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Factors affecting compliance with measles vaccination in Lao PDR

Maniphet Phimmasane[a], Somthana Douangmala[b], Paulin Koffi[a], Daniel Reinharz[c], Yves Buisson[a,*]

[a] Institut de la Francophonie pour la Médecine Tropicale, Samsenthai Street, BP 9519, Vientiane, Lao People's Democratic Republic
[b] Ministry of Health, Vientiane, Lao People's Democratic Republic
[c] Laval University, Quebec City, Canada

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ABSTRACT

In line with WHO objectives, the Lao Government is committed to eliminate measles by 2012. Yet from 1992 to 2007, the annual incidence of measles remained high while the vaccination coverage showed a wide diversity across provinces. A descriptive study was performed to determine factors affecting compliance with vaccination against measles, which included qualitative and quantitative components. The qualitative study used a convenience sample of 13 persons in charge of the vaccination program, consisting of officials from different levels of the health care structure and members of vaccination teams. The quantitative study performed on the target population consisted of a matched, case-control survey conducted on a stratified random sample of parents of children aged 9–23 months. Overall, 584 individuals (292 cases and 292 controls) were interviewed in the three provinces selected because of low vaccination coverage. On the provision of services side (supply), the main problems identified were a lack of vaccine supply and diluent, a difficulty in maintaining the cold chain, a lack of availability and competence among health workers, a lack of coordination and a limited capacity to assess needs and make coherent decisions. In the side of the consumer (demand), major obstacles identified were poor knowledge about measles immunization and difficulties in accessing vaccination centers because of distance and cost. In multivariate analysis, a low education level of the father was a factor of non-immunization while the factors of good compliance were high incomes, spacing of pregnancies, a feeling that children must be vaccinated, knowledge about immunization age, presenting oneself to the hospital rather than expecting the mobile vaccination teams and last, immunization of other family members or friends' children. The main factors affecting the compliance with vaccination against measles in Laos involve both the supply side and the demand side. Obtaining an effective coverage requires upgrading and training the Expanded Programme on Immunization (EPI) staff and a reinforcement of health education for target populations in all provinces.

1. Introduction

Vaccination programs implemented during the 1990s have reduced measles deaths worldwide by 74% between 2000 and 2007. However, measles was still responsible for 197,000 vaccine-preventable deaths in 2007, nearly 540 deaths per day [1]. Outbreaks are reported each year on different continents, but more than 95% of measles deaths occur in low-income countries. Failure to deliver at least one dose of measles vaccine to every infant is the main factor for this mortality. Maintaining a rate of immunization coverage of at least 90% would prevent the spread of the virus and control epidemics [2,3].

Although measles has been eliminated in 24 of 37 countries and territories in the Western Pacific Region (WPR), a large number of cases have been reported in 2008, including 131,441 in China (98.4 cases per million inhabitants) and 11,015 in Japan (86.1 cases per million inhabitants), these two countries representing 82% of the population of WPR and over 97% of confirmed cases of measles [4].

In Laos, the elimination of measles by 2012 is part of the Millennium Development Goals. It requires vaccinating at least 95% of the target population (i.e., more than 2.1 million children aged 9 months to 15 years) [5,6]. Despite the introduction of measles vaccine in the Expanded Programme on Immunization (EPI) in 1982, the rates of vaccination coverage ranged from 40 to 70% in 2006–2007, revealing significant disparities between provinces, with the lowest rates being recorded in the provinces of Oudomxay (26%), Vientiane (46%) and Champasak (29%). The information aimed at parents about the vaccination against measles, their access to modern news media, and their social and cultural behavior have been cited as major determinants of vaccination compliance [7].

In Lao PDR, two studies had been conducted among mothers of children targeted by the EPI. The first, conducted in 2004

* Corresponding author. Tel.: +856 21 250509; fax: +856 21 219347.
E-mail address: yves.buisson@auf.org (Y. Buisson).

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Table 1
Immunization schedule in Lao PDR since 2007.

Vaccines	Age immunization
BCG	At birth
Monovalent hepatitis B	24 h after childbirth
DTP + HepB + OPV (dose 1)	After 6 weeks
DTP + HepB + OPV (dose 2)	After 10 weeks
DTP + HepB + OPV (dose 3)	After 14 weeks
Measles	9–11 months and 12–23 months

in Sanakham district (Vientiane province), demonstrated that the level of mothers' education, occupation and number of children were factors of immunization services attendance [8]. The second, conducted in 2007 in Xaythany district (Vientiane Capital), showed that knowledge and perception of mothers on vaccinations of children less than 3 years of age were strongly related to immunization status of children [9]. Although they represent a cornerstone in the success of measles elimination, factors associated with health services responsible for the EPI implementation have never been studied.

