prefer brand name drugs and they want patients to believe they prescribe better medications. Physicians are less likely to tell patients if they prescribe generic drugs because it delivers the message that they don't give better drugs, unless patients ask about it. Their patients would be upset and would not be happy to know about it.

Perceptions or attitudes vs. generic switch or paying out-of-pocket costs for brand name drugs: For these two analyses, it is straightforward that consumers' perceptions or attitudes have associations with their thoughts about generic switch (Table 40 to Table 42) and paying out-of-pocket costs for brand name drugs (Table 43 to Table 45). All the results from these six tables have the same pattern, a higher proportion of respondents who accepted generic switch or were less likely to pay out-of-pocket costs for a brand name drug perceived generics not inferior to brand in effectiveness. A similarly higher proportion of respondents that denied switch or would pay out-of-pocket costs for a brand perceived brand name drug effectiveness favorably. The

statistics with perceived effectiveness or attitudes were stronger, indicating that in a decision for generic switch or paying out-of-pocket for brand name drugs, effectiveness and attitudes played a more important role than quality.

Objective 3: Examine associations of knowledge with experiences and thoughts

Respondents that had ever been prescribed generic drugs were more likely to have higher knowledge, but not for those who had been prescribed a brand name drug. It is possible that patients usually knew brand name drugs more than generics from their histories that they experienced traditionally because brand name drugs dominated in large hospitals since the time the NHI was started (such as more than 10 years ago). There were fewer discussions about generic substitutes because NHI reimbursed for the majority of brand name drugs and physicians considered less about drug costs while deciding which therapies to use and they wanted to treat patients using better drugs. Patients usually followed whatever physicians prescribed and counted on physician decisions for their treatments. Since physicians might or might not tell their patients what type of medications they prescribed, unless they were interested in knowing more about their medications by doing information search, or there were generic switches occurred. Otherwise, generic drugs were less likely to be noticed. Therefore, patients leveraged the knowledge if they had experiences of receiving generic drugs, perhaps more than they did for their brand name drugs.

The results from the knowledge measure based on 4 questions showed higher knowledge level having a significant relationship with higher acceptance of generic switch (Table 54) or less willingness to pay out-of-pocket costs for brand name drugs (Table 56). Respondents who accepted generic switch or tended not to pay out-of-pocket costs had medium or high knowledge

levels. On the contrary, those who rejected a switch or were willing to pay own costs for brands were more likely to have low knowledge. Similar results did not occur with the knowledge measure based on 7 questions (Table 53 and Table 55). This may have occurred because respondents that scored better with the 4 knowledge questions understood the resemblances and discrepancies between brand names and generics. However whether respondents were aware of characteristics or features related to either brand name or generic drugs would not be as directly related to how they would react to a scenario of generic switch or paying their own costs for brands, so the statistics from the 7 knowledge questions were not as significant as the 4 ones.

For knowledge versus perception of no differences in effectiveness or adverse reactions after generic switch (Table 58), the findings are similar to thoughts about generic switch or paying out-of-pocket costs mentioned just above. The difference is this was for experience rather than thoughts about what they would do, indicating there could be a relationship between experience and knowledge. If patients who knew the similarities and differences between brand name and generic drugs, patients perceived no differences after switch could have psychological effects in addition to therapeutic effects compared who did not know. That was because they were more likely to know that generics and brands have the same active component and are substitutes, they might have presumption that generics were as effective as brand name drugs and felt comfortable that generics could treat them as well as the originators. Knowledge could influence the experiences in this case.

Objective 4: Rating no difference in effectiveness and adverse events after a generic switch vs. pay out-of-pocket costs for brand name drug

It is straightforward to connect the relationship between less willingness to pay out-of-pocket costs for brand name drug if the consumer perceives no difference in effectiveness and

safety after a generic switch (Table 59). Both variables were available only for subsets of respondents so that the number of patients for analysis was small. For those who would have experienced both brands and generics, when there is a medication that costs less but has equal effectiveness and safety compared to the original, consumers would accept the option of zero copay rather than spending money. This can be an indicator to guide policy makers. If consumers can be informed about similar effectiveness and adverse events for generic drugs, they could have better perceptions and they may be more confident to take generic drugs.

Methods and Research Processes

The research topic has not been studied extensively in Taiwan and the policy that generated interest in the area was relatively recent. The novelty of the research and the methods for conducting the study warrant comment on some aspects of the survey administration and data measurement.

Survey Administration

Visiting the hospitals for survey implementation had several advantages. It was relatively efficient to get a higher proportion of appropriate subjects, those who knew about brand name and generic drugs and could complete the questionnaire by surveying respondents at hospitals onsite. The large volume of hospital patients helped find potential study participants easier; they were concentrated in a place where accessing them was more feasible. The topic of the research also was more relevant to people seeking health care, so uptake for data gathering was facilitated. Due to the unfamiliarity of the topic and difficulty for many potential respondents, it could take longer time for respondents to fill out mailed questionnaires;

delivering and collecting questionnaires onsite helped obtain data immediately and more questionnaires were completed. This would be less likely to achieve by using mail survey. Survey completion also could not be accomplished easily by phone because respondents would need to look at the scenarios (more text) to answer those questions, as well as the sources of information items. The visual effects help respondents do the questions needed and not merely give responses 'All that apply' over and over.

The activities and procedures for survey administration provided some insights. The face-to-face contact helped screen the eligible sample population and allowed the researcher to encourage complete responses. Starting the conversation with the idea that the researcher needed help from them to do the survey in order to complete his dissertation was beneficial; for an academic purpose, people would be happy to help if they could contribute. This way people would really take the survey seriously and really provide better response inputs by taking time for the questionnaire. The researcher answered questions onsite to help respondents finish the questionnaires easier, and decrease the possibilities of missing data. When the researcher read the questionnaire to respondents who could not self-administer it, there were opportunities for receiving immediate feedback or comments from the respondents. The dialog and exchange between the researcher and these subjects provided valuable insights and comments about what they were thinking when answering survey questions.

The researcher did not mention the gift certificates in conversations for recruitment to seduce respondents, in an attempt to avoid having subjects only interested in the incentive complete the form with answers that were not serious. The research relied on the mention of incentive in the cover letter only.

The 'push' strategy by the researcher taking initiative was more effective and efficient than the 'pull' strategy to obtain respondents. Even with that, there were challenges with gaining participation for the survey. One reason was that patients were more passive about other activities unrelated to them and their visit to the hospital on that occasion. Many patients used smartphones, read, chatted with people or rested while they were waiting for services and the researcher was hesitant to intervene with them. Also, some patients were distracted by other things, such as thinking about things to do later or going to leave in a hurry and they declined to participate. The poster turned out to be a very secondary recruitment device that predominantly affected hospital staff that were intrigued by the topic and incentive; they might have known something about medications through work and felt they were qualified to do the survey.

Data Measurement

One key goal in this study was to sort respondents into dichotomous groups according to whether their perceptions and attitudes aligned more with brand name or generic drugs. Overall, by default, consumer impressions for generics generally would be inferior to brand names. Therefore, the definitions for brand name favorability in responses were strict and the criteria for generics were relaxed when measuring perceptions or attitudes. Therefore, one group was defined as respondents who had perceived positive or favorable effectiveness, quality or attitudes for brand name drugs, the other group effectively perceived generics as 'not inferior' to brand name drugs in perceived effectiveness, quality or attitudes. The grouping rules affected the counts in each cell of the tabulations and the Chi-squared statistics.

In the bivariate analyses, when perceptions/attitudes were tabulated with knowledge levels, the counts were near equally distributed between two groups of brand name and generics

in 'Medium' knowledge level (the significant p-values come from the disparities in groups of low or high knowledge rather than medium level). There also were smaller numbers of respondents with low and high knowledge levels. That is partly due to the criteria to group respondents by their perceptions and attitudes of brand name and generic drugs, as well as the diverse range of knowledge responses. The large sample size contributed to significant results but meaningful differences may be less substantial.

Some respondents gave diverse and sometimes contradictory responses. For example, the knowledge level measures had some items that were problematic. The anticipated actions items had some confusing response sets by subjects (that didn't make sense). Consequently consistent responses were used to categorize respondents into groups and this reduced sample sizes and limited the analyses to only these respondents.

Implications

This study has two implications, from both marketing and policy perspectives.

From the marketing side, prescription drugs are special products. Medications are considered consumer products but they have therapeutic effects that can make them special. Innovative drugs have patent protection but after the patents of brand name drugs expire, generic competition is unavoidable. To penetrate the market, generic medicines have cost advantage and set prices lower than their brand name counterparts. Generic drugs do not have to demonstrate safety and effectiveness by duplicating animal and clinical tests; they can rely on results of the testing required from the brand name product. Generic manufacturers could promote this as a big advantage. In addition, generic manufacturers could also develop some strategies to improve their product images to be well perceived by consumers. In this study, about half of

respondents perceived generic drugs not inferior to brands on effectiveness. There could be an effort for generic manufacturers to focus on improving the image of effectiveness. They could emphasize that they have to present evidence by the test studies to prove their generic products meet a bioavailability and bioequivalence standard before marketing and comply with the Good Manufacturing Practice requirements. They also could use better materials and improve the facilities for productions, and highlight them with corresponding promotion campaigns to highlight the effectiveness and good quality of their products (similar or equal to the brands).

