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# Management of epilepsy in Laos: perceptions of healthcare professionals from Vientiane Capital Province and traditional healers in Southern Laos

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## Conflict of interest statement

We declare no competing interests. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## List of Abbreviations

AEDs: antiepileptic drugs

CAM: complementary and alternative medicine

DHeVeLoP: Domestic Health Visitors for improving access to care for people with epilepsy in Lao PDR

Lao APE: Lao Association for Patients living with Epilepsy

Lao PDR: Lao People's Democratic Republic

PWEs: people living with epilepsy

## Keywords

Neurological disease, traditional medicine, conventional medicine, treatment gap, Southeast Asia

## Highlights of the findings and novelties

- Understanding the perceptions and reciprocal views of care providers,
- Study the combination of traditional and conventional medicine for epilepsy,
- Public health policies: integration of traditional medicine in the care of patients.

## **Type of Article**

Original Research article

## **Length of the Manuscript**

Title: 126 characters; Abstract: 247 words; Text: 3633 words; References: n. 30; Figures and Tables: n. 5; Supplementary files: n. 4

## **Section**

4. History, Philosophy and Social-Cultural aspects of Traditional Medicine.

## **Taxonomy (classification by EVISE)**

International Issues in Epidemiology

Traditional Herbal Medicine

Clinical Neurology

1 **Management of epilepsy in Laos: perceptions of healthcare professionals from Vientiane Capital**  
2 **Province and traditional healers in Southern Laos**

3

4 **Abstract**

5 *Background and Aim:* Traditional practices are deeply rooted in Lao people's perceptions and beliefs  
6 about health and illness.

7 The objective of the study was to understand the perceptions of healthcare professionals and  
8 traditional healers regarding the management of epilepsy in Laos, and their reciprocal views.

9 *Experimental procedure:* An observational study was carried out in two areas of Laos from February  
10 to May 2017. Semi directive questionnaires were used to collect quantitative and qualitative data.  
11 Semiotic square was carried out to highlight relationships between attitudes of traditional healers  
12 and healthcare professionals. For quantitative approach, the proportions were reported, and the test  
13 used was Fisher's test for nominal variables. The mean and standard deviation expressed the  
14 continuous variables and the Student's t-test was used.

15 *Results and Conclusion:* Epilepsy was cited by 90.9% of traditional healers as a convulsive disease  
16 with saliva or urine, and herbal medicines were predominantly used (86.4%) to treat it. Few  
17 healthcare professionals (26.5%) pointed out that they knew remedies to treat epilepsy other than  
18 antiepileptic drugs (AEDs), and 76.5% of healthcare professionals mentioned that epilepsy was a  
19 disease which only AEDs could treat. On the other hand, 54.5% of traditional healers confirmed a  
20 traditional remedy could cure completely epilepsy through long-term use. Ninety percent of  
21 traditional healers said the collaboration with healthcare professionals was a good idea and 44.1% of  
22 the healthcare professionals group said was complicated.

23 The combination of these medicines for the management of epilepsy needs to be adapted to Lao's  
24 medical context.

25 *Keywords:* epilepsy, traditional medicine, conventional medicine, traditional healer, treatment gap

26

## 27 1. Introduction

28 Epilepsy is a chronic brain disorder that affects about 70 million people worldwide <sup>1</sup>. Epilepsy affects  
29 about 1% of the population in Southeast Asia region; thus, there are approximately 15 million people  
30 with epilepsy in the region. Only 10-20% of all people living with epilepsy (PWEs) receive appropriate  
31 treatment; communities in Southeast Asia continue to believe in many myths and misconceptions  
32 about epilepsy <sup>2</sup>. In Eastern and South Eastern Asian languages, such as Chinese, Japanese, Korean,  
33 Malay, Lao, Thai, Burmese, and Khmer (Cambodia) epilepsy is associated with madness <sup>3</sup>. In many  
34 cultures, including in Africa and Asia, people with epilepsy (PWEs) are viewed with hostility and  
35 denied access to medical and social care. PWEs are excluded from society: exposed to social and  
36 religious taboos, isolated, sometimes with no right to have children or marry <sup>4</sup>, are excluded from  
37 jobs, and are not allowed to have contact or to share meals with other people <sup>5</sup>.

38 Epilepsy is a controllable disease in the majority of PWEs. The goal of treatment is to maintain a  
39 healthy lifestyle, ideally by complete seizure control with no or minimal side effects. Antiepileptic  
40 drugs (AEDs) are the main treatment <sup>6</sup>, and are the usual first line step in the management of  
41 epilepsy for the majority of PWEs <sup>7</sup>. In Asian countries, the treatment gap is 64.0% <sup>8</sup>, and higher in  
42 rural areas than in urban areas, particularly because of a lack of knowledge on epilepsy and the low  
43 availability of AEDs <sup>9</sup>.

