

Full Length Research Paper

Factors associated with co-use of Chinese medicine and Western medicine among outpatients: A survey in a medical center of Chinese Medical University hospital of Central-Taiwan

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The purpose of this study is to investigate the factors which are related to the behaviors of patients who visited both Chinese Medicine (CM) clinics and Western Medicine (WM) clinics, as well as using medications of CM and WM in the same day. The questionnaire was developed according to a series of discussions from an expertise group. Two thousand patients who visited outpatient clinics at China Medical University Hospital were randomly selected and recruited voluntarily by interviewers who had been trained in interview skills. The descriptive analysis and stepwise logistic regressions were used. The survey response rate was 78.4% and the average age of participants was 47.3 (SD=16.3) years. Among those who visited WM or CM clinics within past three years (n=1799), 58.6% visited both WM and CM clinics. Females with higher education who were younger than 40 years old and who used more health-related supplements have a significantly higher tendency to visit both kinds of clinics. Those patients with chronic bronchitis, chronic hepatitis, gynecological diseases, allergies and exercise injuries were more likely to visit both clinics. Moreover, among those who visited both clinics (n=1054), 61.5% (n=648) were likely to co-medicate with WM and CM in the same day. Despite having some limitations, this study did demonstrate the high prevalence of co-use and co-medication of CM and WM in Taiwan. Patients with chronic diseases or long-term intake of medicines and young educated women are at a high risk of developing drug toxicity.

Key words: Chinese medicine (CM), Western Medicine (WM), co-medication of CM and WM, co-use of CM and WM, socio-demographic factor.

INTRODUCTION

Traditional Chinese Medicine (TCM) has attracted increasing attention as a complementary or alternative medicine (CAM) in the United States, while it is commonly accepted for health care among Chinese and some other Asian populations. Sato et al. (1995) indicated in 1945 that 60 of the 758 patients (7.9%) being cared in a general medicine clinic at Saga Medical School Hospital in Japan had ever used alternative medicine at least once. The use of alternative medicine increased from 33.8% in 1990 to 42.1% in 1997 in United States (Eisenberg et al., 1998). In a 2004 survey in Israel it is found that more than 36% of

723 respondents had ever used at least one CAM in past years (Givon et al., 2004). In late 1980, Lin et al. found that in area around Taipei, capital of Taiwan, 7.9% visited TCM clinics only, while 8.4% visited both TCM and Western Medicine (WM) clinics for the past one month (Lin, 1992). However Chou et al. found that over 48% of study subjects in a 2001 survey had visited clinics of both of TCM and WM (Chou, 2001). Over 60% of cancer patients reported having used TCM (Liu et al., 1997). Studies have reported the possibility of interactions between herbal drugs and WM (John et al., 1999; Adriane, 2000). Herb-induced drug interactions may attribute to misidentification of plants, adulteration and contamination (Adriane, 2000). Adverse events may be associated with using both CM and WM (Yu-Chi et al., 2000).

In Taiwan, many hospitals or independent clinics provide

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both CM and WM services. Apart from regular WM clinics, a lot of independent clinics and hospitals are staffed with certified CM doctors only, providing cares with herbal medicine, acupuncture, chiropractics, message, etc. Patients may pay a minimal co-payment (less than \$7 USD) for a visit and the prescribed medicine if the clinic has a contract with National Health Insurance Bureau (NHIB) for the health services. Patients may choose to receive cares from both WM and TCM. Among all contracts, 9.7% are equipped CM in 1999. However some alternative care settings have no contract with NHIB. The actual utilization of CM or both CM and WM may be beyond the scope of official records. Whether the likelihood of suffering adverse effects might be underestimated for those who use CM or co-use both CM and WM. To our knowledge, studies regarding patient visits made to both CM and WM clinics for the same disease with co-medication are limited. We have conducted a well-designed survey to explore the prevalent practice of co-using CM and WM and to identify factors associated with simultaneously making visits to both CM and WM and using medications of CM and WM in the same day.