From a policy perspective, the biggest issue is how to gain trust from Taiwanese consumers and have them perceive generics as not inferior to brand name counterparts. Government administrators should promote and educate patients that generics are not inferior; they have the same dose, same ingredient and same absorption rate (from bioavailability and bioequivalence tests). It would be good to encourage patients using generics as a long-term plan. In addition, the results from one set of knowledge questions in this study investigated how the respondents understood the similarities and differences between brand name and generic drugs. However, only some of the questions were answered correctly by a predominance of respondents although they have heard about these two types of drugs. This indicates that there is a gap between awareness and understanding about this topic.

Below list several suggestions for action about the policy implications in Taiwan derived from this study.

1. First, it would be good to educate about or promote the message of substitutability between brand name and generics (such the similarities and difference knowledge questions in this study), especially to Taiwanese consumers with low knowledge, and particularly those who are likely to be among the older population with lower education. In this study, lower

knowledge respondents usually had positive attitudes toward the brand name version of medications; they perceived them more effective and higher quality. The best way to achieve this may be by engaging multiple roles and collaboration of various healthcare professionals (such as physicians or pharmacists) with government administrators. In addition to the traditional face-to-face medium by physicians or pharmacists, government administrators could implement promotion about the same ingredients and substitutability between brand name and generics for communications in multiple channels, such as traditional media (TV, radio, newspapers), the Internet or social media.

2. Physicians have major roles in deciding which medications are to be received by their patients (nurse practitioners or nursing professionals do not prescribe). Physicians need to tell their patients whether the drugs they are prescribing are brand name or generic, and especially if they are going to make a switch from a brand name to a generic version of a drug. Patients have the right to know any changes in their medications and the reasons behind the change.
3. Pharmacists are drug experts and can play essential roles in educating their patients about medications. They can orally inform patients which drugs are brand name or generics when delivering prescription medications at the pharmacy window. In addition, the prescription drug bags can include this information in case patients would like to refer to it in the future, especially for those who have chronic diseases and have many medications. Another point could be to encourage pharmacists to substitute generic medicines for brand name versions. According to Article 26 of the "Regulations Governing the National Health Insurance Medical Care"⁴⁹, if physicians do not indicate the medicines are not substitutable on their prescriptions, pharmacists or pharmacist assistants can substitute prescriptions with other

medications of the same ingredient, the same dosage form, and the same dosage at the same or lower prices than price of the original prescriptions. Government administrators could encourage pharmacists by granting them more power and responsibilities in a situation of potential generic switch. However, pharmacists will need to work together with physicians to discuss how to achieve this because pharmacists would respect physicians' opinions; physicians understand patients' medical conditions better. Once pharmacists can do more generic switches for patients, they should be able to explain generics to patients who have doubts about the use of generics.

4. The use of generic drugs also has financial interests for hospitals or physicians. Some hospitals in Taiwan already had encouraged physicians to prescribe generics⁵⁰. For example, in order to encourage physicians to prescribe more desired medicines, Chang Gung Hospital modified their computer system so that when physicians choose medications from the computer screen, a small window will pop up to remind physicians to prescribe more generics by stating "please give priority to consideration". If the physicians insist on using the "original drugs", they have to provide explanations. This is also what the government expects from hospitals to use more generic drugs for cost saving. Hospitals are beginning to use more generic drugs for their financial benefits (to keep costs within lowered reimbursements) as well responding to encouragement from the government. However, not all physicians would totally agree with this, some physicians still prefer brand name drugs. Physicians still have the right to decide which medications to prescribe based on patients' conditions, especially for narrow therapeutic index drugs.
5. In this survey, about one-third of respondents that had experienced a generic switch perceived less effectiveness, adverse events or fewer benefits after the switch. Regardless

whether they had a presumption that generics were inferior or had existing negative attitudes (they might have), this proportion of patients should not be ignored. It could be a warning that generic drugs were not really working appropriately due to a lack of rigorous regulations, such as bioavailability and bioequivalence and if so, government administrators have to face this issue. If more and more brand name drug manufacturers leave the Taiwan drug market, it can harm the consumer rights to use medications that they need or prefer. For patients who experienced generic switch but did not benefit from it, government administrators may consider requesting the hospitals switch to other less expensive brand name drugs if such exist, or there could be a subsidy for the more expensive brand name drug.

6. Technology in new drug development has been advancing unprecedentedly. For example, cancer prevalence in Taiwan has been increasing in recent years and there have been a lot of investments in R&D for new drug development, especially for brand name innovative drugs such as immunotherapy or target therapy. The high costs of these drugs most likely would be a financial burden for NHI in the future. The NHI might not be able to cover some of the most expensive drugs, so the responsibilities to pay for brand name drugs out-of-pocket most likely would be transferred to patients over time. To reduce the financial burden for paying for brand name drugs for patients, it should be a priority for government administrators to audit and regulate the approval of less expensive generic drugs once the patents are ready to expire so that patients can have access to generics promptly. Another way to is to use less expensive brand name substitutes if they are available while the expensive brand name drugs are still on patent protections.

7. Last, if NHI wants to re-implement a similar program to have patients pay the difference for brands, right now it seems like that would not be consistent with consumer preferences. It is better to wait until consumers can feel comfortable about generics by changing their perceptions and attitudes. After consumers are more knowledgeable about brand name and generic drug similarities (and equivalence), experience with generic drugs can be promoted. Then, successful experiences with generic drugs can be communicated by word-of-mouth when more consumers have taken them and they feel generics work well. Some respondents who have better attitudes to brands from the survey indicated that they would not mind trying generics if they work. To build confidence with consumers, both education and experiences may need to occur so consumer perceptions and attitudes towards generic drugs fully change.

Study limitations

Sampling and data issues were predominant limitations in the study.

Sampling

Discrepancies between different hospitals in sampling and access to patients could affect the survey results. Although this survey applied purposive sampling, the onsite survey implementations were restrained by IRB regulations in each hospital that affected how the survey would be implemented. For example, the IRB at CMUH was stricter and the survey poster in actual size had to be approved (not just the poster in PowerPoint format), so the poster was not displayed on survey site because there was not time to wait for the approval. In addition, the PI from CMUH allowed the researcher to do the survey only in part of the medical buildings where no major pharmacy was located. The researcher surveyed patients from the waiting area near clinics rather than by the major pharmacy.

Due the limited resources, although the study population of interest was the general population in Taiwan, it was not possible to conduct a comprehensive national survey. The study was done only in several hospitals that the researcher was able to access. The potential bias of looking for survey subjects from hospital visits was that they were more knowledgeable, but potentially not representative of and the results are not necessarily generalizable to the general Taiwan population. It is likely that people in remote areas are underrepresented in the results. The remote areas are difficult to reach because two third of the Taiwan territory is mountainous. People that live in the remote area are less qualified because they are likely to be isolated and less educated, sampling them is not efficient in time and budget. Whether and how their perceptions may vary from those in the sample is unknown.

Data

Since the majority of the survey items yielded categorical data or were derived into categories, data analysis was limited to cross-tabulations and non-parametric Chi squared analysis. Causal relationships were not explored or established with different potential statistical analyses, such as regression models, factor analysis, or structural equation modeling.

The small sample size for respondents who had experienced a generic switch was a limitation. This was an expected phenomenon, given the corresponding low numbers of such subjects from other studies. Also, lower proportions of respondents who reported having experience with being prescribed brand names or generics reduced usable samples as mentioned earlier.

There were some inconsistencies between experiences and perceptions that may have affected subject responses. Patients might have many opinions and might present conflicting

answers about generic switch or paying out-of-pocket costs for brand name drugs. For example, patients may have a perception of not being willing to switch in their mind, but may accept if the physician explains about the switch. It could be because if they feel their physicians are really good, their recommendations would be likely taken by the patients. Some people may have been unsure about the switch, but willing to give it a try and see if it is good.

One limitation is specific to the NT\$500 assumption in the scenario about paying for a brand name drug if it was not covered by NHI. The amount was set arbitrarily and as suggested by some in the pre-test, there were respondents who said that this amount would not prevent them from choosing brand name drugs because they had no problem in affordability. Even though they accepted generic drugs, they also agreed to being willing to pay NT\$500 for the brand name drug. That arbitrary NT\$500 amount could contribute to inconsistent results in perceptions or attitudes. If a different monetary amount was used, it could change the number of subjects accepting it as willingness to pay for the brand name drugs. NT\$500 may still not be a bad choice for the survey; the amount could also be affected by some factors such as geographic regions or income, and it was difficult to set an optimal amount to fit all cases. Using an open-ended willingness-to-pay technique could be used to examine the optimal amount, but it is beyond the study objectives.