44 In developing countries, traditional healthcare systems compete or complement conventional  
45 medicine <sup>10</sup>. Faith healers have strong social and religious connections; they also play an essential  
46 role in the management of epilepsy in some countries. Especially in communities in Southeast Asia,  
47 where PWEs are sometimes more likely to consult traditional healers than conventional doctors <sup>2</sup>.

48 Despite a lack of national policy program on epilepsy in Laos, recent research studies in collaboration  
49 with several centers provided an overview of the state of knowledge <sup>11</sup>. The overall prevalence of  
50 epilepsy was 7.7 cases per thousand inhabitants in 2006 <sup>12</sup>. The treatment gap was 90% or more, the  
51 low level of knowledge of epilepsy on the part of health workers may be contributing to the wide

52 treatment gap in Laos <sup>12</sup>. A low availability of AEDs throughout the country was reported with an  
53 annual importation of phenobarbital allowing to treat around 2% of PWEs and a price of annual  
54 treatment 4- to 10-fold higher than the international price <sup>13</sup>. Only a mean of one PWE per month per  
55 hospital is being cared in Lao hospitals <sup>11</sup>. PWEs face many challenges to get access to appropriate  
56 healthcare: a study in 2013 showed that PWEs combined conventional and traditional medicines  
57 treatments <sup>14</sup>. Traditional practices are deeply rooted in Lao people's perceptions and beliefs about  
58 health and illness. The use of traditional medicine has recently become more popular and accessible,  
59 and in response, the Ministry of Health has launched a policy in support of integrating traditional  
60 medicine with Western medicine. The Centre for Research on Medicinal Plants and Traditional  
61 Medicine was upgraded to a national institute in 2009. In 2014, the Food and Drug Department  
62 provided a census of traditional medicines but guidelines for the safe use have not yet been  
63 formulated. The first national traditional medicine policy and strategy are under discussion <sup>15</sup>.

64 Our study aimed to understand the perceptions of healthcare professionals and traditional healers  
65 regarding the management of epilepsy in Laos, and their reciprocal views on traditional and  
66 conventional medicines, in order to improve the management of epilepsy.

## 67 2. Method

### 68 2.1 Study Area

69 An observational descriptive study was carried out from February to May 2017 by using semi  
70 directive questionnaires. The selection procedure of participants was concentrated in 2 areas of Laos.  
71 First, in Vientiane Capital (Figure 1), a well-known area included in the Domestic Health Visitors for  
72 improving access to care for people with epilepsy in Laos (DHeVeLoP project 2014-2016) <sup>16</sup>. Most of  
73 participants were the members of the Lao Association for Patients with Epilepsy (APE), and lived in  
74 the capital. The APE was established in 2011 with four main activities: organizing scientific  
75 conferences on epilepsy, providing three days training on epilepsy to health personal at both  
76 provincial and district levels, supporting the provision of antiepileptic drugs through a revolving drug  
77 fund at provincial and district hospitals, and promoting the dissemination of information on epilepsy

78 to the public <sup>15</sup>. There are also market trade centers for traditional medicine (sellers of medicinal  
79 plants). The second area was Champasak Province, which located in the South of Laos, it is about  
80 700 kms away from Vientiane Capital (Figure 1). This province has a strong cultural and religious  
81 environment, the largest number of traditional healers, and there is a Traditional Medicine Centre  
82 site in the Provincial Hospital.

## 83 2.2 Participants

### 84 2.2.1 Healthcare professionals

85 The participants in the conventional group were selected from the list of healthcare professionals  
86 from the Lao Association for Patient with Epilepsy <sup>17</sup>.

87 We performed an exhaustive sampling: all healthcare professionals (nurses and general  
88 practitioners) of the list from the association for people living with epilepsy that have been found in  
89 both study areas (Vientiane Capital and Champasak Province) were included. Then, we also  
90 automatically included health personnel in the neurology and mental health services who provided  
91 epilepsy treatment although they were not a member of the association.

### 92 2.2.2 Traditional Healers

93 With the assistance of the Provincial and District Health Units, and especially the Provincial Hospital  
94 Traditional Medicine Centre, as well as through the herbal market, we were able to identify  
95 traditional healers. In addition, a snowball sampling technique was used, allowing recruiting  
96 traditional healers who were familiar and lived in the same villages as PWEs.

97 All participants had to know at least one traditional remedy for treating epilepsy. We included all  
98 types of traditional medicine players (traditional healers and sellers of medicinal plants). They had to  
99 be present at the time of our survey and willing to participate.

