Treatment seeking behavior and associated factors of suspected dengue fever among Shan people in eastern Shan special region IV, Myanmar: a cross-sectional study

Hui Liu¹, Jian-Wei Xu¹,²*, Zadan Ai³, Yan Yu³ and Bian Yu³

Abstract

Background: Dengue fever (DF) is a rapidly spreading mosquito-borne disease along the China-Myanmar border. Understanding treatment-seeking behaviors (TSBs) and associated factors of suspected DF patients in local communities helps to improve health services via promoting prompt treatment, improving patients’ prognosis, finding DF information and timely response to DF foci.

Methods: A combination of qualitative semi-structured in-depth interview (SDIs) included 18 key-informants, and quantitative household questionnaire survey (HHSs) involved 259 households was carried out to investigate TSBs and associated factors of suspected DF patients in the Eastern Shan Special Region IV (ESSR4), Myanmar.

Results: The key informants mentioned that most of their fellow villagers did not seek treatment in public health facilities first. The HHS questionnaires were distributed to household heads, and 241 of the 259 HHS respondents were valid after data auditing. Only 102 (43.2%) household heads reported that their family sought treatment for suspected DF at a public health facility immediately; 111 (46.1%) respondents said that they chose self-medication first. The adjusted odds ratio of multivariate logistic analysis (MLA) predicting household heads’ first seeking healthcare at a public hospital were 1.91 (95%CI: 1.03–3.53) for those who knew DF and 5.11 (95%CI: 2.08–12.58) for those who regarded DF as a deadly disease, indicating that families who knew DF and regarded DF as a deadly disease were more likely to seek treatment for suspected DF at a public health facility immediately.

Conclusion: The inappropriateness of treatment-seeking behaviors for suspected DF hinders the improvement of the patient prognosis and dengue control in ESSR4, Myanmar. People’s awareness of the potential seriousness of DF is a factor influencing appropriate healthcare-seeking behavior among Shan People.

Keywords: Dengue fever, Treatment-seeking behaviors, Influencing factors, Shan people, Myanmar
Background
In comparison with 50 years ago, the worldwide incidence of dengue has risen 30-fold [1, 2]. Dengue is now ranking as one of the most critical global mosquito-borne viral diseases and is endemic in over 100 countries [2, 3]. For many countries, dengue is becoming a threat to their public health, and further adversely impacting their health services and economies [4]. The South-East Asia Region (SEAR) is a focus of dengue fever. Over 70% of the worldwide population at risk of dengue lives in the South-East Asia Region and Western Pacific Region of World Health Organization [5]. In Indonesia, dengue peaks around every 6 to 8 years. Improved treatment for dengue fever (DF) has decreased the case fatality rate by approximately half with each decade since 1980 [6]. Dengue has replaced malaria to become another threat to public health along the China-Myanmar border [7, 8] as malaria has been successfully controlled [9]. More prompt and proper interventions are needed now because of the unavailability of anti-dengue drugs and low efficacy of current dengue vaccines [10, 11]. Early diagnosis and effective supporting treatment for DF can reduce transmission and improve patient prognosis. Some studies document that early supportive treatment can reduce the fatality rate from 20 to 1% or less [5, 12, 13]. Treatment-seeking behaviors (TSBs) are critical for those who have a suspected dengue infection. Patients must have the intention and the means to seek medical care early in the disease attack. Therefore, more studies are needed to investigate local health beliefs and practices, TSBs, and access to care concerning dengue fever to identify challenges and opportunities in diagnostics and treatment [13]. Early diagnosis and effective supporting treatment for DF requires appropriate infrastructure and resources, and also active engagement of communities [6]. Data on treatment-seeking behaviours and affecting factors for suspected DF patients are rare in the Greater Mekong Subregion (GMS). To address this gap, by collaborating with local institutes, we conducted a cross-sectional study to investigate treatment-seeking behaviours and associated factors among the Shan People in the Eastern Shan Special Region IV (ESSR4), Myanmar.

Methods
Study design
This cross-sectional study adopts a mixed-methods approach to collect data, combining qualitative semi-structured in-depth interviews (SDIs) and quantitative household questionnaire surveys (HHSs). In this study, the definition of treatment-seeking behaviours is what the families would expect to do and whether they would want to seek treatment if any household member had a fever that was suspected possibly to be DF. Based on DF incidence in 2017, two types of villages with and without DF cases were deliberately sampled in Mongla Township, ESSR4 of Myanmar. The study is a part of the project of the Shan people’s knowledge, attitude and practices among Shan People in the Eastern Shan Special Region IV (ESSR4), Myanmar [14]. To ensure that our sample was sufficient to address the main aims of the study, a small percentage was used to calculate the appropriate sample size. Based on standard value normal distribution at 95% confidence levels, an estimated 20% of adult people who know that mosquitoes transmit dengue virus and 5% precision, a sample size of 250 heads of household for the questionnaire survey was obtained [15]. The form of questionnaire survey included family wealth index (Table 1), symptoms of suspected DF and treatment seeking behaviours for suspected DF.

