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**Original article**

# Health service use and associated factors among old Khmer people: a cross-sectional survey in Tri Ton District, An Giang Province

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**Abstract:** ***Background:*** The health status of ethnic minorities of all ages lags far behind that of the general population, particularly in the old. The old minor ethnic population is more likely to have chronic diseases but less likely to access health services. This study assesses the rate of health services use and associated factors in the old Khmer population. ***Method:*** A cross-sectional study was conducted on 400 Khmer people aged 60+ year-old from March to May 2020. Eligible participants were randomly recruited from households of five clusters out of nine communes of Tri Ton District, An Giang province, Vietnam. A structured questionnaire was designed to collect data on socio-demography, health status, health service use and accessibility to health services and quality of life. Quality of life was measured using EQ-5D-5L. All eligible participants were face-to-face interviewed by a bilingual researcher. ***Result:*** The rate of health services use was 63.3%. The EQ-5D-5L utility index mean score was 0.46 (SD=0.28) and EQ-VAS mean score was 49.01 (SD=16.19). The odds of using health services were higher in those reported to have problems in mobility (OR=2.56, 95%CI 1.43-4.61, p<0.01), self-care (OR=2.05, 95%CI 1.30-3.24, p<0.01), activity (OR=2.35, 95%CI 1.44-3.82, p<0.01), pain/discomfort (OR=2.63, 95%CI 1.22-5.67, p=0.01), and anxiety/depression (OR=2.07, 95%CI 1.00-4.29, p=0.05) in univariate but not in multivariable analysis. The multivariable logistic regression showed that the odds of using health services were lower in those who were currently working (aOR=0.48, 95%CI 0.30-0.79, p<0.01), accessible to health information (aOR=0.47, 95%CI 0.27-0.80, p<0.01), but higher in those using health insurance (aOR=5.09, 95%CI 3.19-8.14, p<0.01), and in health facilities used Khmer language (aOR=2.04, 95%CI 1.15-3.62, p=0.01). ***Conclusion:*** This study suggested that Khmer people should be involved in all stages of planning and implementing health programs and services for Khmer communities to improve the accessibility and health equity.

**Keywords:** health service utilization; Sustainable Development Goals; geriatric health needs; health equity; social determinants of health.

## 1. INTRODUCTION

The number of old people aged 65 years and over was 727 million in 2020 worldwide and was projected to be 1.5 billion people in 2050 [1]. It was found that 68% of 50-69 year-old people having non-communicable diseases (NCD) reported not receiving treatment at any health facility [2]. Old ethnic minority people suffer more health problems; however, they are less likely to use health services because of the stigma, lingual barriers, social isolation, and limited accessibility to services [3-5].

Vietnam has more than 11.4 million old people (11.9% of the population) in 2019, with the population aging rate

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forecasted to be among the fastest in the world, possibly reaching 17% of the population in 2030 and 27% in 2069 [6]. Data from the Vietnam Population and Housing Census showed ethnic minor people have a higher rate of hearing and visual impairments, and cognitive and functional limitations than that of Kinh people [6]. A study was conducted in Thai Nguyen province showed that half of minor ethnic old people self-treat when they get sick [7]. Another study reported that minor ethnic old people were more likely to do nothing when they are sick compared to old Kinh people (20.5% vs. 10%) [8].

Khmer people have a population of over one million, of which 23.5% live in urban areas [9]. They mainly live under poor condition, in small villages, in remote areas, and by agriculture and hired working. The average monthly income of Khmer households is about 740,000 VND (33 USD) [10]. The percentage of Khmer people having health insurance is 47.8% [11]. Therefore, they have difficulties in accessing social services and medical care. When Khmer people are sick, particularly the old ones, they go to the health communes [12]. Some diseases cannot be treated by health communes' doctors and Khmer people are sent to the secondary hospital. However, many Khmer people cannot afford the treatments and die as a result [12].

With disadvantages in education, employment, income, and living condition, the old Khmer people suffer social gradient in health that reflects Marmot's theory that people who have socioeconomic disadvantages have worse health [13]. Therefore, this study was conducted to assess the rate of health services use of the old Khmer population and identifies associated factors. Findings of this study provide useful data to develop strategies and policies to reduce health inequities in old Khmer people.

## 2. MATERIALS AND METHOD

### 2.1. Study settings

Tri Ton is a rural district located in the west of An Giang Province in the Mekong Delta region of Vietnam. The district covers an area of around 600 $km^2$ with a diverse terrain including hilly and mountainous areas and many large and small canals. Tri Ton has 135,000 people in 2019, of which Kinh people represents the highest percentage (64.85%), followed by Khmer (34.02%), Hoa (1.11%) and Cham people (0.025%) [14]. The district has 5,700 old Khmer people living in nine out of 15 wards. The district has 392 healthcare workers working in one health center, one charitable clinic, and 15 health communes [15].

### 2.2. Study design and participants

A cross-sectional study was conducted from March to May 2020. The inclusion criteria were Khmer people aged 60 years or over, were living in Tri Ton district and agreed to attend in the study. Those who refused to give informed consents and were unable to answer the interview were excluded from the study. The study is reported following the CROSS checklist for reporting of survey studies [16].