CHAPTER 7

CONCLUSION

This research study is a pioneer in exploring Taiwanese consumers' cognitive factors of perceptions, attitudes and thoughts about brand name and generic drugs. An initial discovery during the survey implementation was that many of the patients that the researcher contacted claimed to have not heard anything about brand name and generic drugs. Even some of the patients that had heard of these drugs could not say much about their details or even had misconceptions.

Several findings might be considered meeting preconceived expectations. For example, perceptions or attitudes that favored brand name or generic drugs were correlated with each other in the anticipated directions. That is probably because brand name and generic drugs are also consumer products, so some concepts from consumer behavior could be applied in this study.

However, unlike other common types of merchandise, prescription medications have unique characteristics. In particular, that consumers are not able to purchase prescription drugs easily; they have to get them through orders from physicians who are the main decision makers and control what medications to prescribe. Information asymmetry arises between physicians and patients if physicians do not actively discuss the details about their drugs to their patients. Most patients have never heard of brand name or generic drugs so that they seldom ask their doctors about this information. Unless physicians take actions to switch medications to generics, patients would not learn from their experiences.

The study also provides insights about experiences from the subgroups that did have brand name or generic drugs prescribed for them. Because not many respondents had experience with brand name or generic drugs, and further with a switch from a brand name drug to a

generic, the analyses focused on connections of patient experiences with other factors were exploratory.

More individuals had positive perceptions of effectiveness and quality, plus attitudes toward brand name drugs. The perceptions and attitudes were related to thoughts about accepting a generic drug switch or paying out-of-pocket for brand name drugs and the relationships tended to be stronger for attitudes. There also were relationships between respondent knowledge levels and perceptions of effectiveness and quality for brand name and generic drugs, and similar but often stronger relationships with attitudes.

Although a comprehensive survey for the whole population in Taiwan was not feasible and the survey was implemented only in several selected regions, this study still provides some insights about how patients knew, felt, thought and experienced brand name and generic drugs. The results will contribute to future research.

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APPENDICES

Appendix 1: IRB application

Two levels of IRB applications were required for the study, approval from the researcher's institution (UW-Madison) and local approvals at the three study sites. The approved study procedures needed to be consistent across both levels of approval and the final UW approval was contingent on the local hospital approvals.

At Chien-Yu Hospital, a formal IRB application was not necessary. The hospital was smaller and not routinely involved as a site for research studies. The study contact, Yi-Lang Hsu was a top official at the hospital and he provided permission for the study after reviewing the study proposal and getting questions answered by the researcher. He also served as the local PI for the study and was noted as the local contact for subject questions about the study in the cover letter. A permission letter from him to conduct the study in the hospital was sufficient for the UW approval for that site. The other two hospitals had formal IRB procedures that the researcher complied with to get approval for the study. Key aspects of those procedures are highlighted below.

According to the IRB rules, non-hospital employees were not allowed to be the hosts, liaisons or PIs of studies conducted in their institutions. Therefore, the researcher for this study could only be the co-PI at most and a local PI was required. That affected which hospitals were considered as sites for the study and narrowed the potential hospitals to those where prior connections were available with individuals that could serve as PIs. The study host needed to be an employee of the medical institution and a requirement to be a PI was to have received nine hours of ethics related training courses on clinical trials in the recent three years. At China Medical University Hospital, Yu-Chieh (Jack) Chen served as the local PI. He was a former graduate student at UW-Madison, known to the researcher, and he had the same advisor as the

researcher (Dr. Kreling). He was qualified as a PI in his hospital. At Tri-Service General Hospital, Jue-Zong Yeh served as the local PI and he was referred to the researcher by the researcher's former supervisor, the director of the hospital pharmacy; Mr. Yeh was qualified as a PI in the hospital, but the director was not.

To be a co-PI for research in Taiwan, three hours of ethics related training courses on clinical trials in the recent three years are required, but hours of training are doubled if courses are taken from web training instead of classroom-based training. The researcher completed this training remotely, taking advantage of the web-based option and GCP (Good Clinical Practice) related training certificate copies in pdf were sent in email. Additional training was required so that a total of 9 credits were completed for the specific hospitals. The researcher completed these requirements via two free online courses, one from the Clinical Research Center of National Taiwan University Hospital, and the other from the Clinical Trials Center of China Medical University Affiliated Hospital.

Since the study activities involved interactions and/or communications with human subjects, even if only to obtain informed consent, IRB was required. The IRB review for this study was considered a 'simplified' IRB review because the process of collecting patient data or information did not require comprehensive or invasive research of study subjects; it was considered as a simplified, non-human trial review (not involving new medical technology, pharmaceutical or medical equipment experimental study).

The IRB approvals were done remotely; the researcher did not have to be on-site to submit the application. The online application portal for submitting documents required for hospital IRB was PTMS (Protocol Tracking and Management System) and multiple forms or documents were required for CMUH and TSGH:

- The checklist for simple evaluation for the scope of the study
- Data and safety monitoring program (DSMP) checklist
- New application form
- Simple review evaluation form
- Study plan for this project
- Summary of project (abstract)
- Program PI and co-PI experience and GCP related training certificate copy
- Research team members (including co-host / researcher, etc.) learning experience and GCP related training certificate copies
- A copy of the signed form of "new case application" which the researcher filled out the required information online. The researcher downloaded it and had it signed by the PI.

Appendix 2: Cover letter in English for China Medical University Hospital

BRAND NAME AND GENERIC DRUG SURVEY FOR TAIWANESE

March 2018

Dear ladies/gentlemen,

For many consumers, medications are important for treating their medical conditions. Sometimes, brand name drugs are used and sometimes generic versions of drugs are used in treatment. It would be good for hospital administrators and medical staff to know how people think about brand name and generic drugs.

We are conducting a survey to gather peoples' thoughts about of brand name and generic drugs. There are no direct benefits to participants in this study. However, we hope that the results will increase awareness of consumer views about these types of drugs.

You can help by sharing your thoughts. We invite you to participate in our research project. Your participation in this research project is voluntary. There is no penalty for not participating. The survey will take about 10 minutes to complete. There are no right or wrong answers and you can skip any questions that you do not wish to answer. Individual names will not be gathered and responses will be kept confidential. Your response will be combined with others for analysis and reports of findings.

As a token of our appreciation, you will receive a gift certificate worth NT\$100 when you return your completed survey to the researcher.

If you have any questions concerning the study or in completing the form, please contact the researcher on site or via the email address below. For questions about the rights of research subjects, please contact the Education and Social/Behavioral Science IRB at the University of Wisconsin-Madison by phone at 002-1-608-263-2320 or email at <http://www.irb.wisc.edu>. You also can contact the hospital IRB at China Medical University Hospital (04-22052121 #1923~1927、1929), or you can contact the project host at China Medical University Hospital: Yu-Chieh Chen by phone 04-22052121 #2274 or email at pharmchen@gmail.com.

Thank you for taking time to help us gather these brand name and generic drugs survey data.

Hsingwen Chung, MS

PhD student

School of Pharmacy

University of Wisconsin-Madison, USA

E-mail: chung7@wisc.edu

David H. Kreling, PhD

Professor Emeritus

School of Pharmacy

University of Wisconsin-Madison, USA

E-mail: david.kreling@wisc.edu

Please check the appropriate statement below:

- I am willing to participate and can complete the form.
- I am willing to participate but will need help to read and complete the form.
- I am not interested in participating.

Appendix 3: Cover letter in Chinese for China Medical University Hospital

台灣民眾對原廠藥和學名藥的認知與態度問卷調查

2018年3月

親愛的女士/先生們，

對於許多消費者來說，藥物對於醫治他們的疾病扮演一個重要的角色。消費者有時使用原廠藥，有時使用學名藥替代品做治療。了解消費者如何看待原廠藥和學名藥對於衛生部門行政官員，醫院管理人員和醫務人員來說是有幫助的。

我們正在進行一項問卷調查研究，我們想了解消費者對原廠藥和學名藥的看法。這項研究對參與問卷調查的消費者沒有直接的利益。不過，我們希望這個結果能提高大眾對這類藥物的意識。

您可以通過分享您的想法幫助我們的研究。我們邀請您參與我們的問卷調查。

您有權選擇參加或不參加這個問卷調查。不參加不會有任何形式的懲罰。問卷將需要大約 10 分鐘完成。沒有正確或錯誤的答案，您可以跳過任何您不想回答的問題。個人姓名不會被收集，您的問卷回答將被保密。您的回答與其他人的回答將只會合併起來進行統計分析和研究結果報告用。

為了表示我們的感謝，當您完成問卷交返給研究人員時，您將收到價值 100 新台幣的禮品券(7-ELEVEN)。

如果您有任何關於研究或問卷調查的問題，請在現場或通過下面的電子郵件與研究員聯繫。有關受訪者權利的問題，請聯繫威斯康辛大學-麥迪遜分校的教育和社會行為科學人體試驗審議會(IRB)，電話：002-1-608-263-2320 或電子郵件：<http://www.irb.wisc.edu>。您也可以通過以下電話與中國醫藥大學暨附設醫院研究倫理委員會聯繫：(04-22052121#1923~1927、1929) 或請與計畫主持人陳育傑(04-22052121 #2274, 或電子郵件 pharmchen@gmail.com) 聯繫。

感謝您花時間幫助我們收集消費者原廠藥和學名藥消費者問卷調查資料。

鍾興文
博士候選人
藥學院

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David H. Kreling, PhD

名譽教授
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威斯康辛大學-麥迪遜分校
電子郵件: david.kreling@wisc.edu

請勾選下面的適當聲明:

- 我願意參加並我可以自己填寫問卷。
- 我願意參加，但我需要有人幫助我閱讀和幫助我填寫問卷。
- 我不想參加問卷調查。

Appendix 4: Cover letter in English for Tri-Service General Hospital

BRAND NAME AND GENERIC DRUG SURVEY FOR TAIWANESE

March 2018

Dear ladies/gentlemen,

For many consumers, medications are important for treating their medical conditions. Sometimes, brand name drugs are used and sometimes generic versions of drugs are used in treatment. It would be good for hospital administrators and medical staff to know how people think about brand name and generic drugs.