Study site and population
The ESSR4 is about 80 km from Kungtung, the capital of Eastern Shan State of Myanmar and borders with Xishuangbanna Prefecture, China (Fig. 1) [16]. The council of ESSR4 administrates Mongla Township, Nanban and Selei County where there is a population of about 110,000, most of whom are Shan people. The Shan (known as Dai in China, Thai Yai in Thailand and Lao in Lao PDR) is one of the mainstream ethnicities in the GMS. The hospital of ESSR4 is the sole health facility that can do laboratory-based diagnosis and treatment for DF. After obtaining the permission of the Bureau of Health of ESSR4, the hospital disclosed to us that it reported a total of 114 DF cases in 2017.

Two Villages without DF cases (V1) and two villages with DF cases (V2) were selected for the study, respectively. The criteria for selecting V1 were: (1) there were no laboratory confirmed DF cases in 2017; (2) all households were Shan people; (3) there were at least 300 households together. The criteria for selecting V2 were that one village was that with the highest DF incidence and another one was a middle DF incidence in village to identify challenges and opportunities in diagnostics and treatment [13]. Early diagnosis and effective supporting treatment for DF requires appropriate infrastructure and resources, and also active engagement of communities [6]. Data on treatment-seeking behaviours and affecting factors for suspected DF patients are rare in the Greater Mekong Subregion (GMS). To address this gap, by collaborating with local institutes, we conducted a cross-sectional study to investigate treatment-seeking behaviours and associated factors among the Shan People in the Eastern Shan Special Region IV (ESSR4), Myanmar.

Field survey
The language commonly used for communication is Chinese, which is one of the two official languages (Burmese and Chinese) of the Council of ESSR4,
Myanmar. Thus, the SDI guidelines (Additional File 1) and HHS questionnaires (Additional File 2) were developed in two versions of Chinese and Shan language. Investigators from the Hospital of ESSR4 who understand both the Shan language and Chinese conducted the field survey. The investigators discussed the questions with respondents in Ethnic Shan language and then filled the questionnaire in Chinese. The SDIs were administered to 18 key informants including village leaders, community health worker and representatives, who were supposedly more knowledgeable about dengue. The investigators discussed with the key informants about treatment-seeking behaviors that most of their fellow villagers usually carried out when they experienced fever that was suspected possibly to be DF and also related influencing factors. In the HHSs, household heads were selected as respondents. The household list of each selected village was obtained through the four Villager Committee offices, and then households were sampled by simple computer randomization. The investigators visited house by house to tell the head of each sampled household about the purpose of the project, the topic, and the type of questions to be asked. After an oral informed consent was obtained, a questionnaire was administered to them to collect quantitative data on treatment-seeking behavior and associated factors [17–19]. Family wealth index (FWI) in the questionnaire was determined by household characteristics [17, 18], such as housing, walls and roofs, and assets, such as bicycles, and then classified into five groups, ranked from 1 to 5, representing the poorest to the Least poor (Table 1).

### Data management and analysis

Data of both SDIs and HHSs were entered in Microsoft Excel 2007. One researcher coded records of the qualitative SDI based on the contents of the questions and then entered the information into cells in Microsoft Office Excel 2007. The same content records were combined with code sequencing. The records of each content were analysed by two independent researchers to generate themes first, and then the two researchers’ findings were discussed and compared to finalize the findings [14]. Data of HHSs were analysed in Epi Info 7.2. The percentage and their 95% confidence interval (CI) were calculated for their first treatment actions. A chi-squared test was used to compare the percentages of each aspect of behavior between villages with DF and without DF cases. A multivariate logistic analysis (MLA) was used to assess the association of expected treatment-seeking at public hospitals first and potential influencing factors. In the MLA model, the outcome variable coded with “1″ is

| Family wealth index | Housing characteristics | Transportation tools | Family belongings |
|---------------------|------------------------|---------------------|-------------------|
| 1 Poorest           | Bamboo walls and sheet iron roofs | None | None or chickens |
| 2 Mid low           | Wood walls and sheet iron roofs | Bicycles | Pigs or goats |
| 3 Middle            | Brick walls, wood girders and terracotta roofs | Motorcycles | Cattle or horses |
| 4 Mid high          | Brick concrete walls and terracotta roofs | Tractors | TV sets or refrigerators |
| 5 Least poor        | Steel and concrete | Cars | Shops |
that a household expected to seek treatment at public hospitals (STPHs) first if a family member experienced fever that was suspected possibly to be DF. The independent variables were characteristics of household heads and their families, including perceptions, beliefs, and knowledge of DF [16–18]. In the case that a respondent’s skipping a question led to missing data, the contents of the question were excluded from analyses.