MATERIALS AND METHODS

Selection criteria and participants

This is a cross-sectional survey. Initially two thousand patients who visited outpatient clinics in China Medical University (CMU) hospital were randomly selected from either CM or WM clinics based on computer-generated random numbers during the period from July 15th to July 20th in 2002. After patients were selected from their prescription numbers they were approached by interviewers who had been trained with interview skills and implementation processes in advance. The subjects were also evaluated regarding eligibility, asked for consent to participate and informed of the process of self-administered survey. Participates were excluded if they were under 18 years or they asked their family members or friends to pick up their medicine.

Instruments

The questionnaire of "concurrent use of CM and WM in central Taiwan" was developed according to a series of discussions from an expertise group. It is composed of six sections: socio-demographic information, general strategies of disease management for the past years, diagnosed chronic illness, experience of using dietary supplements and CM for the past years, experience of health care utilization including only WM, only CM and both WM and CM for the past three years, and general knowledge of medication use. The reliabilities of the

survey items for the six sections were from 0.75 to 0.90 based on the Kappa statistics which were done by doing twice of the questionnaire before the formal survey. In this study, patients who visited only CM or WM clinics were recognized as non co-users of WM and CM. Those who visited both CM and WM clinics within past three years were considered as co-users of CM and WM. Co-users were interviewed with several questions regarding their experiences about co-medication of CM and WM in the same day.

Places

This study was implemented in a medical center of CMU hospital where there are clinics with WM or CM services, as well as unique clinics with both WM and CM services available in central Taiwan. Patients were recruited right after they received their prescriptions. On the average one outpatient pharmacist dealt with 4,000 WM visitors per day. Another outpatient pharmacist dealt with 500 CM visitors per day.

Data collection

To explore the influence of socio-demographic factors and disease status, we focused on two groups of variables, which were supposed to be related to the co-users of CM and WM clinics and co-medication of CM and WM in the same day. First group variables consisted of the following demographic variables: gender, age (cut-off point was 40), education levels (cut-off point was senior high school), marital status (married vs. single), number of family members including patients, his spouse and his children (cut-off point was 4 members), religion including any kind of religion (yes vs. no), occupation (yes vs. no), job income (yes vs. no), health-related supplement use (yes vs. no), and health care utilization (cut-off point was 37 visits of clinics from January to July, 2002). Health-related supplements were classified as Western supplements (e.g. vitamins) and Chinese supplements (e.g. herbals). All the demographic variables were coded as dummy variable with 1 or 0 based on the indication on each table.

The second group variables were all recognized as chronic disease factors, which included cerebral stroke, insomnia, thyroid disease, heart disease (done with heart surgery before or taking any heart medicine), hypertension, hypercholesterolemia, asthma, bronchitis, obstructive pneumonia, tuberculosis, gastrointestinal defects (such as constipation, diarrhea, pancreatitis and intestinal infection), peptic ulcer, chronic hepatitis (long-term liver disease), hepatic cirrhosis (long-term renal disease), chronic nephritis, postmenopausal syndrome, gynecological disorders (general diseases of women), sex disorders, diabetes, allergies (general allergy to environmental anti-

Table 1. Demographic characteristics of participants (n=1995).

Variables	Levels	n	%
Gender	Male	845	42.5
	Female	1144	57.5
Marital status	Yes	1573	79.9
	No	396	20.1
Age	< 40	727	37.0
	≥40	1236	63.0
Education level	< High school	716	36.3
	≥ High school	1257	63.7
Occupation	Yes	1226	63.0
	No	719	37.0
Religion	Yes	1284	66.7
	No	642	33.3
Monthly Income	No	731	42.7
	Yes	982	57.3
Number of family	≤4	916	47.7
	>4	1005	52.3
Number of Health-facility use (for last 7 months)	0	7	0.4
	6–12	709	36.1
	13 - 24	778	39.7
	25- 36	327	16.7
	≥37	141	7.2
Money* paid for health-related supplements	No	809	44.7
	Yes	1002	55.3

* N. T. dollars

gen), cancer, gout, arthritis and exercise injuries (taking long-term medicine after exercise). All the diseases were coded as dummy variable with 1 for having the disease or 0 for not having the disease.

Statistical analysis

In addition to descriptive analysis, stepwise logistic regressions were mainly used to figure out the factors from two groups that can explain the behavior of visiting both CM and WM clinics and co-medication of CM and WM in the same day respectively. The data were analyzed by using SAS statistical software (Version 6.12, SAS Institute Inc, Cary, NC) and the significance level was set at 0.05.