We are conducting a survey to gather peoples' thoughts about of brand name and generic drugs. There are no direct benefits to participants in this study. However, we hope that the results will increase awareness of consumer views about these types of drugs.

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Thank you for taking time to help us gather these brand name and generic drugs survey data.

Hsingwen Chung, MS
PhD student
School of Pharmacy

University of Wisconsin-Madison, USA
E-mail: chung7@wisc.edu

David H. Kreling, PhD
Professor Emeritus
School of Pharmacy

University of Wisconsin-Madison, USA
E-mail: david.kreling@wisc.edu

Please check the appropriate statement below:

- I am willing to participate and can complete the form.
- I am willing to participate but will need help to read and complete the form.
- I am not interested in participating.

Appendix 5: Cover letter in Chinese for Tri-Service General Hospital

台灣民眾對原廠藥和學名藥的認知與態度問卷調查

2018年3月

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對於許多消費者來說，藥物對於醫治他們的疾病扮演一個重要的角色。消費者有時使用原廠藥，有時使用學名藥替代品做治療。了解消費者如何看待原廠藥和學名藥對於衛生部門行政官員，醫院管理人員和醫務人員來說是有幫助的。

我們正在進行一項問卷調查研究，我們想瞭解消費者對原廠藥和學名藥的看法。這項研究對參與問卷調查的消費者沒有直接的利益。不過，我們希望這個結果能提高大眾對這類藥物的意識。

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感謝您花時間幫助我們收集消費者原廠藥和學名藥消費者問卷調查資料。

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Appendix 6: Cover letter in English for Chien-Yu Hospital

BRAND NAME AND GENERIC DRUG SURVEY FOR TAIWANESE

March 2018

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Hsingwen Chung, MS

PhD student

School of Pharmacy

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Appendix 7: Cover letter in Chinese for Chien-Yu Hospital

台灣民眾對原廠藥和學名藥的認知與態度問卷調查

2018年3月

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感謝您花時間幫助我們收集消費者原廠藥和學名藥消費者問卷調查資料。

鍾興文
博士候選人
藥學院

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請勾選下面的適當聲明:

- 我願意參加並我可以自己填寫問卷.
- 我願意參加，但我需要有人幫助我閱讀和幫助我填寫問卷.
- 我不想參加問卷調查.

Appendix 8: Survey questionnaire in English

BRAND NAME AND GENERIC DRUG SURVEY FOR TAIWANESE

INSTRUCTIONS: Please check or fill in the appropriate blanks and return this survey to the researcher.

Please understand that THIS IS NOT A TEST of your level of understanding about medications (We just want your thoughts.)

SECTION 1: YOUR MEDICINES AND INFORMATION SOURCES

A. Your conditions and medications:

- 1 Are you taking medication(s) for any of the following chronic condition(s)? [check all that apply]

<input type="checkbox"/> High blood pressure	<input type="checkbox"/> Diabetes
<input type="checkbox"/> High cholesterol	<input type="checkbox"/> Metabolism syndrome
<input type="checkbox"/> Cardiovascular disease	<input type="checkbox"/> Stroke/Cerebrovascular disease
<input type="checkbox"/> Allergic rhinitis	<input type="checkbox"/> Chronic respiratory Disease/Asthma/COPD
<input type="checkbox"/> Chronic kidney disease	<input type="checkbox"/> Chronic Arthritis/osteoporosis/Lupus
<input type="checkbox"/> Cancers	<input type="checkbox"/> Chronic liver disease/cirrhosis
<input type="checkbox"/> Depression/anxiety/emotion issue	<input type="checkbox"/> Peptic ulcer/chronic gastritis
<input type="checkbox"/> Parkinson's/Seizure	<input type="checkbox"/> Chronic anemia
<input type="checkbox"/> Glaucoma/cataract/dry eyes,	<input type="checkbox"/> Skin disease, <input type="checkbox"/> Thyroid disease
<input type="checkbox"/> Others (describe) _____	
<input type="checkbox"/> I don't have chronic diseases	
- 2 How many **prescription drug(s)** are you taking for chronic conditions now?
 0, 1-2, 3-5, 6-9 >=10
- 3 In general, how knowledgeable do you feel you are about brand name drugs?
 not at all, a little, some, a lot
- 4 In general, how knowledgeable do you feel you are about generic drugs?
 not at all, a little, some, a lot

B. Source of information:

The left column of the table below lists sources where information about **medicines** can be obtained.

First, please check in the "USED" column any information sources you may have used to find out about brand name or generic drugs. (Select Up to 3)

Second, please check in the "MOST HELPFUL" column the information sources you think are most helpful to find out about brand name or generic drugs. (Select 1 or 2)

Third, please check in the "MOST RELIABLE" column the information sources you think are most reliable or credible to find out about brand name or generic drugs. (Select 1 or 2)

Sources of information about generic drugs or brand name drugs	sources you have USED (Select Up to 3)	sources that are <u>MOST HELPFUL</u> (Select 1 or 2)	sources that are <u>MOST RELIABLE</u> (Select 1 or 2)
--	---	---	--

TV / Radio			
Physicians			
Pharmacists			
Medication package			
The Internet			
Social media(Line, WeChat, Facebook, etc)			
Medical books/Medical magazines			
Newspapers			
Family, Friends			
School education, school courses			
Other (please describe): _____			

SECTION 2: BRANDNAME AND GENERIC DRUG CHARACTERISTICS *

A. Features and characteristics associated with brand name or generic drug?

For each of the characteristics/features listed below, depend on your intuition, check whether you think it is more likely, the same, or less likely to be associated with a brand name drug or generic drug? (Select one response) - please answer each item as possible

- This is not a test, this part is just to understand your perceptions or attitudes to the medications.

Characteristics/features	More likely to be associated with?			
	Brand name drug	Generic drug	Both the same	I don't know
Relieve more symptoms/episodes				
Have higher potency/strength				
have consistent performance				
Higher quality of non-active content				
Looks and feels like a good quality (shape, color, etc.)				
Produced in facilities monitored for quality				
Appropriate in treating serious diseases				
Minimize risk of treatment adverse effect				
I am comfortable to take				
Will make me satisfied				
I have confidence in treating me better				
Have been on the market longer				
Higher familiarity				
Higher prices in the market				
Higher costs to me				
Need R&D to produce				
Has gone through the process of clinical trials				
Strict approval process (licensing)				
Made by reputable manufacturers				

made by foreign manufacturers				
made by domestic Taiwan manufacturers				
Monopoly of manufacturers				
more often prescribed by clinics				
more often prescribed by large hospitals				

***Note: The sequence of the 24 items will be randomly reordered in the Chinese version**

SECTION 3: BRANDNAME AND GENERIC DRUG THOUGHTS/EXPERIENCES

- A. Your thoughts about similarities/differences in brand name drug and generic substitute:** Please check if you agree or disagree with the following statements about the similarities or differences between a brand name and its generic substitute: (Select one response)
- This is not a test, this part is just to understand your perceptions or attitudes to the medications.

Brand name drug and its generic substitute.....	Agree	Disagree	I don't know
are therapeutically interchangeable			
have same dosage			
have the same absorption rate in the blood stream			
have the same active ingredient			
have the same excipient (non-active part)			

B. Your thoughts about brand name to generic drug switch:

Assume you are taking a brand name drug (Drug X) which is working well for your condition, and this Drug X is covered by NHI.

SCENARIO 1: One day, your physician considers switching your brand name Drug X to the same drug but a generic version (generic substitute) of the drug. The generic substitute is covered by NHI (as well for brand name drug Drug X). Based on what your doctor is considering, do you agree or disagree with the following statements? (Select one response for each statement)

	Agree	Disagree	I don't know
I am fine if my physician prescribes a generic substitute for me.			
I only want Drug X, will not accept anything else.			
I'd like to ask another doctor for different opinion or more information.			
I would like to ask my doctor about why he/she proposes (the switch).			