### 100 2.3 Semi-structured interviews

101 We organized individual interviews using two semi-structured questionnaires and interview guides,  
102 one for healthcare professionals and one for traditional healers. The questionnaire for healthcare  
103 professionals consisted of four sections: sociodemographics, knowledge (epilepsy training), attitudes  
104 and practices regarding epilepsy and its treatments. It included seven questions in total, two closed  
105 questions, and five open-ended questions. The questionnaire for traditional healers consisted of five  
106 sections: sociodemographic data, experience with conventional medicine, knowledge, attitudes, and  
107 practices regarding epilepsy and its treatments. There were in total eight open-ended questions to  
108 allow a good free expression on these topics.

109 Questionnaires were initially developed in English with the agreement of the research team, and  
110 then they were translated in Lao language. The Lao questionnaires were field tested in Vientiane  
111 capital with 10 participants prior to conducting field work.

112 Before starting the interview, the researcher explained in detail the topic and the objective of the  
113 discussion. All individual interviews were conducted by the first author (bilingual, native of Laos) at  
114 the residence of participant from the traditional healers' group. For the conventional group, they  
115 could choose the place where it was most convenient for them. The researcher allowed participants  
116 to share their opinions without influencing the answers. If necessary, more specific questions were  
117 then asked. We worked closely with local healthcare professionals (who acted as mediators) for  
118 better communicating and comprehensive of a local term, so the participants would be able to  
119 provide rich information. Each individual interview would take a minimum of 50 minutes; interviews  
120 were recorded after seeking authorization from the participants. Interviews recorded in Lao were  
121 then translated in English.



## 122 2.4 Ethical considerations

123 Written consent was systematically obtained before the interviews. Our study was authorized by the  
124 Lao National County of Ethics for Health Research (No 032/NIOPH/NECHE and No044/NECHR) and  
125 the Ministry of Health, Laos (Agreement No 0397 dated 04/03/2016).

## 126 2.5 Data analysis

127 Our main objective was focused on understanding the perceptions of traditional healers and  
128 healthcare professionals on epilepsy management by using two different analytical approaches.

### 129 2.5.1 Qualitative analyses

130 Thirteen open-ended questions, reverse translations, and transcriptions were carried out by the  
131 bilingual interviewer, a native of Laos (1<sup>st</sup> author). We used the thematic analysis methodology, first  
132 identifying key themes within data, and encoding before interpretation. The lexical analysis was  
133 based on semantic occurrences, which allowed coding (in qualitative value) according to the most  
134 frequently cited modalities and was presented by a proportion. The validity of the coding was based  
135 on the consensual coding of two researchers (1<sup>st</sup> and 2<sup>nd</sup> author). When differences emerged, a  
136 consensus was sought with a third researcher. These questions were then analyzed as closed  
137 multiple-choice questions by proportion analysis.

138 We used semiotic square in order to highlight relationships between attitudes of traditional healers  
139 and healthcare professionals through the negative and positive answers.

### 140 2.5.2 Quantitative analyses

141 Transcriptions and coding of the lexical segments of interest were carried out using the  
142 functionalities of the Word software; then the coded data were stored in Microsoft Excel. The  
143 statistical analyses were performed using STATA 13 software. For dichotomous and closed-ended  
144 questions, the proportions were reported, and the tests used were Chi2 or Fisher's test. Their mean

145 and standard deviation expressed the quantitative variables, and the Student's t-test was used. The  
146 significance threshold for all analyses was set at 0.05.

## 147 3. Results

### 148 3.1 Sociodemographic data

149 Fifty-six participants were interviewed: 34 healthcare professionals and 22 traditional healers (Figure  
150 1). Women represented 61.8% in the group of healthcare professionals in contrast with the  
151 traditional healers' group, where the male population was predominant (95.5%); the difference  
152 between two groups was significant ( $p < 0.0001$ ). The participants were mostly Buddhists (98.2%) and  
153 in the traditional healers' group, they were significantly older than in the conventional group  
154 ( $p < 0.0001$ ). Only one traditional healer (4.6%) had completed a university degree compared to 100%  
155 of subject in the healthcare professionals' group ( $p < 0.0001$ ) (Table 1).

### 156 3.2 Knowledge and practice of traditional healers on epilepsy

157 Epilepsy was cited by 91% of traditional healers as a convulsive disease with saliva or urine, followed  
158 by a neurological disease (41%). The perception of a supernatural disease was not found in the  
159 participants of the survey. Fifty-four percent had learned about traditional medicine from their family  
160 and they stated this practice was a Lao folk custom. When we questioned if the participant knew  
161 another remedy to treat epilepsy beside a traditional remedy, about 41% mentioned biomedical  
162 medicine as a treatment for epilepsy. Forty-one percent had no restriction if patient would like to  
163 combine antiepileptic drugs with traditional remedy.