RESULTS

Out of valid 1995 questionnaires, 1054 (52.8%) patients visited CM and WM clinics during last three years. Among those valid questionnaires more than 57.5% were women and the mean age was 47.3±16.3 years. Most of the respondents (63.7%) had an educational level higher than

or equal to high school. Sixty-three point six percent of them visited health facilities more than 12 times in the last seven months in table 1. The majority of respondents were from central Taiwan since this hospital is located in central Taiwan.

Among those who visited both clinics for the same disease, men were less likely to visit both clinics than women (adjusted odds ratio [OR] = 0.75 (95% CI 0.60~0.93)). Younger people (i.e., aged less than 40 years old) were more likely to visit both clinics than older people (adjusted OR= 1.75, 95% CI: 1.37~2.24). Those respondents with an educational level less than high school were less likely to visit both clinics (OR=0.64, 95% CI: 0.50~0.83)), whereas those respondents with the experience of using health-related supplements were more likely to visit both clinics (OR=1.70, 95% CI: 1.37~2.11)) in table 2. In other words, those younger female respondents with a higher educational level and experience using health-related supplements had a higher tendency to visit both clinics. Among those who had complete information regarding chronic disease, 670 out of 1275 respondents (52.5%) visited both clinics. Those who had chronic bronchitis, chronic hepatitis, gynecological diseases, allergic problems and exercise injuries were more likely to visit

Table 2. Logistic regression results for exploring socio-demographic factors related to co-use of both WM and CM clinics

Co-use of both WM and CM Clinics (n=820)				
Socio-demographic Factor	b	SE(b)	OR	95% CI
Sex (male=1, female=0)	-0.29**	0.11	0.75	0.60~0.93
Age(< 40 =1, ≥40 =0)	0.56***	0.13	1.75	1.37~2.24
Education Level(≤junior school =1, others=0)	-0.44***	0.13	0.64	0.50~0.83
Use of health-related Supplements (yes=1,no=0)	0.53***	0.11	1.70	1.37~2.11

n : 820 out of 1568 visited CM and WM clinics; b: estimated regression coefficient ; OR : estimated odds ratio; SE(b) : standard error of b ; 95% CI : 95% confidence interval of OR; ** p value <0.01; *** p value<0.001.

Table 3. Logistic regression results for exploring chronic disease factors related to co-use of both CM and WM clinics

Co-use of both CM and WM Clinics (n=670)				
Chronic-Disease Factor	b	SE(b)	OR	95% CI
Heart Disease (Yes=1, No=0)	-0.34*	0.17	0.71	0.51~0.99
Hypertension (Yes=1, No=0)	-0.46**	0.15	0.63	0.47~0.84
Chronic Bronchitis (Yes=1, No=0)	0.61*	0.31	1.85	1.03~3.44
Chronic Hepatitis (Yes=1, No=0)	0.42*	0.17	1.52	1.10~2.12
Gynecological Disease (Yes=1, No=0)	0.75**	0.27	2.11	1.27~3.61
Diabetes (Yes=1, No=0)	-0.39*	0.18	0.68	0.47~0.97
Allergy (Yes=1, No=0)	0.73**	0.24	2.07	1.31~3.37
Exercise Injuries (Yes=1, No=0)	1.28*	0.56	3.60	1.33~12.58

n : 670 out of 1275 visited Chinese medicine clinic and Western medicine clinic;

b : estimated regression coefficient; OR : estimated odds ratio; SE(b) : standard error of b ; 95% CI : 95% confidence interval of OR ; * p value<0.01; ** p value <0.001.

both clinics (OR = 1.85, (95% CI: 1.03~3.44), 1.52 (1.10~2.12), 2.11 (1.27~3.61), 2.07 (1.31~3.37) and 3.60 (1.33~12.58), respectively). But respondents who had heart diseases, hypertension or diabetes were less likely to visit both clinics (OR=0.71 (95% CI: 0.51~0.99), 0.63 (0.47~0.84), 0.68 (0.47~0.97), respectively) in table 3.

