

Effects of Patient Education on the Use of Herbal and Nutritional Supplements in Patients with Renal Impairment

นิพนธ์ฉบับ

Original Article

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วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2562;14(1):9-15.

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บทคัดย่อ

Abstract

วัตถุประสงค์: เพื่อศึกษาอัตราการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหารและผลของการให้ความรู้เกี่ยวกับการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหารที่มีผลต่อไต
วิธีการศึกษา: ทำการศึกษาที่ทดลองที่คลินิกผู้ป่วยนอก โรงพยาบาลสุทธาเวช คณะแพทยศาสตร์ มหาวิทยาลัยมหาสารคาม ระหว่างมกราคมถึงกุมภาพันธ์ พ.ศ. 2559 โดยให้ความรู้ด้านการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหารที่อาจมีผลต่อการทำงานของไตในรูปแบบคู่มือ สุ่มแจก โพรคัทที่ติดตามและให้ความรู้ซ้ำในวันที่ 15 ประเมินผลโดยวัดความรู้ก่อนและหลังการให้ความรู้เกี่ยวกับการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหาร และติดตามการทำงานของไตที่ 1 เดือน หรือเมื่อมาตามนัดครั้งถัดไป ใช้แบบสอบถามรวมข้อมูล เป็นแบบทดสอบความรู้ และแบบสอบถามพฤติกรรมการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหาร ใช้สถิติเชิงพรรณนา, yaired- t test, Wilcoxon signed rank test, และ McNemar chi-square เพื่อวิเคราะห์ข้อมูล **ผลการศึกษา:** มีผู้เข้าร่วมการศึกษาจำนวน 38 ราย โดยร้อยละ 57.9 เป็นเพศหญิง อายุเฉลี่ย 62.45 ปี คะแนนความรู้ก่อนให้ความรู้เป็น 6.21 ± 3.09 คะแนน แล้วเพิ่มเป็น 14.42 ± 1.00 คะแนนหลังให้ความรู้ครั้งที่ 1 และเป็น 14.11 ± 1.20 คะแนนเมื่อสิ้นสุดการติดตาม ซึ่งทั้งสองครั้งต่างจากก่อนให้ความรู้ อย่างมีนัยสำคัญทางสถิติ (P -value < 0.001) พบอัตราการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหารร้อยละ 44.7 และลดลงหลังให้ความรู้เป็นร้อยละ 18.7 (P -value = 0.012) และค่าการทำงานของไตเพิ่มขึ้นหลังให้ความรู้แต่ไม่มีนัยสำคัญทางสถิติ (P -value = 0.062). **สรุป:** การให้ความรู้เกี่ยวกับการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหารช่วยเพิ่มความรู้ของผู้ป่วย ลดอัตราการใช้สมุนไพรและผลิตภัณฑ์เสริมอาหารได้

คำสำคัญ: สมุนไพร, ผลิตภัณฑ์เสริมอาหาร, ผู้ป่วยที่มีภาวะไตบกพร่อง, การให้ความรู้

Objective: To determine the use rate of herbs and dietary supplements and evaluate the effects of health education on using of herbs and dietary supplements with potential effects on renal function in patients with renal impairment. **Methods:** This one-group pretest-posttest experimental study was conducted at the outpatient department in Suddhajej hospital, Faculty of medicine, Mahasarakham University between January and February 2016. Patients were provided an in-person health education session on herbs and dietary supplements with flip charts, leaflets, and pocketbook. The education was also given in the next 5 days via telephone. Patients' knowledge about the subject was measured before and after the education session and renal function was monitored before and 1 month, or next visit, after the session. Data of knowledge and the use behavior were collected using questionnaires. Descriptive statistics, paired t-test, Wilcoxon signed rank test and McNemar chi-square tests were used for analysis. **Results:** Of the 38 patients participating, they were 62.45 years of age and 57.9% were women. Before education session (baseline), their knowledge's score was 6.21 ± 3.09 and was increased to 14.42 ± 1.00 and 14.11 ± 1.20 points at the end of the session and the study, with statistical significance (P -value < 0.001, for both). The use rate of the products was 44.7% of the patients and dropped to 18.7% at the end of study (P -value = 0.0012). Renal function was slightly increased at the end of study with no statistical significance (P -value). **Conclusion:** This study showed that the patient education on the usage of herbs and dietary supplements which effect to renal function significantly decreased the use of herbs and dietary supplements and increased patients' knowledge.