### 164 3.3 Epilepsy remedy of traditional healers

165 Herbal medicines were predominantly used by traditional healers (86.4%) and 31.8% of them used  
166 bone or teeth from animals. The participant explained the reason of using traditional remedies by a  
167 familiarity and a tradition behavior (54.5%). Food restrictions were mentioned for PWEs being  
168 treated with traditional medicine (68.2%). For some traditional healers, the only advice given to  
169 PWEs was to be careful about epileptic seizures (31.2%). Regarding the combination of traditional

170 and biomedical treatments, 45.5% of traditional healers said it was the patient's decision. Forty-one  
171 percent stated that patients could combine a traditional remedy with AEDs with no restriction (Table  
172 2).

### 173 3.4 Attitudes of healthcare professionals on epilepsy care pathway

174 Thirty-four healthcare professionals were interviewed about their opinion on epilepsy management  
175 in Laos (Table 3). Only 21% reported that they received initial training in epilepsy as part of their  
176 medical curriculum. Sixty one percent mentioned that continuous training had improved their  
177 knowledge on epilepsy and 50% stated they had the capacity to diagnose and prescribe antiepileptic  
178 drugs (AEDs).

179 Very few participants pointed out that they knew treatments other than AEDs (26.5%): among those  
180 who knew, 20.6% mentioned traditional ceremonies and 11.5% herbal medicines, only one  
181 healthcare professional mentioned surgery. Otherwise, 41.2% of participants stated that only AEDs  
182 could treat epilepsy, and that traditional remedies or herbal medicine were ineffective. Anyhow, if  
183 PWEs would like to combine, they could (38.2%).

### 184 3.5 Conventional doctor and traditional healers' attitudes on epilepsy treatment

185 We synthesized participants' attitudes according to semiotic squares in Figure 2 (A&B). Regarding the  
186 opinions on AEDs, the figures were categorized in more positive and more negative attitudes for  
187 better understanding. In the conventional group, 61.8% mentioned that AEDs were available and  
188 affordable, but some of them (44.1%) stated AEDs geographical availability could be limited,  
189 potentially leading to low adherence to treatment for PWEs (32.4%). For the traditional healers'  
190 group, AEDs were considered by 68.2% of participants to increase the pharmacological effect of  
191 traditional remedies. Although, 13.6% of participants thought AEDs were used to control the  
192 epileptic seizures, not to treat epilepsy cause.

193 The second question was focused on the perception regarding traditional remedies. Participants in  
194 the conventional group had more negative attitudes on traditional medicine: 76.5% mentioned that  
195 epilepsy was a neurological disease which only AEDs could treat. Only 14.7% said it could be  
196 combined with AEDs as traditional medicine was about providing psychosocial support to PWEs. In  
197 the traditional healers' group, traditional medicine was considered as more natural (organic means)  
198 and moreover, it could cure completely epilepsy when used over the long-term (54.5%). Thirty-six  
199 percent of traditional healers stated that the effectiveness of traditional remedies was unpredictable.  
200 For the collaboration between conventional and traditional medicine, 90.9% of traditional healers  
201 said it was a good idea. In contrast, with the conventional group in which 44.1% stating, it was  
202 complicated.

## 203 4. Discussion

### 204 4.1 Conventional and traditional medicine for epilepsy management

205 Traditional medicine remains an important part of the health care system, particularly in Asian and  
206 African countries <sup>18-20</sup>. Traditional healers showed a positive attitude regarding the collaboration with  
207 healthcare professionals for epilepsy treatment. Most of them said the cooperation was an excellent  
208 approach but only 13.0% of traditional healers recommend PWEs taking a traditional remedy and an  
209 AED at the same time. A study in Burkina Faso demonstrated that most healers (more than 90.0%)  
210 wished to be integrated into the modern healthcare system and considered that both kinds of  
211 treatments were complementary <sup>21</sup>. A study conducted in Cape Town in 2015 showed that traditional  
212 healers were supportive of collaboration with western-trained practitioners <sup>22</sup>. Conversely, the study  
213 in Ivory Coast highlighted that traditional healers would recommend the sudden discontinuation of  
214 modern medicines in preference to traditional treatment, this attitude reflecting their relative  
215 ignorance about modern treatments <sup>23</sup>. In our study, almost half healthcare professionals thought  
216 that collaboration with traditional healers was complicated and only thirty-eight percent stated it  
217 was good. We noticed that they were likely to not recommend complementary treatment, unlike

218 patients in Peru, in which it was showed the traditional medicine has been chosen by PWEs instead  
219 of conventional treatment ( $p=0.024$ )<sup>24</sup>.