Regarding socio-demographic variables, out of 808 respondents who visited both clinics, 489 (60.5%) took both of CM and WM medications in the same day. Only two variables, age and health facility utilization, were statistically significant to explain the reason of co-use of CM and WM in the same day, whereas the other demographic variables were invariant across respondents. For example, age used as a continuous variable increases by one year, the odds for having the co-medication in the same day increases by 2% (OR=1.02 95% CI: 1.01~1.03). Respondents who used health facilities more than 37 times for the last seven months were four times more likely to use CM and WM medications in the same day (OR=4.30, 95% CI: 1.93~11.45) in table 4.

Regarding chronic disease variables, 475 (70.9%) out of the 670 respondents who visited both CM and WM clinics took co-medication of CM and WM in the same day. Respondents with chronic nephritis were 3.75 times more likely to take both medicine on the same day (OR=4.75, 95%CI: 1.39~29.79) than those without chronic nephritis

whereas respondents with exercise injuries were less likely to take CM and WM medications on the same day (OR=0.37, 95% CI: 0.15~0.94) than those without exercise injuries in table 5.

DISCUSSION

With respect to the use of CM, many studies have been conducted so far. In Taiwan, Kang et al. (1994) showed that 34.7% visited a CM clinic for single-method treatment whereas they also showed that 67% utilized CM alternatives via a two-method treatment (Kang et al., 1996). Chou et al. (2001) reported that 48.7% of 1128 patients obtained from 13 teaching hospitals had visited both CM and WM clinics in 1989. Obviously the co-use of CM and WM obtained from our study (52.3%) was not as high as Kang's study of cancer patients in 1996 (67%) but was slightly higher than Chou's study in 2001 (49%). It is noticed that the study places, approach methods, practice experience of subjects and coverage of national health insurance might account for the differences of study results.

As to the cause of co-use of CM and WM, traditional Chinese medicine benefits a few kinds of diseases such as allergy, exercise injuries and some kind of Gynecological

Table 4. Logistic regression results for exploring socio-demographic factors related to co-medication of CM and WM in the same day.

Co-medication of CM and WM in the same day (n=489)				
Socio-demographic Factor	b	SE(b)	OR	95% CI
Age(Continuous variable)	0.02 ^{***}	0.005	1.02	1.01~1.03
Health-facility Use (≥37visits =1, <37visits=0) for the last seven months	1.46 ^{**}	0.45	4.30	1.93~11.45

n : 489 out of 808 patients who visited both clinics, had co-medication of CM and WM

in the same day; b : estimated regression coefficient ; OR : estimated odds ratio;

SE(b) : standard error of b ; 95% CI : 95% confidence interval of OR; **p value <0.01 ; ***p value <0.001.

Table 5. Logistic regression results for exploring chronic disease factors related to co-medication of CM and WM in the same day

Co-medication of CM and WM in the same day (n=475)				
Chronic-Disease Factor	b	SE(b)	OR	95% CI
Chronic Nephritis (Yes=1, No=0)	1.56 [*]	0.74	4.75	1.39~29.79
Exercise Injuries (Yes=1, No=0)	-0.99 [*]	0.47	0.37	0.15~0.94

n : 475 out of 670 patients who visited both clinics, had co-medication of CM and WM on the same day;

b:estimated regression coefficient; OR: estimated odds ratio;

SE(b) : standard error of b ; 95% CI : 95% confidence interval of OR; *p<0.05.

disease. However most specific disease such as hypertension, hepatic malfunctions, heart disease, diabetes mellitus and renal malfunctions can not treated by traditional Chinese medicine.

Due to Chinese culture, various beliefs about Chinese medicine, diverse health care environments and health insurance coverage, it is understandable that there is higher percentage of patients visiting both clinics in Taiwan than in other western countries. The high prevalence indicated that more attention needs to be drawn to those patients who visit both clinics for the same or different diseases at the same time, particularly those who have certain characteristics. In our study, we found that females under the age of 40 with a higher education level who spent more money on health-related supplements had a higher tendency to visit both types of clinics. These results are similar to others' reports. Boutin et al. (2000) found that complementary medicine users are more likely to be females. Furnham et al. (1993) showed that complementary medicine users are younger and have higher incomes than orthodox medicine users. Astin (1998) pointed out in his study that complementary medicine users tend to have higher education. In addition, it was found that those patients with chronic bronchitis, chronic hepatitis, gynecological diseases, allergies and exercise injuries were more likely to visit both types of clinics, whereas patients with heart disease, hypertension or diabetes were less likely to visit both types of clinics. Thus, it is necessary to encourage those patients with the aforementioned diseases to disclose their uses of alternative medicines while they visit either WM or CM

clinics. In addition, it is crucial to check out whether they use both CM and WM medications at the same time.