C. Your thoughts about paying your own out-of-pocket cost for your brand name drugs:

Assume you are taking a brand name drug (Drug Y) which is working well for your condition, and this Drug Y is covered by NHI.

SCENARIO 2: One day, your physician tells you that your brand name drug Y will not be in the hospital formulary, only the same drug but a generic version (generic substitute of the drug) would be covered by NHI in your hospital. That means if you want to continue taking brand name Drug Y you would have to pay an additional \$500 per month. What are your thoughts about the following statements? (Select one response for each statement)

	Agree	Disagree	I don't know
I would pay out-of-pocket costs \$500 for brand name drug (Drug Y) even though Drug Y is not covered by NHI. I would not accept anything else.			
I would accept a different brand name drug as long as it is covered by NHI.			
I would accept a generic substitute. (replace Drug Y)			
I would consider looking for the brand name drug (Drug Y) covered by NHI in other hospitals or pharmacies.			

D. Experiences of brand name and generic drugs

1. Have you ever been prescribed generic drug(s)? _____ Yes, _____ No, _____ Not Known

2. Have you ever been prescribed brand name drug(s)?

Yes, No (go to sec. 4, next page), Not Known (go to sec. 4, next page)

i. If Yes for b), has any of your brand name drug(s) **not been covered** by NHI?

_____ Yes, _____ No (go to iii), _____ Not Known (go to iii)

ii. If Yes for b), have you ever paid for this (these) brand name drug(s) on your own expenses?

Yes, No (go to iii), Not Known (go to iii)

1. If Yes for ii, what's your perception of financial burden to pay on your own expenses for this (these) brand name drug(s)?

_____ Low financial burden, _____ Medium financial burden,

_____ High financial burden, _____ Not known

2. If Yes for ii, select **one or two** main reason(s) for your willingness to pay on your own expenses:

_____ prior experiences, _____ better quality, _____ more effective,

_____ physician recommends, _____ better value,

_____ less adverse effects, _____ others (please describe) _____

iii. Has your doctor ever switched your brand name drugs to generics?

Yes, No, Not Known

If Yes for iii, please compare the differences you perceive after switching to generic drug: (Select one response)

1. Therapeutic effects: _____ worse, _____ No different, _____ better

2. Adverse effects: _____ less often, _____ No different, _____ more often

SECTION 4: INFORMATION ABOUT YOURSELF

These questions are about you and help us analyze the results. Check the space next to your response or write your answer in the space provided. If any questions are not applicable to you, please feel free to leave them blank.

1. How many prescription drugs are you getting today? (you can check your prescription)

_____ drugs

2. How much did you pay for your prescription drugs today? (you can check your receipt)

_____ NT \$0, _____ NT \$1-20, _____ NT \$21-40, _____ NT \$41-60,
 _____ NT \$61-80, _____ NT \$81-100, _____ NT \$101-120
 _____ NT \$121-140, _____ NT \$141-160, _____ NT \$161-180
 _____ NT \$181-200, _____ equal or larger than NT \$201

3. What is your age? _____ Years

4. Please identify highest educational experience you have completed/earned?

_____ Elementary school _____ Junior high school
 _____ Senior high school _____ Associated Bachelor
 _____ Bachelor _____ Masters/ PhD
 _____ Other (describe) _____

5. What is your gender? _____ Male _____ Female

6. What is your monthly household income?

_____ Equal or less than NT\$30,000, _____ NT\$30,001 – NT\$45,000
 _____ NT\$45,001 – NT\$60,000, _____ NT\$60,001 – NT\$75,000
 _____ NT\$75,001 – NT\$90,000, _____ NT\$90,001 – NT\$105,000
 _____ NT\$105,001 – NT\$120,000 _____ equal or higher than NT\$120,001

7. Have you had any medical / healthcare / pharmacy related work experiences?

_____ Yes, _____ No

8. Have you had any medical / healthcare / pharmacy related educational background?

_____ Yes, _____ No

9. Have you had any family members, friends who have worked in medical / healthcare / pharmacy related work experiences? _____ Yes, _____ No

10. Have you had any family members, friends who have medical / healthcare / pharmacy related educational backgrounds? _____ Yes, _____ No

11. Geographic location:

What is your current primary residence?
 _____ city, or _____ county

12. What is your marital status?

_____ single (never married), _____ separated/ divorced, _____ married, _____ widowed

**Please return your completed form to the researcher.
 THANK YOU VERY MUCH FOR YOUR HELP!**

Appendix 9: Survey questionnaire in Chinese

台灣民眾對原廠藥和學名藥的認知與態度問卷調查

說明:請將認為適合您的答案勾選或填寫在適當的空白處,完成後將問卷交給研究人員

請注意: 這問卷不是測試你對藥物的了解程度(我們只是希望知道你對藥物的看法)

第一部分：您的用藥及用藥資訊來源

A. 關於您的健康狀況及用藥:

a. 您是否正在服用以下任何慢性疾病的藥物? [請勾選以下所有可能的選項]

高血壓, 糖尿病, 高膽固醇, 代謝綜合症狀群
 心血管疾病, 中風/腦血管病, 過敏性鼻炎, 癌症
 慢性腎臟病, 慢性貧血, 帕金森/癲癇, 消化性潰瘍/慢性胃炎
 慢性肝病/肝硬化, 青光眼/白內障/乾眼, 慢性關節炎/骨質疏鬆/紅斑狼瘡,
 抑鬱/焦慮/情緒問題, 慢性呼吸系統疾病/氣喘/慢性阻塞性肺病,
 皮膚病, 甲狀腺疾病, 其他(請描述): _____,
 我沒有慢性疾病

b. 您現在服用多少種慢性疾病的處方藥物?

0, 1-2 種, 3-5 種, 6-9 種, 10 種或 10 種以上

c. 一般來說,您對原廠藥了解多少?

完全不知道, 知道很少, 知道一些, 知道很多

d. 一般來說,您對學名藥了解多少?

完全不知道, 知道很少, 知道一些, 知道很多

B. 藥物知識來源:

下表左欄列出了消費者可以獲得藥物知識的來源。

首先,請在行 A 下勾選您“**曾經用過**”有關原廠藥或學名藥的知識來源(最多選三個)

其次,請在行 B 下勾選您認為“**最有幫助**”的原廠藥或學名藥的知識來源(選一或兩個)

第三,請在行 C 下勾選您認為“**最可信賴**”的原廠藥或學名藥的知識來源(選一或兩個)

	A	B	C
藥品資訊的來源	您 曾經用過的 資訊 (最多選三個)	您認為 最有幫助的 資訊 (選一或兩個)	您認為 最可信賴的 資訊 (選一或兩個)
電視/電台			

醫師			
藥劑師			
藥物包裝			
網際網路(新聞,網路搜索)			
社交媒體(Line/微信/臉書,等)			
醫藥書籍/醫藥雜誌			
報紙			
家人/朋友			
學校教育, 學校課程			
其他(請描述): _____			

第二部分：原廠藥和學名藥的性質/特性

B. 原廠藥或學名藥有關聯的性質/特性:

下表左欄列出的這些藥品的性質/特性, 在每一項後請您勾選(憑你的直覺)認為這性質或特性比較傾向於像是原廠藥, 或比較像是學名藥, 或兩者都是? (每項請勾選一個, 請盡可能回答每一項)

- 這部分不是考試, 我們只是想了解你對藥物的看法或態度。

藥品的性質/特性	左列藥品的性質/特性您認為比較像是哪一個?			
	原廠藥	學名藥	兩者都是	我不知道
較能夠有效減輕症狀發作				
藥品須通過臨床試驗				
大型醫院開的比較多				
用品質控管良好的設備製造的藥物				
效果一致, 每次服用都可以達到治療效果				
價格高的藥				
由國內台灣藥廠製造				
會讓我放心服用				
診所開的比較多				
製造商壟斷的藥品市場				
從外觀和感覺(形狀, 顏色等) 像是品質好的藥				
會讓我有信心治療我的疾病				

需要投入經費做研究發展才能生產				
產生副作用的風險較低				
會讓我滿意治療結果				
讓我花較多的錢才能買到的藥				
適合於治療嚴重疾病				
具有高品質賦形劑(非有效成分)的藥品				
經過嚴格審查程序(許可證)才能上市的藥品				
由有信譽的藥廠製造				
在市場比較久的藥品				
較為消費者熟悉的藥品				
藥效較強的藥物				
由國外藥廠製造				

第三部分：原廠藥及學名藥的看法和服用經驗

A. 您對原廠藥與其替代的學名藥之間的相似或差異性的看法:

下面 5 個問題問您關於原廠藥與其學名藥替代品之間的相似或差異性。請您勾選同意或不同意, 或者不知道。(對於每個陳述,請只勾選一個)