220 It is interesting to discuss why they had a different perspective, especially because our study shows a  
221 contradictory perception between the two groups. First, if we consider sex and age, we observed  
222 that the participants' traditional groups were significantly older than those of the conventional  
223 group. Older adults perceive pictures differently than younger adults; older adults focus more on  
224 positive affect<sup>25</sup>. There was also a greater proportion of males in the group of traditional healers  
225 similar to the study in Burkina Faso by Abdullahi et al. (2011), regarding traditional healers'  
226 knowledge and attitudes towards epilepsy, all traditional practitioners were male and most of them  
227 were above 50 years of age<sup>21</sup>. In Lao context, men are considered culturally superior because of their  
228 ability to become monks. Men are generally recognized as the household head for religious and  
229 political purposes<sup>26</sup>. Being a traditional healer in Laos means they have to respect many cultural  
230 rules, so it is not too different from being a religious leader.

#### 231 4.2 Knowledge, Attitudes and Practices regarding on epilepsy care

232 Epilepsy was seen largely as a convulsive disease with saliva or urine flowing out by traditional  
233 healers. The perception that epilepsy has a supernatural origin was not found for traditional healers  
234 and healthcare professionals but was previously reached by PWE, their families and villagers<sup>5</sup>. A  
235 study in Ivory Coast demonstrated that for more than 80.0% of traditional practitioners, epilepsy was  
236 a supernatural disease<sup>23</sup>. Our results, and those of the study in Ivory Coast<sup>23</sup>, suggest that herbal  
237 treatments are the main remedy used by traditional practitioners, 86.4% and 97.0% respectively. In  
238 Latin America, a study conducted in Peru showed the traditional healers were more frequently  
239 consulted than healthcare professionals for first-line antiepileptic treatment. More than 60.0% of  
240 PWEs and 80.0% of traditional healers, used herbal remedies in this survey, and supernatural  
241 etiologies were mentioned by 23.4% of PWEs<sup>24</sup>. By contrast, in Malaysia in 2008, Razali et al. showed  
242 that 75.0% of epileptic patients used Holy water and only 12.5% herbal medicine<sup>27</sup>.

243 Awareness campaigns provided by healthcare system mentioned 38.2% of PWEs and their families  
244 had limited understanding about epilepsy and medicals staff in rural areas had poor knowledge on  
245 epilepsy (23.5%)<sup>28</sup>. More than half of healthcare professionals mentioned that continuous  
246 professional training could be applied to increase knowledge on epilepsy treatment and allowed  
247 them to have the ability to diagnose and prescribe antiepileptic drugs (AEDs). The professional  
248 training that they referred to was the activities of the program DHeVeLoP (2014-2016) and of the Lao  
249 Association for patients living with epilepsy (Lao APE)<sup>17</sup>. This suggested a positive outcome of the  
250 intervention activities compared to the previous study conducted in 2013 which indicated a low  
251 knowledge of epilepsy for healthcare workers in Laos<sup>14</sup>. Two important changes in the management  
252 of epilepsy were made between the studies: the APE provided AEDs and the domestic health visitors  
253 were trained about the disease in the second study. A randomly selected health workers study  
254 conducted in 2009 reported only 2.5% of them recalled ever having received training on epilepsy and  
255 our study highlighted a poor knowledge of the medical staff for less than 25% of the healthcare  
256 professionals surveyed. The majority of the health workers (59.9%) were unaware of any available  
257 AEDs at the health facilities<sup>12</sup> and 55.9% perceived difficulties of AEDs management and accessibility  
258 in the present study.

259 The availability of antiepileptic drugs (AEDs) seems to be a serious barrier to the management of  
260 epilepsy: participants in the conventional group mentioned that AEDs were available and affordable  
261 with some of them stating that their geographical availability across the country could be limited.  
262 Many studies in Laos already highlighted that AEDs had very low availability especially in rural areas  
263<sup>28,29</sup>. Traditional or herbal medicines were considered as ineffective (41.2%) but the study conducted  
264 in 2018 in Laos suggested that more than 50% of PWEs had already consulted a traditional  
265 practitioner to treat their epilepsy<sup>30</sup>. Only thirty-eight percent agreed about the combination of  
266 conventional and traditional medicines based on patient's needs.

267

### 268 4.3 Strengths and limitations

269 Our study was the first study in Laos conducted to understand the perceptions of healthcare  
270 professionals and traditional healers regarding epilepsy treatment. Exploratory research is effective  
271 in laying the foundation for future studies. All information collected was original data; individual  
272 interviews helped participants to discuss contentious issues in more depth, allowing flexibility, and  
273 adaptability to the local context.