The aim of this study was to identify factors of non-vaccination against measles in Laos, related to the offer of services (from the National Immunization Program) and the consumption of services (by parents of children aged 9–23 months).

2. Measles immunization in Laos

According to the Lao PDR immunization schedule updated in 2007, measles immunization, which is free of charge, should be administered at 9–11 months of age and then repeated at 12–23 months [8] (Table 1). The National Center for Immunization located in Vientiane Capital is responsible for the implementation of the EPI. The National Center for Immunization supervises and evaluates all activities and program data at the provincial level, in the districts, health centers and mobile teams. It includes five program areas: (1) planning and financing, (2) logistics and cold chain, (3) administration, (4) statistics and research, and (5) Information Communication Education (ICE). It is overseen by the Center for Mother and Child Health, which is itself placed under the control of the Department of Hygiene and Prevention, under the authority of the Office of the Ministry of Health. Immunizations are carried out by primary care health center staff, who also participates in mobile teams [10].

3. Patients and methods

3.1. Study type

This is a descriptive and analytic study conducted in three provinces selected for their low rates of vaccination coverage and their geographical importance: Oudomxay in northern Laos, Vientiane Capital in the center and Champasak in the south (Fig. 1). The study had two components: one qualitative, focused on the measles vaccination program stakeholders, and one quantitative, focused on parents of children targeted for immunization.

3.2. Study population

For the qualitative component, a representative sample was constituted involving actors at the different levels of responsibility of the national immunization program, spreading from the central level down to the village health centers vaccination teams. Persons interviewed at the central, provincial and districts levels were all public health physicians. At the health center level, the interviewed health workers were nurses most often inexperienced.

For the quantitative component, a case-control matched study on a random sample of parents was performed. We used the method of Quality Control Batch (CQL) recommended by the WHO [11]. For a degree of precision of ± 7% with a confidence interval of 95%, the calculated total size of the sample was 600, estimated at 200 people per province. In each province, we randomly selected one-third of districts, one-third of health centers per district and one-third of villages per health center. In each village randomly selected, we looked for cases (i.e., children aged 9–23 months unvaccinated against measles) and controls (i.e., children vaccinated against measles living in the neighborhood), cases and controls were matched by age and sex.

Vaccination against measles was confirmed by the presentation of an authenticated document (card of vaccination). The interviewee was the mother or father or, if not available, the person (e.g., grandmother, grandfather, aunt, sister, etc.) who regularly took care of the child and who resided with him for more than 3 months at a time.

3.3. Variables studied and questionnaires

For the qualitative component, a questionnaire, constructed specifically for the study, was designed to explore every dimension of the conceptual framework, based on the literature about vaccination success factors (Fig. 2). This questionnaire was used in semi-structured interviews performed in the Lao language. For the quantitative survey, we developed a standardized questionnaire from a WHO reference [11] and pre-tested it in the population to address the socio-demographics, immunization status of parents and children, Knowledge Attitudes and Practices (KAP) of parents about measles and vaccination, including the influence of the environment and reasons for non-vaccination, availability, such as the location of vaccination services.

3.4. Ethics

The objectives and methods of the study were clearly explained before starting interviews. Respondents had the choice to refuse to answer. All information collected was kept strictly confidential. The project was approved by the National Council of Ethics of the Lao PDR.

3.5. Statistical analysis

The responses collected in the qualitative survey were analyzed to highlight the different dimensions of the conceptual framework. Validity of the analyses was based on a triangulation procedure (cross-checking of ideas from multiple sources), and a double coding of information by two researchers. Data from the quantitative survey were treated on Epidata 3.1 and Stata 8.2. Comparisons were made using Chi2 test for discrete variables and t test for continuous variables with a significance level of 5%. Multivariate analyses were used to identify factors independently associated with non-vaccination.

4. Results

4.1. Qualitative survey of the vaccination program stakeholders

Each dimension of the conceptual framework was identified among the reasons cited by interviewed persons to explain the variance of measles vaccination in the country. On the provision of services side, key factors affecting the achievement of satisfactory vaccine coverage were inadequate supplies of vaccine and diluents, difficulties in maintaining the cold chain (due to a lack of fridges, lack of ice for mobile teams, and frequent power cuts that affect