- 這部分不是考試, 我們只是想了解你對藥物的看法或態度

	同意	不同意	我不知道
原廠藥及其替代的學名藥兩者在治療上可互相替代			
原廠藥及其替代的學名藥具有相同的劑量			
原廠藥及其替代的學名藥在血液中的吸收速率相同			
原廠藥及其替代的學名藥具有相同的有效成分或活性成分			
原廠藥及其替代的學名藥具有相同的賦形劑(非活性部分)			

B. 關於您對原廠藥換學名藥的想法:

假設您正在服用一種原廠藥(X 藥), 治療你的疾病效果不錯, 此 X 藥有健保給付, 假設發生以下情形:

情形 1：有一天如果您的醫生考慮把您的原廠藥(X 藥)換成同成分學名藥替代品, 這個學名藥替代品有健保給付(原廠藥 X 藥也有健保給付)。針對您的醫生這種換藥的想法, 您同不同意以下幾個描述?
(對於每個陳述,請只勾選一個)

	同意	不同意	我不知道
如果我醫生把我的原廠藥 X 藥換成學名藥替代品,我會接受			
我只要 X 藥,別牌子的原廠藥或學名藥我都不會接受			
我會詢問另一位醫生的意見,看法或資訊			
如果我的醫生想將我的原廠藥 X 藥換成學名藥,我會問我的醫生為什麼要這樣做			

C. 關於您對自費支付原廠藥的想法:

假設您正在服用一種原廠藥(Y 藥)治療疾病效果不錯,此 Y 藥有健保給付,假設發生以下情形:

情形 2: 有一天如果您的醫生告訴您,您原廠藥 Y 已經不在這家醫院處方集,所以原廠藥 Y 藥要變成自費支付(但是 Y 藥的學名藥替代品仍然有健保給付)。所以如果您要繼續服用**原廠藥 Y**,您必須每月多支付新台幣\$ 500 元。您同不同意以下幾個描述?(對於每個陳述,請只勾選一個)

	同意	不同意	我不知道
如果我的原廠藥 Y 沒有健保給付,我會自費支付\$500 元去拿到原廠藥 Y, 不會接受別牌子的原廠藥或學名藥			
我會接受別牌子的原廠藥, 只要這個藥有健保給付。			
我會接受一個學名藥替代品(取代原廠藥 Y 藥)			
如果原廠藥 Y 在其他醫院或藥局有健保給付,我會考慮在那購買 Y 藥			

D. 關於您原廠藥與學名藥的經驗:

1. 您的醫生是否曾經開學名藥給您? ___有, ___沒有, ___不知道
2. 您的醫生是否曾經開原廠藥給您?

有, 沒有(跳到下面第四部分), 不知道(跳到下面第四部分)

- i. 如果您 b) 回答"有", 您是否曾經有任何原廠藥健保**不**給付?

___是, ___否, ___不知道

- ii. 如果您 b) 回答"有", 您是否曾經**自費支付**差額去得到這個原廠藥?

有, 沒有(跳到下面 iii), 不知道(跳到下面 iii)

1. 如果您 ii 回答"有", 您覺得這自費支付原廠藥對您的財務負擔如何?(請只勾選一個)

___財務負擔大, ___財務負擔中等, ___財務負擔小, ___不知道

2. 如果您 ii 回答"有",您願意自費支付原廠藥的理由(勾選一個或兩個)

___過去服用的經驗, ___品質較好, ___治療效果較好, ___醫生推薦

___高價值, ___怕其他藥有副作用, ___其他(請描述_____)

- iii. 您的醫生有沒有曾經把您的原廠藥換成學名藥?

有, 沒有(跳到下面第四部分), 不知道(跳到下面第四部分)



如果您 iii 回答"有",請比較您換成學名藥後感覺到的差異:(請只勾選一個)

1. 治療效果: ___更差, ___沒有不同, ___更好

2. 不良副作用: ___較少, ___沒有不同, ___更多

第四部分：我們想請教一些個人的問題

這些問題是關於你的基本資訊,這資料可以幫助我們統計結果分析。勾選問題旁邊的空格,或在提供的空格中寫下您的答案。請跳過如果有任何問題不適用於您。

1. 您今天拿了幾種處方藥?(您可以看一下你的處方籤):

___種

2. 您今天為你的處方藥付了多少錢新台幣?(您可以看一下你的收據):

___ \$0, ___ \$1-20, ___ \$21-40, ___ \$41-60,

___ \$61-80, ___ \$81-100, ___ \$101-120, ___ \$121-140,

___ \$141-160 ___ \$161-180, ___ \$181-200, ___ 等於或高於 \$201

3. 您今年幾歲(實歲): ___歲

4. 您已完成/獲得的最高學歷:

___小學, ___初中, ___高中/高職 ___專科(五專,二專)

___大學, ___碩士/博士, ___其他(請描述)_____

5. 您的性別:

___男, ___女

6. 您的家庭月收入(新台幣):

___等於或少於\$ 30,000 ___ \$ 30,001 - \$ 45,000

___ \$ 45,001 - \$ 60,000 ___ \$ 60,001 - \$ 75,000

___ \$ 75,001 - \$ 90,000 ___ \$ 90,001 - \$ 105,000

____ \$ 105,001 - \$ 120,000 ____ 等於或高於 \$ 120,001

7. 您是否有從事過與醫療/保健/藥業相關的職業?
____ 是, ____ 否
8. 您是否有醫療/保健/藥業有關的教育背景? ____ 是, ____ 否
9. 您是否有家人或朋友有從事過與醫療/保健/藥業相關的職業? ____ 是, ____ 否
10. 您是否有家人或朋友有醫療/保健/藥業有關的教育背景? ____ 是, ____ 否
11. 您現在的主要住所是什麼城市/縣: ____ 市,或 ____ 縣
12. 您的婚姻: ____ 單身(從未結婚), ____ 分居/離婚, ____ 已婚, ____ 喪偶

請交回你的問卷。非常感謝您的協助！

我們會送您新台幣\$100 元禮券

Appendix 10: Details in summary for responses in Section 1 and Section 4 (N,%)

	T total N=517 (100%)	TSGH N=200 (38.7%)	CMUH N=203 (39.3%)	CYH N=114 (22.0%)
Chronic Diseases				
High blood pressure	93 (18.0)	41 (20.5)	35 (17.2)	17 (14.9)
Diabetes	38 (7.4)	15 (7.5)	17 (8.4)	6 (5.3)
High cholesterol	44 (8.5)	25 (12.5)	15 (7.4)	4 (3.5)
Metabolism syndrome	8 (1.6)	4 (2.0)	4 (2.0)	0 (0)
Cardiovascular disease	35 (6.8)	14 (7.0)	16 (7.9)	5 (4.4)
Stroke/Cerebrovascular disease	5 (1.0)	3 (1.5)	2 (1.0)	0 (0)
Allergic rhinitis	27 (5.2)	6 (3.0)	14 (6.9)	7 (6.1)
Cancers	18 (3.5)	5 (2.5)	12 (5.9)	1 (0.9)
Chronic kidney disease	14 (2.7)	6 (3.0)	6 (3.0)	2 (1.8)
Peptic ulcer/chronic gastritis	31 (6.0)	12 (6.0)	13 (6.4)	6 (5.3)
Chronic anemia	6 (1.2)	2 (1.0)	3 (1.5)	1 (0.9)
Parkinson's/Seizure	3 (0.6)	2 (1.0)	0 (0)	1 (0.9)
Chronic liver disease/cirrhosis	19 (3.7)	8 (4.0)	8 (3.9)	3 (2.6)
Glaucoma/cataract/dry eyes	15 (2.9)	10 (5.0)	4 (2.0)	1 (0.9)
Depression/anxiety/emotion issue	16 (3.1)	10 (5.0)	4 (2.0)	2 (1.8)
Chro. Arthritis/osteoporosis/Lupus	15 (2.9)	7 (3.5)	3 (1.5)	5 (4.4)
Chro. resp. Diz/Asthma/COPD	13 (2.5)	3 (1.5)	8 (3.9)	2 (1.8)
Skin disease	12 (2.3)	4 (2.0)	5 (2.5)	3 (2.6)
Thyroid disease	15 (2.9)	7 (3.5)	5 (2.5)	3 (2.6)
Nerve system	1 (0.2)	1 (0.5)	0	0
immune system	1 (0.2)	1 (0.5)	0	0
Dry symptom	2 (0.4)	1 (0.5)	1 (0.5)	0
Loss of memory	1 (0.2)	1 (0.5)	0	0
Immune system deficiency	1 (0.2)	1 (0.5)	0	0
Prostate disease	1 (0.2)	1 (0.5)	0	0
Rheumatic immune disease	1 (0.2)	1 (0.5)	0	0
Gout	3 (0.6)	1 (0.5)	1 (0.5)	1 (0.9)
Large Prostate	1 (0.2)	1 (0.5)	0	0
Seizure	1 (0.2)	0	0	1 (0.9)
Bladder inflammation	1 (0.2)	0	0	1 (0.9)
Hormone issue	1 (0.2)	0	1 (0.5)	0
Sleep problem	1 (0.2)	0	1 (0.5)	0
Lymph node inflammation	1 (0.2)	0	1 (0.5)	0