274 A rather modest number of subjects in the samples, which may not adequately represent the target  
275 population, was surveyed. The identification of participants, especially traditional healers was not  
276 easy because not every Traditional Medicine Centre has a list of registered traditional healers  
277 resulting in a lower number of traditional healers answered in comparison with healthcare  
278 professionals. Thus our sample has a limited representativeness, which makes extrapolation of the  
279 results in the national context difficult. Additionally, it could have been interesting to interview  
280 traditional healers from the North of Laos who have different cultural background and medicine  
281 healthcare, influenced by Chinese traditional medicine.

282 Exploratory studies generate qualitative information and interpretation of such type of information is  
283 subject to biases. That is the reason why we combined qualitative and quantitative approaches:  
284 some qualitative answers were then categorized into quantitative variables (after consultation with  
285 several authors). Although it can lead to a loss of information from interviews, it has the benefit of  
286 allowing quantitative analyses.

287 The healthcare seeking behavior of mixing remedies has long been observed. It is time for healthcare  
288 professionals to be more willing to accept complementary and alternative remedies.

### 289 5. Implications for practice and conclusion

290 Most traditional healers said the collaboration with healthcare professionals was a good idea and  
291 nearly half of the healthcare professionals believed it would be complicated. Healthcare  
292 professionals reported than AEDs have a low compliance, mainly due to occasional availability. For

293 them, traditional medicine could be used in association with AEDs as non-medical remedies and  
294 could play a psychotherapeutic role. Traditional healers mentioned that traditional medicine  
295 provides unpredictable effectiveness. Most of them indicated that AEDs will be interesting in order to  
296 increase the efficacy of the traditional remedy. For both groups of caregivers, it would be relevant to  
297 use the effects of traditional medicine coupled with those of AEDs.

298 Understanding the attitudes of the conventional doctor towards traditional medicine will be useful in  
299 implementing future integration of complementary and alternative medicine (CAM). The institutional  
300 recognition of traditional medicine, recommended by the WHO in its strategy 2014-2023, promote  
301 the safe and effective use of CAM through the regulation of products, practices, and practitioners.  
302 Healthcare professionals need to be aware of their presence and their role as a potential referral to  
303 healthcare, considering the holistic, humanitarian and individualized views of the traditional healer,  
304 and the interesting therapeutic and palliative effect of CAM in chronic diseases.

305 This study showed steps forward in epilepsy management in the Lao medical context. Further  
306 research on the combination of traditional and conventional medicine for epilepsy is required and  
307 will bring us closer to the patient. A better understanding of the care pathway will help reduce the  
308 treatment gap.

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311

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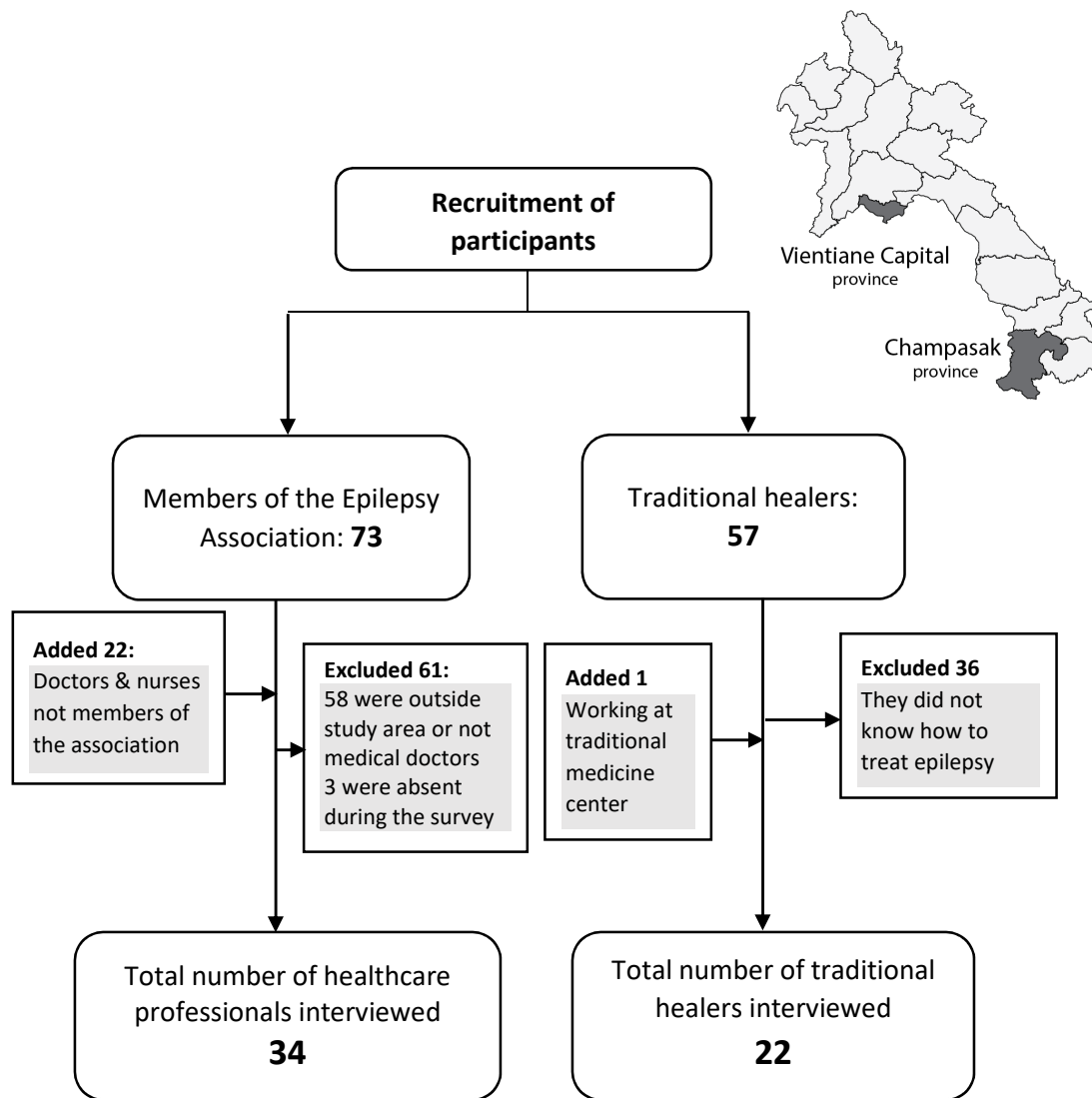