The information sheet and purpose of the study were provided and explained to eligible participants. A Khmer researcher, who is an undergraduate Public Health student of the University of Medicine and Pharmacy at Ho Chi Minh City, arranged to collect informed consents from all participants before any data were collected. For those illiterates to Vietnamese, a local accompanying guide (a community health worker or village's representative) signed an informed consent on behalf of the participant. This study was approved by the Ethics Committee, the University of Medicine and Pharmacy at Ho Chi Minh City (No.176/ĐHYD–HĐĐĐ).

### 2.3. Sample size and sampling

The estimated sample size was 348 older Khmers that had been calculated based on a prevalence of 88.5% of older people using health service at 95% confidence level with a marginal error of 0.05, and a design effect of 2 with adding 10% for non-responders [8]. A cluster sampling was applied to select five out of nine communes of Tri Ton. Five sampling frames of 60+ year-old Khmer people were made from lists of older Khmer people provided by the People's Committees or Health Communes. A researcher randomly selected the first participant of each commune from the commune's sampling frame. If the first selected participant was ineligible, the researcher replaced by the one living next door on the right-hand side of the researcher.

If selected participants were absent at the first visit, the researcher came back the second time. If selected participants were absent at the second visit, they were replaced by the one living the next door on the right-hand side of the researcher. If there were two eligible old Khmer people living at the same house, the researcher let them voluntarily participate in the interview. This was continued to get 70 old Khmer people each commune.

### 2.4. Data collection and tool

A structured questionnaire was designed to collect data on socio-demography, health status, health service use, accessibility to health service and quality of life. All eligible participants were face-to-face interviewed by a bilingual researcher.

Socio-demographic data included gender (man, woman), age-group (60-69, 70-79 and 80+), literate to Vietnamese (Yes, No), marital status (married/living with a spouse, single/divorced/widowed), working status (not working, currently working), annual income in Vietnam Dong (VND) (over 25 million, 16-25 million, 10-15 million, under 10 million), living with family (yes, no), use health insurance (yes, no), transportation to health facilities (someone takes to facilities, self-transportation), access to health information (yes, no), language is used at health facilities (both languages, Vietnamese, Khmer).

Quality of life was measured using EQ-5D-5L developed by Euro-QOL [17]. The scale had five components (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression). Each component in the EQ-5D-5L has five responses including (no, slight, moderate, severe, and extreme problem). These five categories were grouped into "no problem" and "having problem". The EQ-5D-5L has an overall health scale describing the general imaginable health condition, rating from one (the worse) to 100 (the best). EQ-5D-5L and EQ-VAS are not time-consuming and easy to use.

Their validity and reliability have been tested in previous studies [18, 19].

Health services use was yes if the respondents answered that they visited any health services within the last 12 months including hospitals, health centers, health communes, clinics, or drugstores.

### 2.5. Pilot study

A convenient sampling had been applied to select 30 old Khmer people (14 men and 16 women) to test the questionnaire. The use rate of health services was 56.7%. The Cronbach's Alpha of EQ-5D-5L was 0.82.

### 2.6. Statistical analysis

Data were analysed using STATA13 [20]. Frequency and percentage were used to describe independent variables including gender, age group, education level, marital status, working status, annual income, living with family, health insurance use, transportation to health facilities, access to health information, language is used at health facilities, mobility, self-care, usual activity, pain/discomfort, and anxiety/depression. Health quality score (EQ-5D-5L) was transformed into health utility index using Vietnamese value sets [18]. Health utility index and EQ-VAS were described using mean and standard deviation (SD).

Univariate logistic regression was performed to test the association between the health services use and all independent variables. A p-value of 0.2 was set to select potential variables for multivariate logistic regression [21]. A stepwise backward selection was used to remove all variables with p-value less than 0.05 for the final model. Odds Ratios (OR) and their 95% Confidence Interval (95%CI) were reported with p values. A p-value of <0.05 was considered as statistical significance [22].

## 3. RESULTS

**Table 1**. Demographic characteristics of older Khmer minority use and non-use health services in Tri Ton District, An Giang province (n=400)