Results
Characteristics of households
The 18 key informants of SDIs comprised nine males and nine females ranging from 32 to 54 years old. The HHS questionnaires were administered to a total of 259 household heads, and 241 questionnaires were considered valid after auditing. The age median of these respondents was 48.3 (range: 18–54) years. Females accounted for 143 (59.3%) heads of households. Only 27 (11.2%) HHS respondents had formal school education ranging from 1 to 10 years. Most of the families (195) involved in the study belonged to the category of ‘less poor’ (i.e. with FWI 4 or 5, see Table 3).

Treatment-seeking behaviours
The SDI results showed that most of local people investigated did not seek treatment from health facilities during the first 1 or 2 days of fever. Most villagers chose to use Guasha (scrapping) therapy and Shan traditional herbal medicine at first if they had a fever or headache. They would not visit local health facilities until suffering severe illness or symptoms that could not be relieved. Consistent with the interviewing results, HHS results showed that 46.1% (111/241) of households chose to use self-medication at first; only 42.3% (102/241) sought treatment in public hospitals. Significantly, 6.2% (15/241) said they prioritized using traditional Shan medicines for DF [21], early diagnosis and timely treatment [22]. The study demonstrates that treatment-seeking behaviors regarding suspected DF are inappropriate in the ESSR4, Myanmar. Most respondents did not initially visit public health facilities when having a fever (Table 2). In villages with DF (V2), the proportion of families of STPHs was significantly lower (P = 0.037) than that in villages without DF (V1) (Table 2). The crude odds ratio was 0.56 (95%CI: 0.33–0.94), but after MLA controlling for potential confounding, the AOR was 0.59 (95%CI: 0.30–1.17) (Table 3).

Discussion
Dengue is becoming a major threat to public health globally [20]. With the lack of effective antiviral therapies for DF [21], early diagnosis and timely treatment influence the prognosis of DF patients. In contrast, delay in proper treatment can lead to complications or to severe dengue [22]. The study demonstrates that treatment-seeking behaviors regarding suspected DF are inappropriate in the ESSR4, Myanmar. Most respondents did not initially visit public health facilities when having a fever (Table 2). Perceived awareness of DF significantly influenced their TSBs. Similar results were presented in Venezuela [22] and Malaysia [23]. The results indicate that it is critical to raise people’s awareness of appropriate treatment-seek practices. In Myanmar, five Special Regions are mostly administered by local ethnic minority authorities along the China-Myanmar border. As a result, health services provided by the Myanmar central government cannot fully cover these regions, and thereby health services there are somewhat limited [14, 17, 19]. Consequently, international investment and collaboration are urgently needed for dengue control there.

| Treatment-seeking behaviours                  | Total No. (%), n = 241 | No. (%), 95CI in V1, n = 124 | No. (%), 95CI in V2, n = 117 | P-value |
|-----------------------------------------------|------------------------|-------------------------------|-------------------------------|---------|
| Public hospitals                              | 102 (42.3, 36.0–48.8)  | 61 (49.2, 40.1–58.3)          | 41 (35.0, 26.5–44.4)          | 0.037   |
| Self medication                               | 111 (46.1, 39.6–52.6)  | 51 (41.1, 32.4–50.3)          | 60 (51.3, 41.9–60.6)          | 0.147   |
| Traditional Shan medication                   | 15 (6.2, 3.5–10.1)     | 9 (7.3, 3.4–13.3)             | 6 (5.1, 1.9–10.8)             | 0.677   |
| Others                                        | 21 (8.7, 5.5–13.0)     | 6 (4.8, 1.8–10.2)             | 15 (12.8, 7.4–20.3)           | 0.049   |
| No action                                     | 14 (5.8, 3.2–9.6)      | 4 (3.2, 0.9–8.1)              | 10 (8.5, 4.2–15.2)            | 0.136   |

