Screening for Undeclared Synthetic Drugs in Traditional Thai Medicines for Healthy Life Style

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ABSTRACT

This research aims to study the adulteration of synthetic drugs in traditional Thai medicines (TTM) that may affects the consumers' quality of life. The study focuses on the population of various occupations, ages, genders and levels of education in Chiang Mai and other provinces. Data were collected from sampling group of 700 people between March-April 2003. Questionaires were employed using random sampling method in order to gather information on health and the strategy of health maintenance, using TTM as well as the sampling of commercially-available TTM, to investigate the adulteration of synthetic drug(s), if any, in the TTM.

The results showed that 39.1% of the population chose to use TTM, based on the information told by others, while 55.0% of the population confirmed that medicinal -plant drugs could indeed alleviate the illnesses. However, 43.0% of the population believed that the over-consumption of TTM might harm the consumers. The adulterated/contaminated substances most feared by the population were fungi (40.9%) and chemicals/heavy metals (34.4%)), and 37.7% of the population believed that these substances could affect kidneys most. As for the opinion on the development and improvement of TTM, 78.6% of the population believed that the approval by western medicine was the most important issue, while 18.4% commented that the improvement of product appearance was also significant. The analysis for adulterated synthetic drugs in TTM, using thin-layer chromatography, showed no prednisolone, dexamethasone, indomethacin, aspirin, acetaminophen or phenylbutazone in 17 products. Only one product was found to contain acetaminophen.

There were uncontrollable factors in this research, including the inaccurate and incomplete data from some of the questionaires which was due to the fact that the population might not have enough understanding on the use of TTM and adulteration in TTM.

Key words: Undeclared synthetic drugs, Traditional Thai Medicines (TTM)

INTRODUCTION

The use of traditional Thai medicines (medicinal- plant drugs) has recently been increasing as many products, some are illegally manufactured and distributed, are available in the market. There is a belief that the use of medicinal -plant drugs can rapidly alleviate the illnesses and bears no harm to the health (Putiyanan, 2002). However, the contamination with microorganisms and hazardous substances, the adulteration with chemicals or synthetic substances that are unsafe to consumers-intentionally or unintentionally- such as methyl alcohol, chloroform, cyanide and heavy metals (lead, arsenic, mercury) can cause serious health problems (Traditional Medicine Recovery Project, 1987). In addition, some products are adulterated with specially-controlled drugs, such as prednisolone and phenylbutazone to enhance the therapeutic effects.

Long-term uses of these medicines can result in serious adverse effects, i.e., osteoporosis, hypertension, diabetes, gastric ulcer, swelling of face and legs, palpatation and vomitting. These adverse effects cause the health problems, the loss of time and are significant from the economic and family standpoints.

This research aims to study the adulteration of synthetic drugs in Thai medicinal-plant preparations that may affect the quality of life. The opinions about adulteration and contamination in medicinal -plant drugs that affect the quality of life as well as the strategy to develop and improve the medicinal-plant products to a better-known status are also studied. The study uses questionaries as a means to collect data from 700 persons of various occupations, ages, genders and levels of education in Chiang Mai and other provinces, including Lam Phun, Chiang Rai, Samut Sakorn, Bangkok, etc.

METHODOLOGY

This research is a survey study in the form of quantitative and qualitative descriptive research. The time frame of the study was between March and April 2003 with one data collection. The sampling of commercially-available medicinal-plant drugs to investigate the adulteration of synthetic drug(s), such as prednisolone, dexamethasone, indomethacin, aspirin, acetaminophen and phenylbutazone, using thin-layer chromatographic (TLC) technique, (Byrne, 1971; Ethier et al., 1989; Yuen & Lau-Cam, 1985) was also conducted during this time.

The targeted population of this study was general population with various occupations, ages, genders, and levels of education. The size of population was 700. The data were collected using a pre-tested questionaire. The analysis of the data was performed using descriptive statistics.

RESULTS

Part 1: To study the health status and use of traditional Thai medicine for a healthy life style.