Keywords: herb, nutritional supplements, patients with renal impairment, education

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Editorial note

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Introduction

Renal impairment is caused by kidney disease and various other pathologies including bleeding, heart failure, sepsis, and medications. It has been known that certain medications could damage the kidney function and kidney complications which could further lead to chronic kidney disease (CKD). CKD has become a major public health problem worldwide including

Thailand. Incidence of CKD has been increasing worldwide. In the US, incidence and prevalence of all stages of CKD have been increasing. Almost 8 million Americans suffered from stage 3 and 4 CKD¹ while at least 600,000 cases of end-stage renal disease could be found 2015.

In Thailand, prevalence of CKD in adults was 9.1% in 2004.² The CKD is based on the decreased filtration function of the kidney, i. e. , glomerular filtration rate (GFR). CKD is defined as a GFR of less than of 60 mL/min/1.73m².^{3,4} CKD patients face complications such as edema, hyperkalemia, and cardiovascular diseases which make CKD the fourth cause of death in Thai elderly.⁵

CKD patients are among patients who like to use herbs and nutritional supplements in addition to the prescribed drugs. Since treatment of CKD is life-long, CKD patients are more likely to seek supplemental therapeutic modalities for self-medication. Based on the Thai-SEEK study by the Nephrology Society of Thailand conducted in 3,400 Thais in 10 provinces, 33% of Thais used Thai traditional herbs including herbal pills, Chinese herbs, and herb powders. The study also found that herb use was associated with CKD with an odds ratio of 1.61 (95% CI: 1.38 - 1.87) which means that patients using herbs were 1.61 times more likely to have CKD. Therefore, use of herbs could be one of the causes of acute kidney injury (AKI) and CKD in Thai population.⁵ Even though herbal medicines has long been a Thai traditional medicine and promoted into the 4th National Public Health Development Plan, inappropriate use of herbs could pose a detrimental effects on the kidney disease progression.⁶ Like modern medicines, the inappropriate use of herbs include wrong kinds of herbs, wrong dose, wrong administration and a lack of understanding of adverse effects and potential harms.

All incidences mentioned above indicates the essence of information dissimulation regarding knowledge about benefits and harms of herbs and nutritional supplements in renal-impaired patients. Unfortunately, studies on the effects of education on herbs and nutritional supplements have been scarce. Therefore, this study aimed to determine the effect of patient education on the usage of herbs and dietary supplements in patients with renal impairments regarding knowledge and practice behavior on the use of herbs and nutritional supplements, and kidney functions. Specifically, it was hypothesized that once educated on herbs and nutritional supplements potentially affecting kidney function, the patients would 1) gain more knowledge about the subject and more appropriate practice on the use of herbs and nutritional supplements, and 2) maintain their kidney function. While independent variable was the education program on herbs and nutritional supplement potentially affecting kidney function; dependent variables included knowledge score, herb

and nutritional supplement use practice score, and kidney function.

Materials and Methods

In this quasi-experimental study with the one-group pretest-posttest design, we tested the effects of education on herbs and nutritional supplements with potential effects on kidney functions among patients with renal impairment. Education on individual patients with telephone follow-up was carried out in the out-patient department of Suddhavej Hospital, Faculty of Medicine, Mahasarakham University, from January to February 2016. Scores of knowledge and practice of the use of herbs and nutritional supplements and kidney function were assessed before and after the education session.

To be eligible, the prospective participants had to be out-patient with an eGFR of less than 90 ml/min/1.73 m², able to communicate, self-administer the questionnaire, or request for clarification, and willing to participate. The criteria for exclusion were as follows: patients referred to other hospitals during the study period, patients refusing to attend the education session, and patients unable to be contacted by telephone.

Study instruments and procedures

Instruments

Data were collected using a set of questionnaires including demographic information, behavior regarding herb and nutritional supplement use, and knowledge about herb and nutritional supplement. The questions on the use behavior included the patient's history of the use of herbs and nutritional supplements, reasons for the use, and acknowledgement among their healthcare providers. These 10 questions had a yes/no answer format. For the questions assessing knowledge about herbs and nutritional supplements, they asked about appropriate use of herbs and nutritional supplements, and kinds of herbs and nutritional supplements potentially affecting kidney function necessary to know. These 15 questions had a right/wrong response format.