| Characteristics | Sample (n=400) N (%) | Health services | | OR (95%CI) | p-value |
|---|---|---|---|---|---|
| | | Use (n=253) N (%) | Non-use (n=147) N (%) | | |
| Gender | | | | | |
| Man | 133 (33.3) | 82 (32.4) | 51 (34.7) | 1 | |
| Woman | 267 (66.7) | 171 (67.6) | 96 (65.3) | 1.11 (0.72; 1.70) | 0.64 |
| Age-group | | | | | |
| 60-69 | 152 (38.0) | 81 (32.0) | 71 (48.3) | 1 | |
| 70-79 | 135 (33.8) | 89 (35.2) | 46 (31.3) | 1.70 (1.05; 2.73) | 0.03 |
| ≥ 80 | 113 (28.3) | 83 (32.8) | 30 (20.4) | 2.43 (1.43; 4.10) | <0.01 |
| Educational level | | | | | |
| Illiterate to Vietnamese | 328 (82.0) | 210 (83.0) | 118 (80.3) | 1 | |
| Literate to Vietnamese | 72 (18.0) | 43 (17.0) | 29 (19.7) | 0.83 (0.49; 1.40) | 0.49 |
| Marital status | | | | | |
| Single/divorced/widowed | 192 (48.0) | 119 (47.0) | 73 (49.7) | 1 | |
| Married/living with a spouse | 208 (52.0) | 134 (53.0) | 74 (50.3) | 1.11 (0.74; 1.67) | 0.61 |
| Working status | | | | | |
| Not working | 284 (71.0) | 197 (77.9) | 87 (59.2) | 1 | |
| Currently working | 116 (29.0) | 56 (22.1) | 60 (40.8) | 0.41 (0.26; 0.64) | <0.01 |
| Annual household income | | | | | |
| Over 25 million VND | 88 (22.0) | 43 (17.0) | 45 (30.6) | 1 | |
| 16-25 million VND | 74 (18.5) | 51 (20.2) | 23 (15.7) | 2.32 (1.22; 4.43) | 0.01 |
| 10-15 million VND | 143 (35.8) | 91 (36.0) | 52 (35.4) | 1.83 (1.07; 3.14) | 0.03 |
| Under 10 million VND | 95 (23.8) | 68 (26.9) | 27 (18.4) | 2.64 (1.43; 4.86) | <0.01 |
| Living with family | | | | | |
| No | 25 (6.3) | 15 (5.9) | 10 (6.8) | 1 | |
| Yes | 375 (93.8) | 238 (94.1) | 137 (93.2) | 1.16 (0.51; 2.65) | 0.73 |
| Health insurance use | | | | | |
| No | 178 (44.5) | 81 (32.0) | 97 (66.0) | 1 | |
| Yes | 222 (55.5) | 172 (68.0) | 50 (34.0) | 4.12 (2.68; 6.34) | <0.01 |
| Transportation to health facilities | | | | | |
| Transported by someone | 273 (68.3) | 179 (70.8) | 94 (64.0) | 1 | |
| Self-transported | 127 (31.8) | 74 (29.3) | 53 (36.1) | 0.73 (0.48; 1.13) | 0.16 |
| Access to health information | | | | | |
| No | 110 (27.5) | 81 (32.0) | 29 (19.7) | 1 | |
| Yes | 290 (72.5) | 172 (68.0) | 118 (80.3) | 0.52 (0.32; 0.85) | <0.01 |
| Language is used at health facilities | | | | | |
| Both languages | 239 (59.8) | 145 (57.3) | 94 (64.0) | 1 | |
| Khmer language | 99 (24.8) | 71 (28.1) | 28 (19.1) | 1.64 (0.99; 2.73) | 0.06 |
| Vietnamese language | 62 (15.5) | 37 (14.6) | 25 (17.0) | 0.96 (0.54; 1.70) | 0.89 |

*OR: Odds Ratio; 95%CI: 95% Confidence Interval*
*All used univariate logistic regression*

**Table 2.** Quality of life among the Khmer minority elderly in Tri Ton district An Giang province

| | Sample (n=400) | Health services | | OR (95%CI) | p-value |
|---|---|---|---|---|---|
| | | Use (n=253) | Non-use (n=147) | | |
| Mobility (n, %) | | | | | |
| No problem | 53 (13.3) | 23 (9.1) | 30 (20.4) | 1 | |
| Having problems | 347 (86.8) | 230 (90.9) | 117 (79.6) | 2.56 (1.43; 4.61) | <0.01 |
| Self-care (n, %) | | | | | |
| No problem | 103 (25.8) | 52 (20.6) | 51 (34.7) | 1 | |
| Having problems | 297 (74.3) | 201 (79.5) | 96 (65.3) | 2.05 (1.30; 3.24) | <0.01 |
| Usual activity (n, %) | | | | | |
| No problem | 85 (21.3) | 40 (15.8) | 45 (30.6) | 1 | |
| Having problems | 315 (78.8) | 213 (84.2) | 102 (69.4) | 2.35 (1.44; 3.82) | <0.01 |
| Pain/discomfort (n, %) | | | | | |
| No problem | 29 (7.3) | 12 (4.7) | 17 (11.6) | 1 | |
| Having problems | 371 (92.8) | 241 (95.3) | 130 (88.4) | 2.63 (1.22; 5.67) | 0.01 |
| Anxiety/depression (n, %) | | | | | |
| No problem | 32 (8.0) | 15 (5.9) | 17 (11.6) | 1 | |
| Having problems | 368 (92.0) | 238 (94.1) | 130 (88.4) | 2.07 (1.00; 4.29) | 0.05 |
| EQ-5D-5L (Mean ± SD) | 0.46 (0.28) | 0.49 (0.32) | 0.44 (0.25) | 0.51 (0.24; 1.07) | 0.08 |
| EQ VAS (Mean ± SD) | 49.01 (16.19) | 47.75 (15.32) | 51.19 (17.43) | 0.99 (0.97; 1.00) | 0.04 |

*OR: Odds Ratio; SD: Standard Deviation*
*All used univariate logistic regression*

The final sample size comprised of 400 older Khmer with an average age of 73.2 (SD=8.8), ranging from 60 to 98 years old. Most of the participants were women (66.7%), illiterate to Vietnamese (82%), not working (71%), living with family (93.8%), transported to health facilities by someone (68.3%), accessible to health information (72.5%), and used health insurance (55.5%). Half of the participants were married or living with a spouse. The average annual household income was 18 million VND (SD=12), ranging from 6 to 70 million VND with the highest percentage was those having annual income of 10-15 million VND (35.8%). At the time that old Khmer people visiting the health facilities, they were communicated with both Vietnamese and Khmer languages (59.8%).

The percentage of health services use was 63.3% (n=253/400). Significant associations with health services use were observed in age group (p<0.01), working status (p<0.01), annual income (<0.01), health insurance use (<0.01), access to health information (p<0.01) (Table 1).