Results of personal data from 700 samples

Table 1: Population and gender information of the sample group.

Gender	No. (People)	Percentage (%)
Male	279	39.9
Female	421	60.1
Total	700	100.0

The sampling group is 60.1% female and 39.9% male, totaling 700 people.

Table 2: Location of the sample group.

Province	No. (People)	Male	Female	Percentage (%)
Chiang Mai	551	221	328	78.8
Lampang	9	6	3	1.3
Lam Phun	22	10	12	3.1
Bangkok	32	5	27	4.6
Chiang Rai	6	3	3	0.9
Samut Sakorn	19	7	12	2.7
Others	61	25	36	8.7
Total	700	279	421	100.0

Note: Other provinces are Nakorn Pathom, Nontaburi, Phrae, Nan and Uttaradit. The highest sample lived in Chiang Mai (78.8%.).

Table 3: Education status of the sample group.

Level of Education	No. (People)	Male	Female	Percentage (%)
Primary	100	33	67	14.3
Secondary	57	28	29	8.1
High school	151	66	85	21.6
Bachelor's degree	311	121	190	44.4
Graduate level	18	9	9	2.6
Others	63	22	41	9.0
Total	700	279	421	100.0

Note: Other education levels represent vocational school certificate, and diploma. The sample is from the general population with various levels of education from primary school to graduate level. The highest grouping had a bachelor's degree with 44.4% and second major group was high school with 21.6%.

Table 4: Occupations of the sample group.

Occupation	No. (People)	Male	Female	Percentage (%)
Student	286	109	177	40.9
Civil Service	73	43	30	10.4
Government	21	9	12	3.0
Non Government	66	25	41	9.4
Merchant	122	34	88	17.4
Others	132	59	73	18.9
Total	700	279	421	100.0

Note: Other occupations are casual labor, agriculture and freelance. The highest group was students with 40.9%, followed by merchant with 17.4%, civil service with 10.4%, non- government with 9.4%, government with 3.0% and others is 18.9%.

From Tables 1-4, it can be seen that the sample groups varied among locations, levels of education, occupations and genders. Majority of sample groups were Chiang Mai citizens (78.8%), with bachelor's degree (44.4%), being students (40.9%) and female (60.1%).

Results of health status from 700 samples

Table 5: Personal illness of the sample group.

Personal Illness	No. (People)	Male	Female	Percentage (%)
No	573	241	332	81.9
Yes	127	39	89	18.1
Total	700	279	421	100.0

Note: From 700 samples, 81.9% had no personal illness and 18.1% had a personal illness.

Table 6: The chosen medical treatments in the sample group.

Medical treatments	No. (People)	Male	Female	Percentage (%)
No treatment	49	19	30	7.0
Buying drugs from pharmacy	239	91	148	34.1
Go to hospital/clinic	343	134	209	49.0
Traditional medicine	22	11	11	3.1
Others	47	24	23	6.7
Total	700	279	421	100.0

Note: Other options are exercise or depend on the severity of the illness. The largest sample groups who were concerned about their health status visited hospital when illness occurred (49.0%), the second-most popular choice is buying drugs from pharmacy (34.1%). Only 3.1% chose traditional medicine as their first choice for medication.

Table 7: The use of traditional medicine in the sample group.

Use of traditional medicine	No. (People)	Male	Female	Percentage (%)
No	377	159	218	53.9
Yes	323	120	203	46.1
Total	700	279	421	100.0

Note: From 700 samples, 323 persons (46.1%) used traditional medicine.

Table 8: The reasons for using traditional medicine in the sample group.

Cause	No. (People)	Percentage (%)
Low price	58	8.1
Western medicine cannot treat.	42	6.0
Safe	150	21.4
Convenient to purchase	60	8.6
Properties of medicine	274	39.1
Others	47	6.7

Note: 1. Other causes are herbal garden-owned, self-made, and minimal side effects.
2. May not sum up to 100 % because the targeted population can answer more than one choice, and some of the sample group did not use traditional medicine.