The questions assessing knowledge had an acceptable content validity as determined by three experts with an Index of Item Objective Congruence of 0.55 for all questions all together. The revised version of the questionnaire was tested for internal consistency reliability in 20 individual comparable to the prospective participants. The internal consistency

reliability was high with a Kuder Richardson (KR-20) coefficient of 0.8796.

The instruments for education session were teaching materials (flip charts, leaflets) and a pocketbook on the use of herbs and nutritional supplements for patients with renal impairment.

Procedures

At their follow-up visit, patients were screened for eligibility by three researcher assistants who were well trained by the investigators. Prospective participants were informed about the study and asked for written informed consent if willing to participate. The participants were asked to complete the questionnaires on demographic information, social history, history of illness, and their use of herbs and nutritional supplements. The participant's laboratory data such as eGFR based on the Modification of Diet in Renal Disease (MDRD) equation were collected from their medical records.

Before education session, the participants were then asked to complete the questions on knowledge about herbs and nutritional supplements and the questions on the use of the products (pretest). In the first education session, the investigators provided individual participants the knowledge about herbs and nutritional supplements potentially affecting renal function. This in-person education session took about 20 minutes for a given participant. The investigators used the teaching materials of herbs and nutritional supplements with potential to harm the kidney. Discussion and questions from the participant were encouraged. At the end of the session, the investigators gave the participant a pocket book on the subject for further self-study. The participants were asked to complete the questions on knowledge about herbs and nutritional supplements (posttest-1 for knowledge).

At 15 days after the in-person education session, the participants were followed up by telephone for the discussion on the knowledge about herbs and nutritional supplements for 10 – 15 minutes per participant. At 30 days after the in-person education session or at the participant's next follow-up visit, the participants asked to complete the questions on knowledge (posttest-2 for knowledge) and practice behavior (posttest for behavior) either by telephone or in-person interview, as applicable. Kidney function laboratory data were also obtained from medical records at this follow-up.

This study was approved by the Ethic Committee for Human Study of the Faculty of Pharmacy, Mahasarakham University (PH 003/2558) in the academic year of 2015.

Statistical analysis

All data were presented with descriptive statistics such as mean with standard deviation and frequency with percentage. Scores of knowledge about herbs and nutritional supplements at pretest, posttest-1 and posttest-2 were compared using paired t-test or Wilcoxon signed rank test, as appropriate. Proportions of participants answering each question correctly before and after the education session were tested using McNemar chi-square test. Proportions of patients reporting the use of herbs and nutritional supplements at pretest and posttest-2 were compared using McNemar chi-square test. GFR levels pretest and posttest-2 were compared using paired t-test or Wilcoxon signed rank test, as appropriate. Significance level was set at a *P*-value < 0.05.

Results

There were 39 patients eligible for the study. Since one patient refused to attend the education session, 38 patients with renal impairment participated in the study. There were slightly more women (57.9%) than men (Table 1). Their average age was 62.45 ± 11.18 years and duration of renal impairment was 2.03 ± 1.87 years. All patients had at least co-morbidity. Almost half of the patients received advice about renal impairment (42.1%). As high as 57.9% of the participants reported that they had used herbs; while 31.6% had used nutritional supplements.

Table 1 Characteristics of patients with renal impairment (N = 38).

| Characteristics | N | % |
|---|----|------|
| Gender | | |
| Female | 22 | 57.9 |
| Male | 16 | 42.1 |
| Age: mean = 62.45 ± 11.18 yrs | | |
| Co-morbidity (n = 38, 100%) | | |
| Diabetes | 2 | 5.3 |
| Hypertension | 3 | 7.9 |
| Dyslipidemia | 3 | 7.9 |
| Hyperthyroidism | 2 | 5.3 |
| Diabetes + hypertension | 4 | 10.5 |
| Hypertension + CKD | 6 | 15.8 |
| Diabetes + CKD | 3 | 7.9 |
| Diabetes + hypertension + dyslipidemia | 7 | 18.4 |
| Diabetes + dyslipidemia + CKD | 4 | 10.5 |
| Hypertension + dyslipidemia + CKD | 4 | 10.5 |
| Having advice from healthcare provider: Yes | 16 | 42.1 |
| Having used herbs: Yes | 22 | 57.9 |
| Having used nutritional supplements: Yes | 12 | 31.6 |