**Table 3.** Multivariable logistic regression model assessed association between associated factors with health service use (n=400)

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| | OR | 95%CI | p-value | aOR | 95%CI | p-value |
| Working status | | | | | | |
| Not working | | | | | | |
| Currently working | 0.41 | 0.26; 0.64 | <0.01 | 0.48 | 0.30; 0.79 | <0.01 |
| Health insurance use | | | | | | |
| No | | | | | | |
| Yes | 4.12 | 2.68; 6.34 | <0.01 | 5.09 | 3.19; 8.14 | <0.01 |
| Access to health information | | | | | | |
| No | | | | | | |
| Yes | 0.52 | 0.32; 0.85 | <0.01 | 0.47 | 0.27; 0.80 | <0.01 |
| Language is used at health facilities | | | | | | |
| Both languages | | | | | | |
| Khmer language | 1.64 | 0.99; 2.73 | 0.06 | 2.04 | 1.15; 3.62 | 0.01 |
| Vietnamese language | 0.96 | 0.54; 1.70 | 0.89 | 0.95 | 0.51; 1.77 | 0.87 |

*OR: Odds Ratio; aOR: adjusted Odds Ratio; 95%CI: 95% Confidence Interval*
*Model 1: Univariate logistic regression.*
*Model 2: Multivariable Logistic Regression was adjusted for age group, working status, annual income, use health insurance, transportation to health facilities, access to health information, language is used at health facility, EQ-5D-5L utility index and EQ-VAS score.*

The percentages of those having problems in mobility, self-care, usual activity, pain/discomfort, and anxiety/depression were 86.8%, 74.3%, 78.8%, 92.8%, and 92.0%, respectively. In those used health services, the percentages of those having problems in mobility, self-care, usual activity, pain/discomfort, and anxiety/depression were 90.9%, 79.5%, 84.2%, 95.3%, and 94.1%. The EQ-5D-5L utility index mean score was 0.46 (SD=0.28) and EQ-VAS mean score was 49.01 (SD=16.19). The odds of using health services were not significantly different across EQ-5D-5L and EQ-VAS scores. However, the odds of using health services were higher in those reported to have problems in mobility (OR=2.56, 95%CI 1.43-4.61, p<0.01), self-care (OR=2.05, 95%CI 1.30-3.24, p<0.01), activity (OR=2.35, 95%CI 1.44-

3.82, p<0.01), pain/discomfort (OR=2.63, 95%CI 1.22-5.67, p=0.01), and anxiety/depression (OR=2.07, 95%CI 1.00-4.29, p=0.05) (Table 2).

After adjusting for other variables, the multivariable logistic regression shows that the odds of using health services were lower in those were currently working compared to those were not working (aOR=0.48, 95%CI 0.30-0.79, p<0.01) and those were accessible to health information compared to those were not accessible (aOR=0.47, 95%CI 0.27-0.80, p<0.01) but higher in those using health insurance compared to those not using health insurance (aOR=5.09, 95%CI 3.19-8.14, p<0.01). The odds of using health services were higher in health facilities used Khmer language compared to those used both languages (aOR=2.04, 95%CI 1.15-3.62, p=0.01); however, the odds of using health services in health facilities used Vietnamese were not significantly different.

## 4. DISCUSSION

The rate of health services use among the old Khmer people was 63.3% which is lower than that of previous studies conducted in Binh Phuoc (89%), Quang Nam (95%) and Binh Dinh (95%) in 2015 [8, 23, 24]. Difference in ethnic characteristics, economic conditions, and geographic areas may lead to variation in rates of health services use. A study conducted in 2010 in the Netherlands found that the health disadvantage in old minor ethnic population did not result in more frequent use of health services [5]. Adini's study reported that old ethnic minorities had lower rates of health services use, including preventive care, intensive care, and advanced technological use compared to the other group [25].

Health services use is built up based on burden of aging-related diseases. WHO suggested that more than 46% of people aged 60+ years having disabilities [26]. Old people were more likely to use health services because they have more health problems and suffer many side effects of treatment [27]. As a result, aging increases the rate of health services use is high that is consistent with findings of previous studies [28, 29].

This study found no association between the gender, education, and marital status with health services use. The association between gender with health services use is unclear. Some studies showed that women are more likely to use health services [30-32] because women live longer and report greater morbidity and more frequently use healthcare services at the end of life [26, 33, 34]. Some studies found that men are more likely to delay treatment than women because of social and behavioral factors [35, 36]. Similarly, the association between education with health services use remains unclear. Some studies showed that low education limits the accessibility to healthcare services [30, 37]. Other studies showed that higher education may lead to more knowledge of healthcare prevention and health services [38, 39]. Marital status was found to have an association with health services use [30, 40]. Married people were 8.1 times (95%CI: 2.39-27.18) more likely to visit health facilities as compared to single people [30]. Married people may be encouraged to seek healthcare early and financially supported by their partners. They were diagnosed and treated at early stages of health problems that helped avoid the multiple burdens and further complications [40].