Abbreviation: V1 village without DF cases, V2 village with DF cases, 95%CI 95% confidence interval
| Independent variables                          | No. respondents | No. STPHs (%) | Crude OR (95% CI) |  \( P \) values | Adjusted OR (95% CI*) |  \( P \) values |
|-----------------------------------------------|-----------------|---------------|-------------------|------------------|-----------------------|-----------------|
| **Villages**                                  |                 |               |                   |                  |                       |                 |
| DF cases                                      | 117             | 41 (35.0)     | 0.56 (0.33–0.94)  | 0.027            | 0.59 (0.30–1.17)      | 0.132           |
| Non DF                                        | 124             | 61 (49.2)     | 1                  | 1                |                       |                 |
| **Sex of the household heads**                |                 |               |                   |                  |                       |                 |
| Male                                          | 98              | 44 (44.9)     | 1.18 (0.70–1.98)  | 0.532            | 1.17 (0.69–2.00)      | 0.558           |
| Female                                        | 143             | 58 (40.6)     | 1                  | 1                |                       |                 |
| **Age of the respondents (years)**            |                 |               |                   |                  |                       |                 |
| 18–45                                         | 95              | 42 (44.2)     | 1.14 (0.56–1.91)  | 0.632            | 1.31 (0.63–2.77)      | 0.473           |
| 46–54                                         | 146             | 60 (41.1)     | 1                  | 1                |                       |                 |
| **School education**                          |                 |               |                   |                  |                       |                 |
| Yes                                           | 27              | 11 (40.7)     | 0.90 (0.40–2.04)  | 0.803            | 0.43 (0.13–1.43)      | 0.170           |
| No                                            | 208             | 90 (43.3)     | 1                  | 1                |                       |                 |
| **Family wealth index**                       |                 |               |                   |                  |                       |                 |
| 4–5                                           | 195             | 84 (43.1)     | 1.18 (0.61–2.27)  | 0.620            | 1.53 (0.62–3.78)      | 0.360           |
| 1–3                                           | 46              | 18 (39.1)     | 1                  | 1                |                       |                 |
| **Belief of the Buddha protecting good people**|                 |               |                   |                  |                       |                 |
| Yes                                           | 191             | 87 (45.6)     | 1.84 (0.94–3.6)   | 0.076            | 1.87 (0.89–3.97)      | 0.104           |
| Non                                           | 48              | 15 (31.2)     | 1                  | 1                |                       |                 |
| **Belief of natural factors influencing human health** |                 |               |                   |                  |                       |                 |
| Yes                                           | 146             | 61 (41.8)     | 0.92 (0.54–1.57)  | 0.759            | 0.92 (0.53–1.59)      | 0.755           |
| No                                            | 89              | 39 (43.8)     | 1                  | 1                |                       |                 |
| **Belief of sound hygiene being helpful for people’s health** |                 |               |                   |                  |                       |                 |
| Yes                                           | 203             | 88 (43.4)     | 1.24 (0.59–2.60)  | 0.577            | 0.94 (0.42–2.09)      | 0.864           |
| No                                            | 34              | 13 (38.2)     | 1                  | 1                |                       |                 |
| **Heard about DF**                            |                 |               |                   |                  |                       |                 |
| Yes                                           | 83              | 46 (55.4)     | 2.35 (1.36–4.05)  | 0.002            | 1.91 (1.03–3.53)      | 0.040           |
| No                                            | 153             | 53 (34.6)     | 1                  | 1                |                       |                 |
| **Regard DF a deadly disease**                |                 |               |                   |                  |                       |                 |
| Yes                                           | 63              | 38 (60.3)     | 4.40 (2.13–9.09)  | < 0.001          | 5.11 (2.08–12.58)     | < 0.001         |
| No                                            | 74              | 19 (25.7)     | 1                  | 1                |                       |                 |
| **Know fever as one of DF symptoms**          |                 |               |                   |                  |                       |                 |
| Yes                                           | 46              | 25 (54.3)     | 1.85 (0.89–3.84)  | 0.098            | 1.96 (0.93–4.17)      | 0.078           |
| No                                            | 125             | 48 (38.4)     | 1                  | 1                |                       |                 |
| **Perceive DF transmissible**                 |                 |               |                   |                  |                       |                 |
| Yes                                           | 41              | 23 (56.1)     | 2.01 (1.01–4.00)  | 0.047            | 1.72 (0.80–3.67)      | 1.168           |
| No                                            | 175             | 68 (38.9)     | 1                  | 1                |                       |                 |
| **Family income source**                      |                 |               |                   |                  |                       |                 |
| Others                                        | 158             | 60 (38.0)     | 0.67 (0.34–1.31)  | 0.245            | 0.75 (0.36–1.54)      | 0.433           |
| Agriculture                                   | 44              | 21 (47.7)     | 1                  | 1                |                       |                 |
| **Family decision**                           |                 |               |                   |                  |                       |                 |
| Wife or co-decision                           | 132             | 66 (50.0)     | 2.00 (1.12–3.41)  | 0.011            | 1.50 (0.81–2.79)      | 0.200           |
| Husband                                       | 102             | 34 (33.3)     | 1                  | 1                |                       |                 |