The sample group chose traditional medicine mostly because of the properties of the drugs (39.1%), and believing that traditional medicine was safe (21.4%). Other reasons were the traditional drug had low price (8.1%) and convenient to purchase (8.6%). Only 6.0% of sample group who chose traditional medicine thought western medicine could not help.

Table 9: The sources of purchasing traditional medicine in the sample group.

Source	No. (People)	Percentage (%)
Pharmacy	147	21.0
Department Store	58	8.3
Direct from Producer	74	10.6
Traditional Drug Store	104	14.9
Others	129	18.4

Note: 1. Other sources are gifts, sellers, own garden, and direct sales.
2. May not sum up to 100 % because the targeted population can answer more than one choice, and some of the sample group did not use traditional medicine.

Traditional medicine was considered to be purchased conveniently from pharmacy (21.0%), from traditional drug stores (14.9%), direct from producers (10.6%), and from department stores (8.3%).

Table 10: The frequency of using traditional medicine in the sample group.

Frequency	No. (People)	Percentage (%)
Everyday	41	5.9
When get ill	116	16.6
Depends	335	47.9
Others	40	5.7

Note: 1. Others represents time of injury.
2. May not sum up to 100% because the targeted population can answer more than one choice.

Most of the drug users used traditional drugs for the proper symptoms (47.9%), when they got ill (16.6%), and 5.9% of sample used it everyday, may be caused by personal illness or getting used to it.

Table 11: The attitude towards the efficiency of traditional medicine in the sample group.

Health Care Efficiency	No. (People)	Percentage (%)
Most efficiency	73	10.4
High efficiency	385	55.0
Medium efficiency	56	8.0
Just moral support	53	7.6
No effect	4	0.6
Others	129	18.4

Note: 1. Others represents co-use with western medicine.
2. May not sum up to 100% because the targeted population can answer more than one choice.

The sample group believed that traditional medicines were highly efficient (55.5%), and the most effective (10.4%). A total of 65.4% of samples believed that traditional medicine really caused a healthy life.

Table 12: The attitude towards the risks of over-consumption of traditional medicine in the sample group.

Health risk	No. (People)	Percentage (%)
Yes	303	43.3
No	298	42.6
Uncertain	99	14.1
Total	700	100.0

42.6% of the sample group believed that the over-consumption of traditional medicine had no harm to the health, while 43.3 % thought that they contained risks if they overused the drugs. Only 14.1% of sample was uncertain about the risk of traditional medicine.

Table 13: The attitude towards the continuing use of traditional medicine in the sample group.

Continuing use consideration	No. (People)	Percentage (%)
Certainly use	169	24.1
Not use	17	2.4
Depends	437	62.4
Uncertain	77	11.0
Total	700	100.0

The sample group had a positive attitude towards traditional medicine and will certainly use in the future (24.1%), and depended on the symptom (62.4%), total 86.5%, while 13.4% of samples was uncertain about continuing to use the traditional medicine.

Table 14: The reasons for not using traditional medicine in the sample group.

Cause	No. (People)	Percentage (%)
Poor quality	288	41.1
High price	43	6.1
Contamination	173	24.7
Adulteration	181	25.9
Lack of Hygiene	174	24.9
Others	72	10.3

Note: 1. Other causes are risk awareness, and uninterested.
2. May not sum up to 100% because the targeted population can answer more than one choice.

The sample group did not use traditional medicines due to drug quality (41.1%), contamination (24.7%), adulteration (25.9%), and lack of hygiene (24.95%).

Table 15: The major concern of contaminants and adulterations of traditional medicine in sample group.

Contaminants / Adulterations	No. (People)	Percentage (%)
Steroids	152	21.7
Chemical/heavy metals	241	34.4
Insecticides	220	31.4
Organic substances	286	40.9
Others	27	3.9

Note: 1. Others represents manufacturing process.
2. May not sum up to 100% because the targeted population can answer more than one choice.