Some studies showed that among racial and ethnic groups, those whose family income was below the poverty line were more likely to delay seeking or not fully accessing health services because of medical fees. Low-income old people were less likely to receive a mammogram, colonoscopy, or influenza vaccination compared to high-income old ones [41]. Similarly, research in Ethiopia confirmed that economic disadvantages can lead to self-medication and traditional drugs [42]. However, our study and some previous studies have found that low-income groups are more likely to use health services [30, 31, 43]. Girma's study reported that the low and middle socio-economic groups were 2.6 and 3.5 times more likely to use health services than the high socio-economic groups [30]. This result may be due to differences in health status among income groups, lower-income groups are more likely to be in older age groups, reporting multiple health problems such as multiple chronic illnesses or anxiety. A study found that the prevalence of disability among older people in low-income countries is higher than that of high-income countries, and higher in women than men [26]. Therefore, low-income old people have high need for health services use. In addition, most studies found that poor financial status increases the risk of disease in old ethnic minorities. A study showed that Chinese Canadian who have higher levels of financial satisfaction were associated with better physical and mental health; however, poor financial status (lower income, less satisfaction with economic status) was a significant predictor of depression in old Chinese Canadian [44]. Our findings show that the burden of medical costs and poverty makes people liable for illness. Therefore, a healthcare plan for ethnic minorities and poor groups of the elderly is necessary to solve the financial and health problems towards the goals of healthcare equity and healthy ageing in our country [45].

The mean EQ-5D-5L score of older Khmer people is 0.46 (SD= 0.28) and the mean EQ-VAS score is 49.01 (SD= 16.19). This result is lower than that of the study by Thang Pham (0.66, SD=0.22; 61.2%, SD=21.2%) conducted on individual over 60 years old living in Soc Son, Ha Noi [46] and study conducted on 65 years and older people residing in the Netherlands (0.72, SD=0.26) [46, 47]. Our study used an EQ-5D-5L Vietnamese value sets to calculate utility index, whereas Thang Pham's study used an EQ-5D-5L Thai value sets [46] and the study in the Netherland use an EQ-5D-5L Dutch value sets [47].

Previous studies showed that old ethnic people tend to report poorer health outcome [48-50]. The Vietnam Ministry of Health reported that 37.6% of the old people having at least one difficulty in daily activities and that rate increases to more than 50% in the age group of 80 and older [45]. Similarly, a study by the Central Geriatric Hospital in 2015 recorded that 90% of people aged 80 years and older need support in daily activities [51]. Our study showed that most old Khmer people reporting health problems in mobility, self-care, usual activities, pain/discomfort and anxiety/depressions.

The presence of health problems is a factor contributing to health services use in the old people [28, 30]. The old Khmer people reported health problems in any five components of EQ-5D-5L are more likely to use health services that was consistent with the Andersen healthcare utilization model and Girma's study that people with poor health are more likely to

use health services [28, 30]. The presence of a health problem or disability was found to increase the rate of health services use to 3.3 times [30]. A survey in Shanghai reported an increase in the rate of health services use when the old people have limited daily activities [28].

Our study found that higher rate of health services use was observed among those who are not currently working ($p<0.01$) that was consistent with Girma's study that housewives were 2.9 times more likely to visit the health services than farmers [30]. Most of the unemployed people in our study were old age and poor health, they are more likely to use health services. After adjusting for other variables, old people who used health insurance were five times more likely to use health services compared to their counterparts that was consistent with previous studies [52-54]. A literature review confirmed that health insurance increases health services use in the US and that the percentage of people using health insurance for health care in adults ranges from 60% to 100% [52]. Health insurance keeps the key role to improve equity in accessing to health services in ethnic groups [55]. Therefore, continuing to maintain 100% health insurance coverage among ethnic minorities, particularly in the old people is to improve the quality of health and the accessibility to health services use in this vulnerable group.

Health information is positively associated with health services use. A study in Quang Nam and Quang Ngai province confirmed that the percentage of health services use was higher in those people accessible to health information [24, 56]. However, our study found that those people accessible to health information had a lower percentage of health services use than their counterparts. Those are literate to Vietnamese, younger and married are more likely to access to health information that bring them better health status, therefore, they are less likely to seek and use health services [38, 39, 57]. The literature showed that many minor ethnic people self-treat their health problems first. They only seek help from health services if their conditions become worse that keeps the health services use at the minimum rate [37].

Previous studies confirmed that minor ethnic people have difficulty in reading information that uses medical terminology, is hard to understand, has doubted accuracy, untrusted sources, or is not written in their own language [37, 58-60]. Evidence suggested that some ethnic groups prefer culturally specific cancer information that is simple and uses little medical terminology [61]. Africans, Hispanics, and Asians are more receptive to cancer information that is specifically geared toward their community and respects their cultural values and beliefs [61]. A study by Xiaoquan showed that foreign-born respondents were less likely to trust health information from newspapers (64% vs. 74%, $p=0.022$) and magazines (59% vs. 74%, $p < 0.01$), in doctors and health professionals (91% vs. 94%, $p=0.074$) and the Internet (66% vs. 76%, $p=0.083$) than the U.S.-born [60]. A study by Vahabi et al. confirmed that cultural beliefs are barriers that prevent health information from reaching to minor ethnic people because they are worried that if they receive information about a disease, they will get that disease as a bad luck [61]. Our result reflects that although old Khmer people tend to frequently access to health information, they still face cultural barriers that prevent them from accessing to and using information for health care purposes. Therefore, providing health information in receiver's mother tongue and intelligible manners would be useful to help old Khmers accept the information.