For all variables, there were a total of 241 respondents who answered questions on seeking treatment, unless otherwise indicated; 
Abbreviation: DF dengue fever, STPHs seeking treatment at public hospitals first, OR odds ratio, 95%CI 95% confidence interval
In the ESSR4, only the hospital of ESSR4 can perform laboratory-based diagnosis and treatment. DF is becoming a new threat to public health after the China Global Fund to fight AIDS, Tuberculosis and Malaria project has successfully reduced the malaria burden along the China-Myanmar border [9]. However, funding is still not enough to control DF. Information, education, and communication on DF have not been effectively performed in ESSR4. In this study, only 19.1% (46/241) of HHS respondents knew DF and listed fever as one of DF symptoms (Table 3). The results of this study show that local people cannot recognize DF symptoms and the value of seeking proper diagnosis and effective supporting treatment in formal health facilities. When effective antiviral therapies of DF are still unavailable, DF treatment can largely rely on symptom-relief-based supporting therapy. Some Shan traditional therapies such as Guasha (scrapping) and herbal drugs are said to be able to relieve fever, headache and other symptoms. Traditional medical practices and home remedies were also widely perceived and experienced as efficacious for treating DF in Malaysia [22]. In this situation, without antiviral therapies of DF, research on efficacy and limitation of Shan traditional therapies for DF might be an interesting topic that needs to be explored. Such studies can provide evidence for efficacy, safety and limitation on the traditional medication. When results of researches can provide solid evidences on risks of traditional therapies, communication of updated evidence to the public would help improve seeking treatment for DF and dengue intervention.

This study has an obvious limitation. Due to the limited facility of laboratory-based diagnosis, the number of confirmed DF cases was limited. This study could only investigate treatment-seeking behaviors of suspected DF, namely, what the families would expect to do and where they would expect to seek treatment if a household member experienced fever that was suspected possibly to be DF. However, this kind of treatment-seeking intention study would be also helpful for further intervention in ESSR4 of Myanmar or other regions with a similar context.

Conclusion
The results of this study indicated that treatment-seeking behavior of suspected DF patients is not appropriate in the ESSR4 of Myanmar. Local people’s awareness of DF is a major influencing factor in the situation of lacking sound knowledge about DF among Shan people. In the setting of a weak health system, international collaboration and support are urgently needed.

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Authors’ contributions
JWX conceived the study. JWX and HL designed the study. HL, JWX, ZA, YY, BY performed the field survey to collect the data. JWX and HL drafted the manuscript with intellectual contributions from all coauthors. All authors interpreted the data, reviewed and approved the final manuscript.

Funding
The field investigation was supported by the National Social Science Fund of China (No. 16ASH004). The funders had no roles in the design of the study, or the collection, analysis and interpretation of data, or writing the manuscript.

Availability of data and materials
The datasets used and/or analyzed during the current study are available and can be obtained from the corresponding author on reasonable request.

Ethics approval and consent to participate
The Ethics Committees of Yunnan Institute of Parasitic Diseases (ECYIPD) in China granted the Ethical approval for the study (ECYIPD201704). The study was interview-based, and did not include any human specimens. The ECYIPD considered that a verbal consent would be enough. The investigation was also approved by the Bureau of Health, ESSR4 of Myanmar. Participants’ participation in the study was entirely voluntary and all participants were obtained verbal consent.

Consent for publication
No personal identifying material is contained within this publication .

Competing interests
The authors declare that they have no competing interests.

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Supplementary information

Abstract

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Conclusion
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Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s12913-020-05163-z.

Abbreviations
DF: Dengue fever; SDI: Semi-structured in-depth interview; HHS: Household questionnaire survey; CI: Confidence interval; TSB: Treatment-seeking behaviors; GMS: Greater Mekong Subregion; V1: Village Mangjingpa and Wangnali where there were not dengue fever cases in 2017; V2: Wangmaidaio and Wangdong where there were dengue fever cases in 2017; FWI: Family wealth index; MLA: Multivariate logistic analysis; AOR: Adjusted odds ratio; ESSR4: Eastern Shan Special Region IV

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