For the co-medication of CM and WM in the same day, within the population who made visits to both types of clinics, as high as 71% of the interviewees answered in the positive way. Particularly, 12% of them reported that they encountered certain uncomfortable symptoms, including headaches, sleep disorders, upset stomachs, increased heartbeat, panting, diarrhea, polyuria, skin redness and fatigue although these were not confirmed by their health care providers. Remarkably, it might be underreported due to the recall bias or likelihood that the public has a higher tendency to tolerate uncomfortable symptoms in Taiwan. Although it is still a big challenge for health care providers, particularly physicians and pharmacists, to apply sound clinical evidence for Chinese Medicine and co-medication for patient care, our study demonstrates the importance to make efforts on emphasizing the risk and potential adverse effects, as well as consequence of interactions for those patients who have higher tendency for combined medications of WM and CM.

In addition, it was demonstrated that age, health-facility use and chronic nephritis are significantly associated with co-medication, given the invariance of other factors. Elder people who use more health facilities and patients with chronic nephritis are more likely to take both CM and WM at the same time. Therefore, health care providers not only have to pay more attention to those patients but also have to spend more time on consulting and educating them for the appropriate use of Chinese and Western medication. In fact, it is anecdotal that there is high possibility that the

use of Western medicine might cause kidney dysfunction and even result in lethal episodes among the general public in Taiwan, where Chinese Medicine is sometimes recognized as either a preventative strategy or even a salvaging strategy if one is simultaneously taking Western medicine. However, there is usually more than one ingredient for CM medications and not all WM medication will cause renal impairment. In addition, there is still a shortage of sound evidence to ensure whether only WM or the combination of CM and WM causes the adverse events. Further studies have to be done to reveal these mysteries.

Other than exploring the use of CM and WM, interestingly, it was confirmed that patients with exercise injuries are more likely to use Chinese medicine than those with other chronic illness. It could be the following reasons. First, patients prefer to ask for physical therapy from the Chinese traditional doctors (e.g., acupuncture, chiropractics, massage) rather than visiting WM clinics (e.g., pain relief). Second, it is common to find practitioners who are familiar with acupuncture, chiropractics, and massage all over Taiwan although they are not required to have conventional Chinese Medicine degrees. Third, it is believed that the traditional ways of Chinese Medicine are more useful than Western medicine (e.g., occupational therapy). As a result, in our study it is less likely that patients had exercise injuries and took both WM and CM medication in the same time.

In this study, we acknowledge the following limitations. First we only interviewed those patients in CMU hospital, which is located in central Taiwan. In other words, it is difficult to generate results for other patients who visited other hospitals or even reside in other areas of Taiwan. Second there is a higher possibility that we encountered recall bias because respondents were asked the questions related within three years of their experience or behaviors. Third the results can only be applied to patients who visit one medical center clinic but not for patients who visit local clinics. It is possible that patients who visit different types of hospitals and clinics have different characteristics and disease statuses.

Nevertheless, the results obtained from this study can definitely provide sound information on the scope and extent of co-use and co-medication of CM and WM. With this information, directions on the future health policy revision, health insurance coverage and public health education will be referenced.

Despite the above limitations, this study did demonstrate that more than 50% of patients are likely to visit both WM and CM for the same disease and 71% of them took WM and CM medication in the same day. Although it is unclear whether the risks outweigh the benefits or vice versa, we have to put more effort on these facts to find strategies to improve the health care and to prevent undesired disasters from happening through appropriate health education for the public, doctors and patients, as well as adequate health policy making.

Ethical approval

The procedures followed were in accordance with the ethical standards of the Committee on Human Experimentation of China Medical University.

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Competing interests

None declared.

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