Among herbs and nutritional supplements reported by the participants, those with potential to affect kidney function

included garlic, kariyat (*Andrographis paniculata*), turmeric (*Curcuma longa*), moringa (*Moringa oleifera*), noni (*Morinda citrifolia*), rosella (*Hibiscus sabdariffa*), *Cissus quadrangularis*, and Laurel clockvine (*Thunbergia laurifolia*); while those with no such effect were wheat germ milk, blackberry lily (*Belamcanda chinensis*), bael fruit (*Aegle marmelos*), chlorophyll extract, ginger tea, female herbal tonics, fish oil, collagen, Sacha peanut (*Plukenetia volubilis*), Yangdaeng (*Dipterocarpus turbinatus*), ginseng, bamboo grass leaf extract (*Tiliacora triandra*), egg woman (*Phyllanthus amarus*), pandan leaf, and rice germ extract.

Proportions of patients with correct answers and scores of knowledge about renal impairment and the use of herbs and nutritional supplements

Scores of knowledge about renal impairment and the use of herbs and nutritional supplements increased from 6.21 ± 3.09 points of a total of 15 points at pretest to 14.42 ± 1.00 points at posttest-1 and 14.11 ± 1.20 points at posttest-2. The scores of knowledge at posttest-1 and posttest-2 were

significantly higher than that at pretest (P -value < 0.001, for both); however, the scores at posttest-1 and posttest-2 were not different (P -value = 0.244).

Once each individual question was considered at pretest, no single question was answered correctly by all participants. The most correctly answered questions were questions 4 and 6 (84.2% both). This suggested that most patients understood that they should consult with physicians before using herbs or nutritional supplement and they should verify that given products were certified by the Thai FDA. On the other hand, the question the least correctly answered was question 8 (15.8%). This meant that most patients cough mixture with glycyrrhiza was not safe for patients with renal impairment. In addition, most patients did not know that senna, kariyat (*Andrographis paniculata*), noni (*Morinda citrifolia*), turmeric (*Curcuma longa*) and wildbetal leafbush (*Piper sarmentosum*) were not safe for renal-impaired patients and should be avoided. However, at posttest-2, proportions of patients answering correctly on questions 7 to 14 increased with statistical significance (Table 2).

Table 2 Proportions of patients with correct answers and scores of knowledge about herbs and nutritional supplements with potential renal effects before and after the education session (N = 38).

| Questions ^{II} | N (%) of participants answering correctly | | | | P -value* (posttest-1 vs posttest-2) | |
|---|---|--------------|--|--------------|---|--|
| | Pretest | Posttest-1 | P -value* (pretest vs posttest-1) | Posttest-2 | | P -value* (pretest vs posttest-2) |
| 1. Herbs and nutritional supplements could replace prescribed modern medicines. | 22 (57.9) | 33 (86.8) | 0.002 | 32 (84.2) | 0.013 | 0.754 |
| 2. Some herbs and nutritional supplements could damage kidney function. | 31 (81.6) | 37 (97.4) | 0.31 | 38 (100.0) | N/A | N/A |
| 3. Some herbs and nutritional supplements could interact with prescribed medicines and harm the kidney. | 25 (65.8) | 37 (97.4) | < 0.001 | 36 (94.7) | 0.003 | < 0.001 |
| 4. Patients should consult physicians before using herbs and nutritional supplements. | 32 (84.2) | 38 (100) | N/A | 34 (89.5) | 0.754 | N/A |
| 5. Even though renally impaired, patients could use all kinds of herbs and nutritional supplements. | 31 (81.6) | 37 (97.4) | 0.031 | 36 (94.7) | 0.062 | <0.001 |
| 6. Herbs and nutritional supplements have to be approved by the Thai FDA. | 32 (84.2) | 38 (100.0) | N/A | 37 (97.4) | 0.125 | N/A |
| 7. Glycyrrhiza can be used to treat kidney impairment. | 8 (21.1) | 37 (97.4) | < 0.001 | 33 (86.8) | < 0.001 | 0.219 |
| 8. Cough syrup with glycyrrhiza can be used safely in patients with kidney impairment. | 6 (15.8) | 35 (92.1) | < 0.001 | 35 (92.1) | < 0.001 | < 0.001 |
| 9. Patients with kidney impairment can use senna safely. | 9 (23.7) | 36 (94.7) | < 0.001 | 35 (92.1) | < 0.001 | < 0.001 |
| 10. Patients with kidney impairment can use kariyat safely. | 9 (23.7) | 38 (100.0) | N/A | 36 (94.7) | < 0.001 | N/A |
| 11. Noni can help the kidney function better. | 13 (34.2) | 38 (100.0) | N/A | 36 (94.7) | < 0.001 | N/A |
| 12. Turmeric could damage the kidney function. | 10 (26.3) | 34 (89.5) | < 0.001 | 33 (86.8) | < 0.001 | < 0.001 |
| 13. Wildbetal leafbush could cause kidney stone. | 15 (39.5) | 37 (97.4) | < 0.001 | 37 (97.4) | < 0.001 | < 0.001 |
| 14. Long-term use of herbs and nutritional supplements containing high level of oxalic acid such as noni and Sparrow's Brinjal (<i>Solanum indicum</i>) could cause kidney stone. | 14 (36.8) | 36 (94.6) | < 0.001 | 36 (94.7) | < 0.001 | < 0.001 |
| 15. Nutritional supplements containing clove, spinach, and ginkgo could harm the kidney. | 11 (28.9) | 34 (89.5) | < 0.001 | 36 (94.7) | < 0.001 | < 0.001 |
| Average scores (points) (mean ± SD) | 6.21 ± 3.09 | 14.42 ± 1.00 | < 0.001 ^a | 14.11 ± 1.20 | < 0.001 ^b | 0.244 ^c |

