



# Association Between Socio-Economic Status and the Presence of Soap at Handwashing Facilities in Lao People's Democratic Republic: A Cross-Sectional Study

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## Introduction

Handwashing with soap is effective in preventing communicable diseases including diarrhea,<sup>1</sup> but many households do not use soap for handwashing. A report from WHO/UNICEF showed that while water is available, soap tends to be unavailable for handwashing in rural households.<sup>2</sup> For example, in the Lao People's Democratic Republic (Lao PDR), only 1.0% of households lacked water for handwashing but 34.7% lacked soap.<sup>3</sup>

Survey data suggest that socio-economic status (SES) is associated with the presence of soap for handwashing. A descriptive study on handwashing in 51 countries reported that households in lower wealth quintiles or in rural areas were less likely to have soap in their handwashing facilities than households in higher wealth quintiles or in urban areas.<sup>4</sup> According to a study that used nationally representative data of 16 sub-Saharan African countries, there were remarkable inequalities in access to water and soap for handwashing by place of residence and wealth quintile.<sup>5</sup> The Lao Social Indicator Survey II (LSIS II)—a household-based nationwide survey in 2017—showed that households whose heads have lower educational attainment, rural households, households of minority language group, and households of lower wealth quintiles were less likely to have soap for handwashing, compared to their counterparts.<sup>6</sup> However, these studies failed to examine the association between SES and the presence of soap for handwashing while considering confounding factors and thus the association remains unclear. Therefore, this study examined the association between SES and the presence of soap for handwashing facility in Lao PDR while controlling for potential confounding factors.

## Methods

This study used the LSIS II data (<https://mics.unicef.org/surveys>). Out of 23 299 households sampled, this study included 18 978 households where handwashing facilities with water

were available. Then, 136 households were excluded because of missing value or “I don't know” responses. Overall, the sample contained 18 842 households.

The outcome variable was the presence of soap at the handwashing facility. In the LSIS II, households with a site for handwashing with water were evaluated based on the following observation item: Is soap/detergent/ash/mud/sand present at the place for handwashing? The predictor variables included the educational attainment of the head of household and the household wealth as ranked into quartiles. To assess the household wealth, an asset-based index was originally built by principal component analysis. The information used for the index was the possession of 15 household assets including television, refrigerator, and motorcycle. Predictor variables other than SES were the ethno-linguistic group, existence of children under 5 years of age, ownership of domestic animals, and living area.

Bivariate analyses were conducted to assess the association between the outcome variable and each of the predictor variables. Multivariate analyses were conducted to assess the association between the outcome variable and each of the predictor variable while adjusting for other predictor variables. A mixed-effect logistic regression was used to account for the hierarchical structure of the data. A Chi-square trend test was conducted to assess the linear trend between the outcome and the household wealth or the educational



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**Table 1.** Characteristics of the Study Households (n = 18842).

Characteristics	n	%
Household wealth		
First (poorest)	4711	25.0
Second	4736	25.1
Third	4696	24.9
Fourth (richest)	4699	24.9
Educational attainment of household head		
No formal education/early childhood education	2920	15.5
Primary	8143	43.2
Lower secondary or above	7779	41.3
Ethno-linguistic group of household head		
Lao-Tai	11489	61.0
Others	7353	39.0
Existence of children under 5 years		
Existence	7349	39.0
Inexistence	11493	61.0
Presence of soap at handwashing facility		
Presence	11591	61.5
Absence	7251	38.5
Ownership of domestic animal		
Yes	15185	80.6
No	3657	19.4
Living area		
Urban	6147	32.6
Rural	12695	67.4

attainment. Ethical approval for this study was waived because this study used publicly open data without personal identification.

## Results

Of the 18842 households having a handwashing facility with water, 7251 (38.5%) had not placed soap at the handwashing facility (Table 1).

The bivariate analysis showed that the factors significantly associated with soap in handwashing facilities were household wealth, educational attainment of household head, and living area (Table 2). These associations remained significant in the multivariate analysis.