Figure 1: Flow chart of healthcare professionals & traditional healers interviewed and localization of study areas in Lao PDR

|          | Healthcare professional   | Traditional healers  |
|----------|---|--|
| <b>+</b> | <b>61.8%</b> : Availability and affordability   | <b>68.2%</b> : Increase the efficacy of the traditional remedy   |
| <b>-</b> | <b>44.1%</b> : Low geographic availability<br><b>32.4%</b> : Occasional availability → Low patient compliance | <b>13,6%</b> : Can control the seizure but not treat the real cause<br><b>9.1%</b> : Had more side-effects |

Figure 2.A: Opinion on antiepileptic drugs (AEDs) for epilepsy treatment

|          | Healthcare professional  | Traditional healers  |
|----------|--|--|
| <b>+</b> | <b>14.7%</b> : In association “non-medical remedy = psychotherapy” | <b>54.5%</b> : Can heal completely epilepsy<br><b>54.5%</b> : Less chemicals supplements, more natural ingredients |
| <b>-</b> | <b>76.5%</b> : Only AEDs can treat epilepsy                        | <b>36.4%</b> : Unpredictable effectiveness   |

Figure 2.B: Opinion on traditional method for epilepsy treatment

Table 1: Sociodemographic characteristics of participants interviewed

|                                | Overall<br>N=56   | Healthcare<br>professionals N= 34 | Traditional healers<br>N= 22 | P value              |
|--------------------------------|-------------------|-----------------------------------|------------------------------|----------------------|
| <b>Sex</b>                     |                   |                                   |                              |                      |
| Male                           | 34 (60.7%)        | 13 (38.2%)                        | 21 (95.5%)                   | <0.0001 <sup>a</sup> |
| Female                         | 22 (39.3%)        | 21 (61.8%)                        | 1 (4.6%)                     |                      |
| <b>Mean age ± SD (Min-Max)</b> | 50.4±13.9 (24-80) | 43.1±9.1 (24-61)                  | 61.8±12.3 (34-80)            | <0.0001 <sup>b</sup> |
| <b>Religion</b>                |                   |                                   |                              |                      |
| Buddhism                       | 55 (98.2%)        | 34 (100.0%)                       | 21 (95.5%)                   | 0.393 <sup>a</sup>   |
| Animism                        | 1 (1.8%)          | 0                                 | 1 (4.6%)                     |                      |
| <b>Education level</b>         |                   |                                   |                              |                      |
| Special education system       | 2 (3.6%)          | 0                                 | 2 (9.1%)                     | <0.0001 <sup>a</sup> |
| Primary school                 | 10 (17.9%)        | 0                                 | 10 (45.5%)                   |                      |
| Secondary and higher           | 9 (16.1%)         | 0                                 | 9 (40.9%)                    |                      |
| University degree              | 35 (62.5%)        | 34 (100.0%)                       | 1 (4.6%)                     |                      |
| <b>Family status</b>           |                   |                                   |                              |                      |
| Single                         | 5 (8.9%)          | 5 (14.7%)                         | 0                            | 0.145 <sup>a</sup>   |
| Married                        | 51 (91.1%)        | 29 (85.3%)                        | 22 (100.0%)                  |                      |