^{II} Questions with true statements: 2, 3, 4, 6, 12, 13, 14 and 15; questions with false statements: 1, 5, 7, 8, 9, 10 and 11.

* Test of proportions of patients answering correctly by McNemar chi-square test.

^a Comparison of average score at pretest with posttest-1 by paired t-test.

^b Comparison of average score at pretest with posttest-2 by paired t-test.

^c Comparison of average score at posttest-1 with posttest-2 by paired t-test.

Proportions of patients with the use of herbs and nutritional supplements

It was found that only 17 of 38 participants used herbs and/ or nutritional supplements (44. 7%) (Table 3) , 10 participants using herbs, 1 using nutritional supplement, and 6 using both herbs and nutritional supplements. Of the 17 users of herbs or nutritional supplements, 11 (64. 71%) reported or informed their healthcare providers about the use and only 2 (11. 76%) asked their providers about herbs or nutritional supplements.

There were 4 participants who were given information about herbs and nutritional supplements (23. 53%) . Ten participants used herbs or nutritional supplements according to significant others (58.52%). About half of the users sought information about herbs or nutritional supplements by their own (52.9%); while 35.29% used the products based on the advertising media. Of these 17 users, 17. 65% reported abnormality after using herbs or nutritional supplements which included edema, itching, somnolence, nausea and vomiting (Table 3).

Table 3 Proportions of patients reporting the use of herbs and nutritional supplements with potential renal effects (N = 38).

| Behaviors | N (%) | |
|--|------------|------------|
| | Yes | No |
| 1. Are you using any herbs? | 16 (42.1) | 22 (57.9) |
| 2. Are you using any nutritional supplements? | 7 (18.4) | 31 (81.6) |
| 3. Are you using herbs or nutritional supplements with prescribed modern medicines? | 17 (44.7) | 21 (55.3) |
| <i>Questions 4 – 10 were applicable to participants answering "Yes" to at least 1 of questions 1 – 3. (N = 17)</i> | | |
| 4. Do you ask for information about and nutritional supplements from healthcare providers? | 2 (11.76) | 15 (88.24) |
| 5. Have you been given information about herbs and nutritional supplements? | 4 (23.53) | 13 (76.47) |
| 6. Have you informed your healthcare providers about your use of herbs or nutritional supplements? | 11 (64.71) | 6 (35.29) |
| 7. Have you had any abnormality after using herbs or nutritional supplements? | 3 (17.65) | 14 (82.35) |
| 8. Have you used herbs or nutritional supplements according to your significant others? | 10 (58.82) | 7 (41.18) |
| 9. Have you used herbs or nutritional supplements according to advertisement media? | 6 (35.29) | 11 (64.71) |
| 10. Have you sought information about herbs or nutritional supplements by your own? | 9 (52.9) | 8 (47.1) |
| 11. If given information about effects on the kidney of herbs and nutritional supplements, will you discontinue the use of the products? | 36 (94.7) | 2 (5.3) |

After the second education, the proportion of users of herbs and nutritional supplements decreased from baseline (Table 4) . For herb users, it dropped from 42. 1% to 13. 2% with statistical significance (*P*-value = 0. 006) . On the other

hand, nutritional supplements users decreased from 18.4% to 10.5% with no statistical significance (*P*-value = 0.375) .