The major concern of the sample group about contaminants were organic substances such as fungus (40.9%), chemical heavy metal (34.4%), insecticides (31.4%), steroids (21.7%), and others (3.9%). Some of the sample group did not know that there were contaminant and adulterant in traditional medicine.

Table 16: The opinions of sample group of the area affected due to contaminants and adulterations.

Affected area	No. (People)	Percentage (%)
Bone	101	14.4
Kidney	264	37.7
Liver	209	29.9
Blood pressure	87	12.4
Gastro vascular system	201	28.7
Others	98	14.3

Note: 1. Others represents effects to every organ.
2. May not sum up to 100% because the targeted population can answer more than one choice.

The area the sample group believed that the contaminants and adulterations affected most were the kidneys (37.7%), the liver (29.9%), the gastro-vascular system (28.7%), bones (14.4%), blood pressure (12.4%) and all of the body (14.3%).

Table 17: The opinions of the sample group to the development/improvement of traditional medicine.

Development /improvement	No. (People)	Percentage (%)
Medical certification	550	78.6
Taste	77	11.0
Package	129	18.4
Marketing	71	10.1
Price	53	7.6
Others	52	7.4

Note: 1. Others represents quality control and legal assurance.
2. May not sum up to 100% because the targeted population can answer more than one choice.

Most of the sample group thought that to qualify as traditional medicines, the development and improvement should be done. Not only to certify traditional medicine by modern medication (78.6%), but also to consider about packaging (18.4%), taste (11.0%) and marketing (10.1%). While quality control, legal assurance and price were not considered so important.

From the studies of undeclared synthetic drugs in traditional Thai medicine for healthy life style in general population with various occupations, levels of education, and genders, the research was a survey study in the form of quantitative and qualitative descriptive research. The size of the population sampled was 700. The data were collected by a pre-tested questionnaire.

The occupations among sample group were 40.9% students, 10.4% civil services, 3.0% government officers, 9.4% non-governmental organizations, 17.4% merchants, and 18.9% others. The levels of education attained among the sample group were 14.3% primary level, 8.1% secondary school, 21.6% high school, 44.4% bachelor's degree, 2.6% graduate level and 9.0% others. There were 39.9% males and 60.1% females in the sample.

The results can be summarized as follow:

- The preferred medical treatments were going to hospital, and buying drugs from the pharmacy (49.0% and 34.1% respectively).
- The percentage of the group using traditional medicine was 46.1% which was less than non-user group (53.9%).
- The sample group decided to use traditional medicine because of the properties of each drug (39.1%) and the drug safety (21.4%).
- The sources for purchasing traditional medicine were modern pharmacies (21.0%) and traditional drug stores (14.9%).
- The sample group considered using traditional medicine in case of demand (47.9%) and when getting ill (16.6%).
- About half (55.0%) of the sample group believed that traditional medicine could help for a healthy life style.
- 43.3% of the sample group believed that over-consumption of traditional medicine could cause health risks while 42.6% believed that over-consumption of traditional medicine had no harm.
- 62.4% of the sample group would continue to use traditional medicine when appropriate and 24.1% would certainly continue to use the drugs.
- The traditional medicine non-users were concerned about contaminations, adulterations and inconvenient method of use at 25.9%, 24.7%, and 24.9% respectively.
- The major risks contaminants and adulterations were organic substances (40.9%), chemical and heavy metals (34.4%) and insecticide (31.4%).
- The sample group recommended medical certification (78.6%) and renovated packaging (18.4%) to develop and improve the quality of traditional medicine.

Part 2: To analyze undeclared synthetic drugs in traditional Thai medicine for a healthy life style.

From 18 samples of traditional Thai medicine that were analyzed, one sample was found to contain a synthetic drug (acetaminophen). In other 17 samples, these synthetic drugs: presnisolene, dexamethasone, indomethacin, aspirin, acetaminophen, and phenylbutazone were not found.

These results show the personal, health, medical treatment data and the study of undeclared synthetic drugs in traditional Thai medicine for healthy life style in percentage.