Nerve problem/right shoulder	1 (0.2)	0	1 (0.5)	0
Menopause	1 (0.2)	0	1 (0.5)	0
Number of Rx for chronic diseases				
No prescriptions	274 (53.0)	89 (44.5)	111 (54.7)	74 (64.9)
1-2 prescriptions	142 (27.5)	67 (33.5)	54 (26.6)	21 (18.4)
3-5 prescriptions	73 (14.1)	33 (16.5)	25 (12.3)	15 (13.2)
6-9 prescriptions	19 (3.7)	7 (3.5)	9 (4.4)	3 (2.6)
10 or above	8 (1.6)	4 (2.0)	4 (2.0)	0 (0)
Missing	1 (0.2)	0 (0)	0 (0)	1 (0.9)
How much do you know about brand name drugs?				
Not at all	49 (9.5)	14 (7.0)	9 (4.4)	26 (22.8)
A little	221 (42.8)	84 (42.0)	92 (45.3)	45 (39.5)
Some	228 (44.1)	92 (46.0)	98 (48.3)	38 (33.3)
A lot	13 (2.5)	5 (2.5)	4 (2.0)	4 (3.5)
Missing	6 (1.2)	5 (2.5)	0 (0.9)	1 (0.9)
How much do you know about generic drugs?				
Not at all	87 (16.8)	28 (14.0)	26 (12.8)	33 (28.9)
A little	214 (41.1)	84 (42.0)	90 (44.3)	40 (35.1)
Some	197 (38.1)	78 (39.0)	84 (41.4)	35 (30.7)
A lot	12 (2.3)	5 (2.5)	3 (1.5)	4 (3.5)
Missing	7 (1.4)	5 (2.5)	0 (0)	2 (1.8)
Source of information (Used)				
TV / Radio	131 (25.3)	44 (22.0)	58 (28.6)	29 (25.4)
Physicians	356 (68.9)	142 (71.0)	133 (65.5)	81 (71.1)
Pharmacists	199 (38.5)	75 (37.5)	79 (38.9)	45 (39.5)
Medication package	113 (21.9)	48 (24.0)	33 (16.3)	32 (28.1)
The Internet	154 (29.8)	59 (29.5)	67 (33.0)	28 (24.6)
Social media(Line, WeChat, FB, etc)	24 (4.6)	12 (6.0)	7 (3.5)	5 (4.4)
Medical books/Medical magazines	121 (23.4)	59 (29.5)	47 (23.2)	15 (13.2)
Newspapers	43 (8.3)	16 (8.0)	18 (8.9)	9 (7.9)
Family, Friends	115 (22.2)	46 (23.0)	44 (21.7)	25 (21.9)
School education, courses	33 (6.4)	18 (9.0)	9 (4.4)	6 (5.3)
other	1 (0.2)	0 (0)	0 (0)	1 (0.9)
Source of information (Helpful)				
TV / Radio	43 (8.3)	13 (6.5)	16 (7.9)	14 (12.3)
Physicians	345 (66.7)	128 (64.0)	133 (65.5)	84 (73.7)

Pharmacists	163 (31.5)	61 (30.5)	70 (34.5)	32 (28.1)
Medication package	64 (12.4)	29 (14.5)	20 (9.9)	15 (13.2)
The Internet	85 (16.4)	41 (20.5)	36 (17.7)	8 (7.0)
Social media(Line, WeChat, FB, etc)	8 (1.6)	2 (1.0)	4 (2.0)	2 (1.8)
Medical books/Medical magazines	92 (17.8)	41 (20.5)	34 (16.8)	17 (14.9)
Newspapers	12 (2.3)	6 (3.0)	4 (2.0)	2 (1.8)
Family, Friends	18 (3.5)	4 (2.0)	7 (3.5)	7 (6.1)
School education, courses	24 (4.6)	13 (6.5)	6 (3.0)	5 (4.4)
other	3 (0.6)	0 (0)	1 (0.5)	2 (0.9)
Source of information (Reliable)				
TV / Radio	20 (3.9)	5 (2.5)	9 (4.4)	6 (5.3)
Physicians	405 (78.3)	154 (77.0)	159 (78.3)	92 (80.7)
Pharmacists	178 (34.4)	69 (34.5)	75 (37.0)	34 (29.8)
Medication package	34 (6.6)	20 (10.0)	7 (3.5)	7 (6.1)
The Internet	27 (5.2)	11 (5.5)	14 (6.9)	2 (1.8)
Social media(Line, WeChat, FB, etc)	1 (0.2)	0 (0)	1 (0.5)	0 (0)
Medical books/Medical magazines	58 (11.2)	26 (13.0)	25 (12.3)	7 (6.1)
Newspapers	4 (0.8)	3 (1.5)	0 (0)	1 (0.9)
Family, Friends	14 (2.7)	4 (2.0)	5 (2.5)	5 (4.4)
School education, courses	18 (3.5)	9 (4.5)	5 (2.5)	4 (3.5)
other	4 (0.8)	0 (0)	2 (1.0)	2 (0.9)
Age (mean, standard deviation)	48.2 (14.4)	48.3 (14.5)	47.4 (12.8)	49.5 (16.7)
Gender				
Male	227 (43.9)	79 (40)	103 (50.7)	45 (39.5)
Female	270 (52.2)	110 (55)	99 (48.8)	61 (53.5)
Missing	20 (3.9)	11 (5)	1 (0.5)	8 (7.0)
Income				
≤NT\$30,000	84 (16.3)	25 (12.5)	30 (14.8)	29 (25.4)
NT\$30,001 – NT\$45,000	95 (18.4)	24 (12.0)	35 (17.2)	36 (31.6)
NT\$45,001 – NT\$60,000	87 (16.8)	17 (8.5)	44 (21.7)	26 (22.8)
NT\$60,001 – NT\$75,000	50 (9.7)	25 (12.5)	18 (8.9)	7 (6.1)
NT\$75,001 – NT\$90,000	49 (9.5)	23 (11.5)	19 (9.4)	7 (6.1)
NT\$90,001 – NT\$105,000	36 (7.0)	21 (10.5)	13 (6.4)	2 (1.8)
NT\$105,001 – NT\$120,000	33 (6.4)	18 (9.0)	11 (5.4)	4 (3.5)
> NT\$120,001	57 (11.0)	32 (16.0)	23 (11.3)	2 (1.8)
Missing	26 (5.0)	15 (7.5)	10 (4.9)	1 (0.9)

Education				
Elementary school	21 (4.1)	5 (2.5)	3 (1.5)	13 (11.4)
Junior high school	18 (3.5)	5 (2.5)	7 (3.5)	6 (5.3)
Senior high school	114 (22.1)	48 (24.0)	41 (20.2)	25 (21.9)
Associated Bachelor	109 (21.1)	32 (16.0)	56 (27.6)	21 (18.4)
Bachelor	188 (36.4)	80 (40.0)	64 (31.5)	44 (38.6)
Masters/PhD	66 (12.8)	29 (14.5)	32 (15.8)	5 (4.4)
Missing	1 (0.2)	1 (0.5)	0 (0)	0 (0)
Region				
Chiayi	3 (0.6)	0	2 (1.0)	1 (0.9)
Chunghua	11 (2.1)	0	9 (4.4)	2 (1.8)
Hsinchu	7 (1.4)	7 (3.5)	0	0
Kaohsiung City	107 (20.7)	6 (3.0)	1 (0.5)	100 (87.7)
New Taipei City	36 (7.0)	35 (17.5)	1 (0.5)	0
Pingdong	4 (0.8)	0	0	4 (3.5)
Taichung City	177 (34.2)	0	177 (87.2)	0
Tainan	4 (0.8)	2 (1.0)	1 (0.5)	1 (0.9)
Taipei City	133 (25.7)	132 (66.0)	0	1 (0.9)
Taoyuan	5 (1.0)	5 (2.5)	0	0
Yunlin	3 (0.6)	1 (0.5)	0	2 (1.8)
Keelung	7 (1.4)	7 (3.5)	0	0
Miaoli	4 (0.8)	1 (0.5)	3 (1.5)	0
Nantou	9 (1.7)	0	9 (4.4)	0
Yilan	1 (0.2)	1 (0.5)	0	0
Missing	6 (1.2)	3 (1.5)	0	3 (2.6)
Marital status				
single (never married)	130 (25.2)	56 (28.0)	48 (23.7)	26 (22.8)
separated / divorced	23 (4.5)	6 (3.0)	10 (4.9)	7 (6.1)
married	357 (69.1)	135 (67.5)	145 (71.4)	77 (67.5)
widowed	5 (1.0)	2 (1.0)	0 (0)	3 (2.6)
Missing	2 (0.4)	1 (0.5)	0 (0)	1 (0.9)
Have you had any medical / healthcare / pharmacy related work experiences?				
Yes	108 (20.9)	39 (19.5)	35 (17.2)	34 (29.8)
No	408 (78.9)	160 (80.0)	168 (82.8)	80 (70.2)
Missing	1 (0.2)	1 (0.5)	0 (0)	0 (0)