This study showed that health facilities only used Khmer language to communicate with people had a higher percentage of health services use than those using both Vietnamese and Khmer languages (OR:2.04; 95%CI: 1.15 - 3.62) when adjusting for other variables. This result is consistent with many studies around the world when lingual barriers were always a concern in evaluating the use of health services among ethnic minorities [37, 62-64]. A study in the US showed that non-English speaking Asian and Latinos had significantly lower odds of receiving services compared to English-speaking Asian (OR=0.15; 95%CI: 0.30-0.81) and Latinos (OR=0.19; 95%CI: 0.09-0.39) [65]. A systematic review of studies of language barriers in healthcare of Latino populations showed that access to care, quality of care, and health status are lingual barriers. It was reported that 19% of the Latino adults had not found health services they needed due to lingual barriers [62, 66]. A survey among health services providers in the US reported that 51% of them said that they often enlist help from staff members who speak Spanish such as receptionists and even janitors, 29% rely on translation from patients' family members or friends. Another 15% of the providers said they seek help over telephone, 4% said that their organizations provide foreign-language training for health professionals [66]. A study in Vietnam found that doctors have difficulty in examining ethnic people who cannot speak Vietnamese [67]. Our study found that language plays an important role in the health services use among the old Khmer people who tend to visit doctors who speak their native language. This is an important point to develop medical workforces who can use Khmer language to communicate with Khmer patients.

This study has some limitations. Firstly, it is a cross-sectional design and therefore, a causal relationship between health services use and other factors could not be confirmed. Secondly, data was collected using a self-reported questionnaire that may cause recall bias. However, the questions are about their current situation and most recent use of health services that keep the bias at the minimum. Thirdly, women represent a higher percentage than men in this study that possibly indicating a sampling bias. However, there is evidence that women represent a higher percentage than men in old age groups because women live longer [1, 6]. Therefore, any sampling bias if occurs would be small. Finally, this study was conducted in one district of An Giang province, its generalizability should be cautiously interpreted.

## Conclusion

Despite the limitations, this study provides preliminary findings on health services use and associated factors of old Khmer people living in Mekong Delta, Vietnam. In light of goal 3 of the 17 sustainable development goals "to ensure healthy lives and promote well-being for all at all ages" [68]. Findings of this study suggested that Khmer health workforces and people should be involved in all stages of planning and implementing health programs and services in Khmer communities. Further studies should be conducted to explore culture and belief barriers that prevent Khmer people from using health services.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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## AUTHORS' CONTRIBUTION

LKN, VANH and KGT designed the study. LKN collected data. LKN and KGT drafted the manuscript. KGT, LKN, and VANH did the analysis and edited the manuscript. All authors contributed to interpretation of the data, critically reviewed, and approved the manuscript.