• Gender of sample population:	Male/Female	=	39.9/60.1
• Location of sample group:	Chiang Mai/Others's	=	78.7/21.3
• Level of education:	Lower than Bachelor/Higher	=	44.0/47.0
• Occupation:	Study/Employed	=	40.9/40.2
• Personal illness:	No/Yes	=	81.9/18.1
• Medical treatment	Yes/No	=	86.2/7.0
• Traditional medicine chosen	Alleviate illness/ Others	=	60.5/29.4
• Sources of supply	Pharmacy/Others	=	35.4/37.3
• Frequency of use	When get ill/Others	=	16.6/59.5
• Health effects	High/Others	=	65.4/34.6
• Harmful effects	Yes/No	=	43.3/56.7
• Efficiency of drugs	Believe/No effect	=	86.5/13.5
• Non-user consideration	Quality/Price	=	126.1/6.1
• Risks of traditional medicine	Contamination/ Adulteration	=	21.7/110.6
• Effects of contamination	Yes/Others	=	123.1/14.0
• Development/Improvement	Need/others	=	118.1/15.0
• Adulteration in medicine	No/No	=	94.4/5.6

The results of the study suggest that the population believed that medicinal-plant drugs could indeed alleviate the illnesses. However, over-consumption of medicinal-plant drugs might harm the consumers. The majority of the population believed that the adulterated/contaminated substances in medicinal -plant drugs, including fungi and chemicals/heavy metals, could harm the liver and kidneys, thus deteriorate the quality of life. In addition, the population voiced their opinions on the development and improvement of medicinal-plant drugs that the approval by western medicine was the most important issue, followed by the improvement of product appearance. The TLC analysis for adulterated synthetic drugs in medicinal-plant drugs showed that 17 of 18 products contained no prednisolone, dexamethasone, indomethacin, aspirin, acetaminophen and phenylbutazone. Acetaminophen was found as an adulterant in only one product.

DISCUSSION

Personal data of surveyed population such as gender, level of education and occupation have little effect on traditional Thai medicine consumption behavior. Consequently, the other environmental factors should be considered to clarify the results of the study. Furthermore, the results explained that sample group believed that traditional medicine could enrich their health status. However, the sample group was concerned about the risk of contamination and adulteration in traditional medicine. The sample group still did not know about undeclared substances and side effects of the contamination and adulteration in the drugs. They recommended that traditional medicine should be developed and improved in terms of quality and cleanness for more acceptance.

In drug samples that were tested for contamination and adulteration, most of the traditional medicines were not contaminated by undeclared synthetic drugs. The only traditional medicine found to contain a synthetic drug (acetaminophen) had no label. Thus, the traditional medicines that have no label and are not registered in the market should be collected and tested for undeclared synthetic drugs.

RECOMMENDATIONS

The surveyed population mostly lack of knowledge about contamination and adulteration in traditional medicine and do not know the effects of them on human health. Therefore, some of data are inaccurate and incomplete.

The involved organizations, both governmental and non-governmental, should consider more about the risks of unqualified traditional medicine. Furthermore, they should promote and campaign for effective quality control. Recommendations for future study :

1. The selected target population should have basic knowledge about traditional medicine in order to obtain more accurate and complete data and results.
2. The questionnaire should be more precise, by separating the user and non-user group for clearer analyses.
3. The collection of the traditional medicine should be of both unlabeled and labeled drugs for better comparison.

CONCLUSION

In conclusion, it can be said that the use of medicinal-plant drugs (traditional Thai medicine) is a popular choice of illness treatment among the surveyed population. There may be some contaminants and adulterants in other products that were not sampled for investigation in this study in which concerns arise among consumers. Therefore, the development and improvement of medicinal -plant products, especially in terms of cleanness, quality and packaging are of prime importance to gain acceptance from the population.

There were uncontrollable factors in this research, including the inaccurate and incomplete data from some of the questionaires, which was due to the fact that the population might not have enough understanding on the use of drugs and adulteration in medicinal-plant drugs.

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