Have you had any medical / healthcare / pharmacy related educational background?				
Yes	103(19.9)	43 (21.5)	34 (16.8)	26 (22.8)
No	413(79.9)	156 (78.0)	169 (83.2)	88 (77.2)
Missing	1(0.2)	1 (0.5)	0 (0)	0 (0)
Any family members, friends have worked in medical / healthcare/ pharmacy related work experiences?				
Yes	282(54.6)	110 (55.0)	116 (57.1)	56 (49.1)
No	233(45.1)	88 (44.0)	87 (42.9)	58 (50.9)
Missing	2(0.4)	2 (1.0)	0 (0)	0 (0)
Any family members, friends who have medical / healthcare/ pharmacy related educational backgrounds?				
Yes	286(55.3)	105 (52.5)	120 (59.1)	61 (53.5)
No	228(44.1)	92 (46.0)	83 (40.9)	53 (46.5)
Missing	3(0.6)	3 (1.5)	0 (0)	0 (0)

Appendix 11: Code book

Variable Name	Description	Coding	Notes
ResplD	Respondent Identification	Number on form	
Datesurveyed	Date survey was implemented	mo / day / year	
Section 1			
ChronDiz	Taking medication(s) for any of the following chronic condition(s)	1=High blood pressure 2=Diabetes 3=High cholesterol 4=Metabolism syndrome 5=Cardiovascular disease 6=Stroke/Cerebrovascular disease 7=Allergic rhinitis 8=Cancers 9=Chronic kidney disease 10=Peptic ulcer/chronic gastritis 11=Chronic anemia 12=Parkinson's/Seizure 13=Chronic liver disease/cirrhosis 14=Glaucoma/cataract/dry eyes 15=Depression/anxiety/emotion issue 16=Chronic Arthritis/osteoporosis/Lupus 17=Chronic respiratory Disease/Asthma/COPD 18=Skin disease 19=Thyroid disease 20=Others (describe) 21=I don't have chronic diseases	1A1
NumRx	Number of prescription drug(s) for chronic conditions now	1= 0 2= 1-2 3= 3-5 4= 6-9 5= ≥10	1A2
KnowBrand	knowledgeable about brand name drugs	1=Not at all 2=A little 3=Some 4=A lot	1A3
KnowGen	knowledgeable about generic drugs	1=Not at all 2=A little 3=Some 4=A lot	1A4
SourceInfoUSE1 SourceInfoUSE2 SourceInfoUSE3 SourceInfoHELP1 SourceInfoHELP2 SourceInfoREL1 SourceInfoREL2	sources where information about medicines	1=TV / Radio 2=Physicians 3=Pharmacists 4=Medication package 5=The Internet 6=Social media(Line, WeChat, Facebook, etc) 7=Medical books/Medical magazines 8=Newspapers 9=Family, Friends 10=School education, school courses 11=Other (please describe): _____	1B
Section 2			

FeatureChara			2A
FeatureChara1	1=Relieve more symptoms/episodes		
FeatureChara2	2=Has gone through the process of clinical trials		
FeatureChara3	3=more often prescribed by large hospitals		1=brand name 2=generic name 3=both the same 4=I don't know
FeatureChara4	4=Produced in facilities monitored for quality		
FeatureChara5	5=have consistent performance		
FeatureChara6	6=Higher prices in the market		
FeatureChara7	7=made by domestic Taiwan manufacturers		
FeatureChara8	8=I am comfortable to take		
FeatureChara9	9=more often prescribed by clinics		
FeatureChara10	10=Monopoly of manufacturers		
FeatureChara11	11=Looks and feels like a good quality (shape, color, etc.)		
FeatureChara12	12=I have confidence in treating me better		
FeatureChara13	13=Need R&D to produce		
FeatureChara14	14=Minimize risk of treatment adverse effect		
FeatureChara15	15=Will make me satisfied		
FeatureChara16	16=Higher costs to me		
FeatureChara17	17=Appropriate in treating serious diseases		
FeatureChara18	18=Higher quality of non-active content		
FeatureChara19	19=Strict approval process (licensing)		
FeatureChara20	20=Made by reputable manufacturers		
FeatureChara21	21=Have been on the market longer		
FeatureChara22	22=Higher familiarity		
FeatureChara23	23=Have higher potency/strength		
FeatureChara24	24=made by foreign manufacturers		
Section 3			
	similarities/differences in brand name drug and generic substitute		3A
SimiDiff1	therapeutically interchangeable		1=Agree
SimiDiff2	The same dosage		2=Disagree
SimiDiff3	The same absorption rate in the blood stream		3= I don't know
SimiDiff4	The same active ingredient		
SimiDiff5	The same excipient (non-active part)		
	thoughts about brand name to generic drug switch		3B
SwitchThought1	I am fine if my physician prescribes a generic substitute for me		1=Agree
SwitchThought2	I only want Drug X, will not accept anything else		2=Disagree
SwitchThought3	I'd like to ask another doctor for different opinion or more information		3= I don't know
SwitchThought4	I would like to ask my doctor about why he/she proposes (the switch)		

OOPThought1	thoughts about paying your own out-of-pocket cost for your brand name drugs I would pay out-of-pocket costs \$500 for brand name drug (Drug Y) even though Drug Y is not covered by NHI. I would not accept anything else.		3C
OOPThought2	I would accept a different brand name drug as long as it is covered by NHI.		
OOPThought3	I would accept a generic substitute.(replace Drug Y)		
OOPThought4	I would consider looking for the brand name drug (Drug Y) covered by NHI in other hospitals or pharmacies.		
PrescribGen	Have you ever been prescribed generic drug(s)?	1=Yes 2=No 3= I don't know	3Da
PrescribBrand	Have you ever been prescribed brand name drug(s)?	1=Yes 2=No 3= I don't know	3Db
BrandNotCover	has any of your brand name drug(s) not been covered by NHI?	1=Yes 2=No 3= I don't know	3Dbi
PaidBrand	have you ever paid for this (these) brand name drug(s) on your own expenses?	1=Yes 2=No 3= I don't know	3Dbii
FinanceBurden	perception of financial burden to pay on your own expenses for this (these) brand name drug(s)?	1=Low financial burden 2=Medium financial burden 3=High financial burden 4=Not known	3Dbii1
WTPPaidOOP1 WTPPaidOOP2 WTPPaidOOP3 WTPPaidOOP4 WTPPaidOOP5 WTPPaidOOP6 WTPPaidOOP7	main reason(s) for your willingness to pay on your own expenses	1=prior experiences 2=better quality 3=more effective 4=physician recommends 5=better value 6=less adverse effects 7=others (please describe)	3Dbii2
Switched	Has your doctor ever switched your brand name drugs to generics	1=Yes 2=No 3= I don't know	3Dbiii
SwitchedThera	Therapeutic effects after switching to generic drug	worse=0 no difference=1 better=2	3Dbiii1
SwitchedAdv	Adverse effects after switching to generic drug	less often=0 no difference=1 more often=2	3Dbiii2
Section 4			
RxToday	prescription drugs are you getting today	Just number	1
RxPayToday	How much did you pay for your prescription drugs today?	1=NT \$0 2=NT \$1-20 3=NT \$21-40 4=NT \$41-60, 5=NT \$61-80, 6=NT \$81-100 7=NT \$101-120	2

		8=NT \$121-140 9=NT \$141-160 10= NT \$161-180 11= NT \$181-200 12= ≥ NT \$201	
Age	Age	In years	3
Education	highest educational experience	1=Elementary school 2=Junior high school 3=Senior high school 4=Associated Bachelor 5=Bachelor 6=Masters/ PhD	4
Gender	gender	1 = male, 2 = female	5
Income	monthly household income	1= ≤ NT\$30,000 2= NT\$30,001 – NT\$45,000 3= NT\$45,001 – NT\$60,000 4= NT\$60,001 – NT\$75,000 5= NT\$75,001 – NT\$90,000 6= NT\$90,001 – NT\$105,000 7= NT\$105,001 – NT\$120,000 8= ≥ NT\$120,001	6
MeWork	Have you had any medical / healthcare / pharmacy related work experiences?	1 = yes, 2 = no	7
MeEdu	Have you had any medical / healthcare / pharmacy related educational background	1 = yes, 2 = no	8
OtherWork	Have you had any family members, friends who have worked in medical / healthcare / pharmacy related work experiences?	1 = yes, 2 = no	9
OtherEdu	Have you had any family members, friends who have medical / healthcare / pharmacy related educational backgrounds	1 = yes, 2 = no	10
Region	current primary residence?	city, or county	11
Marital	marital status	1 = single (never married) 2 = separated / divorced 3 = married 4 = widowed	12