a=fisher's exact test, b=student's T-Test

Table 2: Knowledge and practices towards epilepsy of traditional healers

|  | Traditional healers<br>N=22 |
|--|-----------------------------|
| <b>Knowledge on epilepsy and epilepsy remedy</b>                                 |                             |
| <b>What is epilepsy, also called mad pig disease? (multiple answers)</b>         |                             |
| Convulsive disease with saliva/urine   | 20 (90.9%)                  |
| Neurological disease   | 9 (40.9%)                   |
| Disease of the blood system  | 7 (31.8%)                   |
| Disease of nerve fibers /tendons   | 6 (27.3%)                   |
| Hereditary disease   | 6 (27.3%)                   |
| <b>Do you know epilepsy remedies other than your epilepsy treatment methods?</b> |                             |
| Yes  | 11 (50.0%)                  |
| Biomedical medicine  | 9 (40.9%)                   |
| Acupuncture  | 2 (9.1%)                    |
| No   | 11 (50.0%)                  |
| <b>How did you learn about traditional medicine? (multiple answers)</b>          |                             |
| Family knowledge   | 12 (54.5%)                  |
| Learned at the temple (learned with a monk)                                      | 4 (18.2%)                   |
| Learned by ancient traditional healer  | 3 (13.6%)                   |
| The only one remedy access to care in rural area                                 | 3 (13.7%)                   |
| Have been chosen by a spirit to become a healer                                  | 3 (13.7%)                   |
| <b>Practices on epilepsy</b>   |                             |
| <b>Which methods do you use to treat epilepsy? (multiple answers)</b>            |                             |
| Herbal medicines   | 19 (86.4%)                  |
| Animals (bone, teeth)  | 7 (31.8%)                   |
| Other  | 4 (18.2%)                   |
| <b>Why do you use traditional remedy? (multiple answers)</b>                     |                             |
| This is a tradition/ these traditions exist in Lao folk custom                   | 12 (54.5%)                  |
| Generation-to-generation knowledge   | 8 (36.4%)                   |
| Fewest side effects  | 7 (31.8%)                   |
| <b>Restrictions? Yes</b>   |                             |
| Food diet  | 15 (68.2%)                  |
| No restrictions, just advise him to be careful about the seizures                | 7 (31.2%)                   |
| Drinking alcohol   | 4 (18.2%)                   |
| <b>Advice for PWEs who want to use antiepileptic drugs</b>                       |                             |
| Patient's preference   | 10 (45.5%)                  |
| In association with no restriction   | 9 (40.9%)                   |
| One after the other  | 3 (13.6%)                   |

Table 3: Opinion of healthcare professionals on epilepsy care

|  |  | Healthcare<br>professionals<br>(N=34) |
|--|--|---------------------------------------|
| <b>Opinion on the epilepsy care system in Laos</b>     |  |                                       |
| <b>Positive attitude</b>                               | Continuous training enabling to increase knowledge             | 21 (61.8%)                            |
|  | Capacity of diagnosis & prescription of AEDs                   | 17 (50.0%)                            |
|  | Improvement of the patient's quality of life                   | 8 (23.5%)                             |
| <b>Negative attitude</b>                               | Difficulty of AEDs management and accessibility                | 19 (55.9%)                            |
|  | Misunderstanding of patients and their families about epilepsy | 13 (38.2%)                            |
|  | Poor knowledge of the medical staff                            | 8 (23.5%)                             |
|  | Complexity of doctor-patient coordination                      | 5 (14.7%)                             |
| <b>Do you know any other remedy to treat epilepsy?</b> |  |                                       |
| <i>Yes (multiple answer)</i>                           |  | 9 (26.5%)                             |
|  | Traditional ceremony   | 7 (20.6%)                             |
|  | Herbal medicines   | 4 (11.8%)                             |
|  | Surgery  | 1 (2.9%)                              |
| <i>No</i>  |  | 25 (67.6%)                            |
| <b>Advice for PWEs who want to use herbal medicine</b> |  |                                       |
|  | Only AEDs, other remedies are not effective                    | 14 (41.2%)                            |
|  | In association   | 13 (38.2%)                            |
|  | Patient's preference   | 7 (20.6%)                             |



# Knowledge (epilepsy training), Attitudes & Practices regarding epilepsy and its treatments

## Semi-structured interviews

Traditional healers



86.0% used medical plants

91.0% : willing to collaborate

Healthcare professionals



76.5% mentioned only antiepileptic drugs

44.1%: collaboration was complicated

Qualitative analyses  
Quantitative analyses

Healthcare system

Conventional medicine

Traditional medicine

Healthcare pathway