There was a significant linear relationship between the presence of soap and household wealth/educational attainment ( $P < .001$ ). The proportion of households presenting soap at handwashing facilities increased with increasing household wealth; 32.8% of the poorest households vs. 86.3% of the least poor households. Likewise, the proportion of households presenting soap at handwashing facilities increased with the level of educational attainment; 43.6% of the households whose heads had lower educational attainment vs. 74.9% of the households whose heads had higher educational attainment.

## Discussion

The price of soap does not seem to be expensive in Lao PDR (average price of a bar soap: 3110 kip, approximately 0.34 U.S. dollars).<sup>7</sup> However, the findings of the present study suggest that soap is not affordable to poor households. Although no study from Lao PDR has yet assessed people's perception on soap, many studies have been conducted outside Lao PDR and reported people's perception that soap is too expensive. For example, during the COVID-19 pandemic, the proportion of respondents reporting that soap is too expensive was 39% in Bangladesh, 21% in India, 62% in Nepal, and 66% in Pakistan.<sup>8</sup> In Australian remote Aboriginal communities, 75% of participants reported they would buy more soap if these were not so expensive.<sup>9</sup>

The association between the educational attainment and the presence of soap at handwashing facilities can be explained by the exposure to hygiene education at school. In Lao PDR, basic hygiene is taught at primary and secondary schools. Therefore, it would be reasonable to consider that heads of households who had higher educational attainment better understand the importance of handwashing with soap.

The results suggest that basic hygiene education alone may not be effective: There is a need to address the cost of soap. A systematic review showed that education and behavioral change interventions with free provision of soap are

**Table 2.** Association Factors of Soap Presence at Handwashing Facility (n = 18842).

Characteristics	Bivariate analysis			Multivariate analysis <sup>a</sup>		
	OR	95% CI	P-value	AOR	95% CI	P-value
Household wealth						
First (poorest)	1.00	Reference		1.00	Reference	
Second	2.35	2.11-2.62	<.001	2.01	1.79-2.24	<.001
Third	4.55	4.02-5.15	<.001	3.24	2.85-3.69	<.001
Fourth (richest)	10.47	9.03-12.14	<.001	6.24	5.33-7.32	<.001
Educational attainment of household head						
No formal education/early childhood education	1.00	Reference		1.00	Reference	
Primary	1.37	1.23-1.52	<.001	1.13	1.01-1.26	.030
Lower secondary or above	2.47	2.20-2.78	<.001	1.59	1.41-1.79	<.001
Ethno-linguistic group of household head						
Lao-Tai	1.00	Reference		1.00	Reference	
Others	0.31	0.27-0.34	<.001	0.53	0.47-0.60	<.001
Existence of children under 5 years						
Existence	1.00	Reference		1.00	Reference	
Inexistence	0.98	0.91-1.06	.608	0.97	0.90-1.05	.511
Ownership of domestic animal						
Yes	1.00	Reference		1.00	Reference	
No	0.93	0.84-1.03	.183	1.02	0.92-1.14	.707
Living area						
Urban	1.00	Reference		1.00	Reference	
Rural	0.19	0.15-0.23	<.001	0.49	0.41-0.59	<.001

Abbreviations: OR, odds ratio; CI, confidence interval; AOR, adjusted odd ratio.

<sup>a</sup>Adjusted for educational attainment of household head, ethno-linguistic group of household head, existence of children under 5 years, household wealth, ownership of domestic animal and living area.

more effective in preventing diarrhea compared to education and behavioral change interventions alone.<sup>1</sup> To make soap more affordable, Burundi put subsidized soap on the market nationwide at half price during the COVID-19 pandemic.<sup>10</sup> Subsidization of soap might also work in Lao PDR.

We recommend that a future study should examine whether increased affordability by providing subsidization or free distribution of soap can lead to increased use of soap in Lao PDR.

## Conclusion

This study demonstrated that household wealth and the educational attainment of household heads were independently and significantly associated with the presence of soap at household handwashing place in Lao PDR. The findings suggest that affordability of soap and limited knowledge on hand hygiene could be a barrier to soap ownership.

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