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## REFERENCES

1. United Nations. World Population Ageging 2020 Highlights. Population Division of the United Nations Department of Economic and Social Affairs.; 2020.
2. Global Age Watch. Vietnam insight: The right to health and access to universal health coverage for older people. HelpAge International; 2018.
3. Ahmed I. American Psychiatric Association Ethnic Minority Elderly Curriculum.
4. Acharya S, Ghimire S, Jeffers EM, Shrestha N. Health care utilization and health care expenditure of Nepali older adults. Frontiers in public health. 2019;7:24.
5. Verhagen I, Ros WJ, Steunenberg B, Laan W, de Wit NJ. Differences in health care utilisation between elderly from ethnic minorities and ethnic Dutch elderly. International journal for equity in health. 2014;13(1):1-7.
6. General Statistic Office. Completed results of the 2019 Vietnam population and housing census. Hanoi; 2021.
7. Dam TT, Mai AT, Nguyen TH, Tran TH, Thach TN. Current status accessing to health care services of older people in Lau Thuong ward, Vo Nhai district, Thai Nguyen province. Y hoc Thuc Hanh. 2013;866(4):52-5.
8. Nguyen TBC, Truong TTD, Phung DN. The rate to approach health care services and related factors in the elderly in Bu Dop district, Binh Phuoc province in 2017. Y Hoc TP Ho Chi Minh. 2018;22(1):260 - 4.
9. General Statistics Office, Ethnic Committee. Results of the survey to collect information on the socio-economic status of 53 ethnic minorities in 2019. 2020.
10. Nghi NQ, Trinh BV. Factors influencing the income of minority ethnic groups in the Mekong Delta. Can Tho University Journal of Science. 2011:240-50.
11. Phung DT, Nguyen VC, Nguyen CT, Ta TKV. Overview of socio-economic situation of 53 ethnic minorities. Ha Noi; 2017.
12. Khmers Kampuchea-Krom Federation. Right to Preserve Khmer-Krom Identity and Culture, Religious Violations, Land Right Violations, Right to Education, Women Face Double Discrimination, and Right to Health. Submission to the UN Office of the High Commissioner for Human Rights Universal Periodic Review: Socialist Republic of Vietnam; 2014.
13. Marmot M. Social determinants of health inequalities. Lancet. 2005;365(9464):1099-104.
14. An Giang Propaganda. The Vietnam Fatherland Front in Tri Ton district strengthens the building of national unity block 2019. 2019 [Available from: http://tuyengiaoangiang.vn/xay-dung-dang/dan-van/8729-m%E1%BA%B7t-tr%E1%BA%ADn-t%E1%BB%95-qu%E1%BB%91c-vi%E1%BB%87t-nam-huy%E1%BB%87n-tri-t%C3%B4n-t%C4%83ng-c%C6%B0%E1%BB%9Dng-x%C3%A2y-d%E1%BB%B1ng-kh%E1%BB%91i-%C4%91%E1%BA%A1i-%C4%91o%C3%A0n-k%E1%BA%BFt-d%C3%A2n-t%E1%BB%99c.html.
15. An Giang Statistical Office, Tri Ton District Statistical Office. Tri Ton District Statistical Yearbook 2015. Tri Ton District An Giang; 2016.
16. Sharma A, Minh Duc NT, Luu Lam Thang T, Nam NH, Ng SJ, Abbas KS, et al. A Consensus-Based Checklist for Reporting of Survey Studies (CROSS). J Gen Intern Med. 2021;36(10):3179-87.
17. EuroQol Group. EQ-5D-5L 2009 [Available from: https://euroqol.org/eq-5d-instruments/eq-5d-5l-about/.
18. Mai Vu Quynh, Sun Sun, Van Minh Hoang, Luo Nan, Giang Kim Bao, Lindholm Lars, et al. An EQ-5D-5L value set for Vietnam. Quality of Life Research. 2020;29(7):1923-33.
19. Tran Bach Xuan, Ohinmaa Arto, Nguyen Long Thanh, Nguyen Thu Anh, Nguyen Thao Huong. Determinants of health-related quality of life in adults living with HIV in Vietnam. AIDS care. 2011;23(10):1236-45.
20. StataCorp,. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.
21. Bendel RB, Afifi AA. Comparison of Stopping Rules in Forward "Stepwise" Regression. Journal of the American Statistical Association. 1977;72(357):46-53.
22. Cecatto SB, Monteiro-Soares M, Henriques T, Monteiro E, Moura CIFP. Derivation of a clinical decision rule for predictive factors for the development of pharyngocutaneous fistula postlaryngectomy. Brazilian journal of otorhinolaryngology. 2015;81:394-401.
23. Tra My Vo Thi. Actual situation of using health services and related factors among the elderly in Phuoc Hung commune, Tuy Phuoc district, Binh Dinh province in 2015 [Thesis Bachelor of Public Health]. HCM city: University of medicine and pharmacy at Ho Chi Minh city; 2016.
24. Ty Gon Ngo Thi. The rate of using health services among the elderly and related factors in Binh Nam commune, Thanh Binh district, Quang Nam province in 2018 [Doctor of Preventive Medicine Graduation Thesis]. HCM city: University of medicine and pharmacy at Ho Chi Minh city; 2017.
25. Adini B. Ethnic inequality within the elderly population in utilizing healthcare services. Israel journal of health policy research. 2019;8(1):1-4.
26. World Health Organization. Good health adds life to years: Global brief for World Health Day 2012. World Health Organization; 2012.
27. Musso CG, Belloso WH, Scibona P, Bellizzi V, Macías Núñez JF. Impact of renal aging on drug therapy. Postgraduate medicine. 2015;127(6):623-9.
28. Jiang M, Yang G, Fang L, Wan J, Yang Y, Wang Y. Factors associated with healthcare utilization among community-dwelling elderly in Shanghai, China. PloS one. 2018;13(12):e0207646.
29. Vegda K, Nie JX, Wang L, Tracy CS, Moineddin R, Upshur RE. Trends in health services utilization, medication use, and health conditions among older adults: a 2-year retrospective chart review in a primary care practice. BMC health services research. 2009;9(1):1-7.
30. Girma F, Jira C, Girma B. Health services utilization and associated factors in jimma zone, South west ethiopia. Ethiopian journal of health sciences. 2011.
31. Gurung L, Paudel G, Yadav U. Health service utilization by elderly population in urban Nepal: a cross-sectional study. Journal of Manmohan Memorial Institute of Health Sciences. 2016;2:27-36.
32. Ngoc Thuy Nguyen, Duy Ngoc Nguyen. Acess to primary health care services by older people in rural areas of Southern Vietnam. Y Hoc TP Ho Chi Minh. 2014; Vol. 18(Supplement of No 6- 2014):500-6.
33. Redondo-Sendino Á, Guallar-Castillón P, Banegas JR, Rodríguez-Artalejo F. Gender differences in the utilization of health-care services among the older adult population of Spain. BMC Public Health. 2006;6(1):155.
34. Nathanson CA. Illness and the feminine role: a theoretical review. Social Science & Medicine (1967). 1975;9(2):57-62.
35. Andrulis DP, McGregor CM, Weiss KB, Ramirez KL, Ginsberg CA, Shaw-Taylor Y. U.S. hospital care for HIV-infected persons and the role of public and private teaching hospitals: 1988-1991. J Acquir Immune Defic Syndr Hum Retrovirol. 1995;9(2):193-203.
36. Park JM. Health status and health services utilization in elderly Koreans. International Journal for equity in Health. 2014;13(1):1-7.
37. Scheppers E, Van Dongen E, Dekker J, Geertzen J, Dekker J. Potential barriers to the use of health services among ethnic minorities: a review. Family practice. 2006;23(3):325-48.
38. Li YN, Nong DX, Wei B, Feng QM, Luo HY. The impact of predisposing, enabling, and need factors in utilization of health services

