

主論文の要旨

**Assessment of the underlying causes of adult deaths
using a short version of verbal autopsy in Xaiyabouli
Province, Lao People's Democratic Republic**

ラオスのサイニャブリー県で行った口述剖検ツール短縮版による
成人の死因特定の評価

名古屋大学大学院医学系研究科 総合医学専攻
社会生命科学講座 医療行政学分野

(指導：山本 英子 教授)

Bounbouly THANAVANH

【Introduction】

In developing countries, it is difficult to collect the data of the underlying cause of death (UCOD), especially when a death does not occur in a health facility. This study aimed to develop a short version of verbal autopsy (VA) and identify the UCOD of adult in Lao People's Democratic Republic (Lao PDR).

【Methods】

A short version of VA for deaths outside health facilities was developed. This study included all deaths of people aged 15 years old or older in Xaiyabouli Province in 2020. Socio-demographic factors, place of death, and UCOD of the deceased were collected from health facilities or from family members using a questionnaire including the short VA form. UCOD was compared between home deaths and hospital deaths, between the age group of 15-59 years old and the age group ≥ 60 years old, and between males and females.

【Results】

Development and verification of the short VA form

The short VA form was developed including 22 UCODs considering the situation of Lao PDR. The UCOD was coded by ICD-10 and corresponding category of WHO VA (Table 1). The short VA form was validated by comparing UCOD of 97 patients who died at Xaiyabouli Provincial Hospital that were recorded in the medical records and those decided by the short VA. The sensitivity of the short VA was 85.7% (12/14) for myocardial infarction, 80.0% (4/5) for asthma, and 84.6% (11/13) for heart/renal failure with face edema (Table 2). The sensitivity was 90.7% (88/97, 95% confidence interval 83.1-95.7%). The specificity and the positive predictive value of the short VA were 98.8% and 92.3% for myocardial infarction, 97.6% and 84.6% for heart/renal failure with face edema, 98.9% and 88.9% for pneumonia, 98.9% and 87.5% for stroke, respectively. Kappa statistics showed that κ was 0.896, which means a perfect agreement between UCOD by the short VA and hospital diagnoses.

Characteristics of deaths in Xaiyabouli Province in 2020

In 2020, a total of 1,254 deaths in Xaiyabouli Province were reported and the information of 1,235 deaths were collected including 1,012 deaths outside health facilities and 223 deaths at health facilities. All 1,012 deaths outside health facilities were at home (81.9%) and all 223 deaths at hospitals (18.1%) but not health centers (Table 3). The information of 1,012 home deaths was collected using the short VA form (Fig 1).

UCOD of all deaths in Xaiyabouli Province

UCOD of the 1,235 deaths were identified using the short VA or from medical records at hospitals (Fig 1). The most common cause was senility (n=164, 13.3%), followed by

heart/renal failure (n=130, 10.5%), pneumonia (n=119, 9.6%), traffic accident (n=88, 7.1%), myocardial infarction (n=79, 6.4%), and stroke (n=78, 6.3%) (Table 4). Heart failure or renal failure could not be separately identified as UCOD of home deaths (n=73, 7.2%), although heart failure (n=26) and renal failure (n=31) were diagnosed for hospital deaths. Of all deaths, 50 deaths (4.0%) were due to suicide/homicide and 52 deaths (4.2%) due to tumors, and causes of 183 deaths (14.8%) were categorized into others because UCOD was not identified. The major UCOD category was heart/renal disease (n=225, 18.2%) followed by accident/injury (n=180, 14.6%), respiratory disease (n=165, 13.4%), senile (n=164, 13.3%), and brain disease (n=129, 10.5%).

Comparison of UCOD between home deaths and hospital deaths, between age groups, and between males and females

UCOD categories were compared between home deaths and hospital deaths, home deaths had more accident/injury (16.0% vs. 8.1%, $P=0.002$) and tumor (4.7% vs. 1.8%, $P<0.001$) (Table 4). All deaths due to senility were home deaths. Deaths caused by heart/renal disease (15.1% vs. 32.3%, $P<0.001$), respiratory disease (12.2% vs. 18.8%, $P=0.012$), liver/gastro-intestine disease (5.3% vs. 9.0%, $P=0.043$), and infection (3.1% vs. 14.3%, $P<0.001$) were less likely to have occurred at home compared to at hospitals.

All deaths were divided into the age group of 15-59 years old and the age group of 60 years old or older. The age group of 15-59 years had more deaths of the categories of accident/injury (28.1% vs. 4.4%, $P<0.001$), liver/gastro-intestine disease (8.1% vs. 4.4%, $P=0.008$), infection (7.2% vs. 3.5%, $P=0.006$), and tumor (6.0% vs. 2.8%, $P<0.001$) (Table 4). Comparison of UCOD between males and females showed that males had significantly fewer natural deaths (11.2% vs. 15.9%, $P=0.018$) and more deaths due to tumor (5.2% vs. 3.0%, $P=0.018$) than females.

【Discussion】

The short VA was developed to identify UCODs of deaths outside health facilities in Xaiyabouli Province. The preliminary validation of the short VA form by hospital diagnosis showed high sensitivity and specificity. However, UCOD of 17.2% of home deaths could not be identified by the short VA and heart failure and renal failure could not be distinguished. Symptoms of chronic heart failure and end-stage renal failure are similar and the two diseases are major progressive factors of each other. To identify more kinds of UCOD, being diagnosed and having laboratory examinations at health facilities before deaths is needed.

The first study to show the UCODs in the adult population in Lao PDR, including deaths outside hospitals. In this study, heart/renal disease was the major UCOD category among all deaths as well as hospital deaths and one of the main categories among home deaths. Deaths due to arachnoid hemorrhage and stroke accounted for 10.4% of all deaths and 69 deaths

categorized into other UCOD had a history of hypertension or diabetes mellites. The results of this study suggest that 46.2% of all deaths were due to NCD (heart/renal disease, respiratory disease, brain disease, and tumor), which was lower than that estimated by the WHO in 2016. In the WHO estimation, 60% of all deaths were due to NCD, including cardiovascular disease (27%), cancer (12%), chronic respiratory disease (5%), diabetes (4%), and others (12%).

Compared to the age group of 60 years or older, the age group of younger than 60 years had higher mortality due to accident/injury, liver/gastro-intestine disease, infection, and tumor, especially traffic accident, suicide/homicide, and liver failure. These results were consistent with those of previous studies in Lao PDR and other developing countries. To reduce preventable deaths in the younger generation, interventions for preventing traffic accidents, promoting mental health service, and establishing a safe environment for people are needed in the province.

This study has some limitations. First, UCOD of 17.2% of home deaths could not be identified using the short VA form. Heart failure and renal failure could not be distinguished and causes of diarrhea or liver failure could not be found. Second, this study may not include all deaths that occurred in the province because 63.9% of all deaths in the whole country were not registered using civil registration in 2018. Third, the results of this study cannot be representative of the data of Lao PDR because this study included only deaths in a province for a year.

【Conclusions】

The major UCOD category was heart/renal disease in the adult generation in Xaiyabouli Province. Cost-effective interventions based on the multisectoral noncommunicable disease prevention plan should be appropriately implemented. Mortality surveillance using the short VA tool should be conducted for all home deaths in Lao PDR.