Table 4 Proportions of patients reporting the use of herbs and nutritional supplements with potential renal effects before and after the education session (N = 38).

| Usage | N (%) | | <i>P</i> -value ^a |
|-------------------------|------------------|-----------------|------------------------------|
| | Before education | After education | |
| Herbs | 16 (42.1) | 5 (13.2) | 0.006 |
| Nutritional supplements | 7 (18.4) | 4 (10.5) | 0.375 |

^a McNemar Chi-square test.

Renal functions by eGFR before and after the education session

Kidney function as average eGFR improved slightly from 43.34 before education to 46.29 ml/min/1.73m² after education with no statistical significance (*P*-value = 0.062) (Table 5).

Table 5 Kidney function as eGFR levels before and after the education session (N = 38).

| Kidney function | Before education | After education | <i>P</i> -value ^a |
|--|------------------|-----------------|------------------------------|
| eGFR _{max} (ml/min/1.73m ²) | 89.50 | 100.04 | |
| eGFR _{min} (ml/min/1.73m ²) | 2.54 | 2.26 | |
| eGFR _{average} (ml/min/1.73m ²) | 43.34 ± 3.57 | 46.29 ± 3.76 | 0.062 |

^a Wilcoxon signed rank test.

Discussions and Conclusion

The study determined the effect of providing educational session on the level of knowledge and the behavior of using herbs and nutritional supplements among patients impairment who were taken of at the outpatient department of Suthavet Hospital, Faculty of Medicine, Mahasarakham University. The study was a one-group pre-post design with a total of 38 participants. Of these participants, 44.7% of them used herbs or nutritional supplements; specifically, 26.3% using herbs, 2.6% using nutritional supplements, and 15.79% using both herbs and nutritional supplements.

Regarding knowledge, most patients did not know what kinds of herbs and nutritional supplements should not be taken since they could affect kidney function. After education session, the score of knowledge was improved significantly (*P*-value < 0.001) . This finding was consistent with the study of Nualchuay (2011) where patients in kidney disease clinic of Thasala Hospital had their knowledge about the disease and self-care significantly improved after receiving pharmaceutical

care service (P -value < 0.001).⁷ However, since our study focused only on the knowledge about the use of herbs and nutritional supplements, our finding indicated that pharmacist's involvement in the care of CKD patients regarding appropriate use of herbs and nutritional supplements could improve the patient's understanding which hopefully could improve the practice behavior on the use of the products. In addition, our pocketbook for self-learning later after the education session could also enhance the learning on the subject. This was consistent with the study of Somsiri (2011) which found that education program through media and self-care handbook for patients with cardiovascular diseases helped enhance the understanding specific to given patients.⁸ In our study, at day 15 after the in-person education session, we also provided additional education via telephone to review what the patients had learned and also correct what had been misunderstood. The knowledge at another 15 days was found to be even better. This finding was consistent with Soomhirun and colleagues (2009) where the program to prevent re-hospitalization of patients with heart failure helped the patients learn more efficiently, and self-care more effectively. The program also provided follow-up advice through telephone with the help of more than single type of media.⁹

In our study, 64.71% of the patients did not inform their healthcare providers about their use of herbs and nutritional supplements. This was different from the study of Tangkiatkamjai where 72% did not inform their healthcare providers.¹⁰ Our study found that they used the products according to their significant others (58.82%), they sought the information by themselves (52.9%), they followed the advertising media (35.29%), and they experienced some adverse effects from herbs or nutritional supplements (17.65%). This was consistent with the study of Tangkiatkamjai that most patients used herb and nutritional supplements because of the recommendation of family and friend.¹⁰ Our study suggested that after the second education session, the numbers of patients using the products decreased significantly

Our study also found that after the education session, a slight increase in kidney function was found but with no statistical significance. This was consistent with the study of Nualchay where GFR increased in 16.19% of the patients, remained the same in 70.8%, and decreased in 13.33% after receiving pharmaceutical care service.⁷ The improvement in kidney function could be in part due to the education session.

Other factors could be, but not limited to, advice from physicians and nurses, medication adherence, and self-modified lifestyle.

This study had certain limitations. The one-group design allowed for certain level of bias and confounding. Future studies should employ a better study design such as randomized controlled trial. The intervention should include advice from multidisciplinary team to control for confounding effect. The multidisciplinary team could also be a better approach for comprehensive healthcare service.

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