among rural residents in Guangxi, China. BMC Health Serv Res. 2016;16(1):592.
39. Huang L, Yang D, Yao L, Liu Z, Wu W. Guangxi's rural health insurance scheme: evidence from an ethnic minority region in China. Rural Remote Health. 2013;13(2):2454.
40. Hilz R, Wagner M. Marital status, partnership and health behaviour: findings from the German ageing survey (DEAS). Comparative Population Studies-Zeitschrift für Bevölkerungswissenschaft. 2018;43:65-97.
41. Institute of Medicine Committee on the Future Health Care Workforce for Older A. Retooling for an Aging America: Building the Health Care Workforce. Washington (DC): National Academies Press (US)
Copyright 2008 by the National Academy of Sciences. All rights reserved.; 2008.
42. Abula T, Worku A. Self-medication in three towns of North West Ethiopia. The Ethiopian Journal of Health Development. 2001;15(1).
43. Doorslaer Ev, Koolman X, Jones AM. Explaining income-related inequalities in doctor utilisation in Europe. Health economics. 2004;13(7):629-47.
44. Ng E, Lai DW, Rudner AT, Orpana H. What do we know about immigrant seniors aging in Canada? A demographic, socio-economic and health profile. CERIS working papers. 2012:88-90.
45. Ministry of Health, Health Partnership Group. General report on health sector 2016. Towards the goal of healthy aging in Vietnam. Ha Noi: Medical Publishing House; 2018.
46. Pham T, Nguyen NTT, ChieuTo SB, Pham TL, Nguyen TX, Nguyen HTT, et al. Gender differences in quality of life and health services utilization among elderly people in rural Vietnam. International journal of environmental research and public health. 2019;16(1):69.
47. Lutomski JE, Krabbe PFM, Bleijenberg N, Blom J, Kempen GIJM, MacNeil-Vroomen J, et al. Measurement properties of the EQ-5D across four major geriatric conditions: Findings from TOPICS-MDS. Health and Quality of Life Outcomes. 2017;15(1):45.
48. Evandrou M, Falkingham J, Feng Z, Vlachantoni A. Ethnic inequalities in limiting health and self-reported health in later life revisited. J Epidemiol Community Health. 2016;70(7):653-62.
49. Ng JH, Bierman AS, Elliott MN, Wilson RL, Xia C, Scholle SH. Beyond black and white: race/ethnicity and health status among older adults. The American journal of managed care. 2014;20(3):239.
50. Shelley D, Russell S, Parikh NS, Fahs M. Ethnic disparities in self-reported oral health status and access to care among older adults in NYC. Journal of Urban Health. 2011;88(4):651-62.
51. United Nations Population Fund, Viet Nam National Committee on Ageing. Towards a comprehensive national policy for aging Viet Nam. Ha Noi; 2019.
52. Guindon GE. The impact of health insurance on health services utilization and health outcomes in Vietnam. Health Economics, Policy and Law. 2014;9(4):359-82.
53. Thuong Nguyen Thi Thu. Impact of health insurance on healthcare utilisation patterns in Vietnam: a survey-based analysis with propensity score matching method. BMJ Open. 2020;10(10):e040062.
54. Thuong Nguyen Thi Thu, Huy Tran Quang, Tai Do Anh, Kien Tran Nhuan. Impact of Health Insurance on Health Care Utilisation and Out-of-Pocket Health Expenditure in Vietnam. BioMed Research International. 2020;2020:9065287.
55. Artiga S, Hill L, Orgera K, Damico A. Health coverage by race and Ethnicity, 2010–2019. Kaiser Family Foundation. 2021.
56. Thao Nguyen Le Thi. The rate of using health services and related factors in the elderly in Tran Phu ward - Quang Ngai [Thesis Bachelor of Public Health]. HCM city: University of medicine and pharmacy at Ho Chi Minh city; 2011.
57. Dickerson S, Reinhart AM, Feeley TH, Bidani R, Rich E, Garg VK, et al. Patient Internet use for health information at three urban primary care clinics. Journal of the American Medical Informatics Association. 2004;11(6):499-504.
58. Todd L, Hoffman-Goetz L. A qualitative study of cancer information seeking among English-as-a-second-Language older Chinese immigrant women to Canada: sources, barriers, and strategies. Journal of Cancer Education. 2011;26(2):333-40.
59. Yoon J, Kim S. Internet use by international graduate students in the USA seeking health information. Aslib Journal of Information Management. 2014.
60. Zhao X. Cancer information disparities between US-and foreign-born populations. Journal of Health Communication. 2010;15(sup3):5-21.
61. Vahabi M. Breast cancer and screening information needs and preferred communication medium among Iranian immigrant women in Toronto. Health Soc Care Community. 2011;19(6):626-35.
62. National Academies of Sciences E, Medicine, Health, Medicine D, Board on Health Care S, Committee on Health Care U, et al. Health-Care Utilization as a Proxy in Disability Determination. Washington (DC): National Academies Press (US) Copyright 2018 by the National Academy of Sciences. All rights reserved.; 2018.
63. Likupe G. Communicating with older ethnic minority patients. Nurs Stand. 2014;28(40):37-43.
64. Jacobs E, Chen AHM, Karliner LS, Agger-Gupta N, Mutha S. The need for more research on language barriers in health care: a proposed research agenda. The Milbank quarterly. 2006;84(1):111-33.
65. Sentell T, Shumway M, Snowden L. Access to mental health treatment by English language proficiency and race/ethnicity. Journal of General Internal Medicine. 2007;22(2):289-93.
66. Language barriers contribute to health care disparities for Latinos in the United States of America. Rev Panam Salud Publica. 2002;11(1):56-8.
67. Mai Vuong Lan, Oanh Tran Thi Mai, Long Nguyen Hoang. Actual situation of using health services of some population groups and barriers in accessing health services. Y hoc Thuc Hanh. 2013;7(876):14-5.
68. United Nations Department of Economic Social Affairs. The Sustainable Development Goals Report 2021: United Nations; 2021.