

## Abstract

The objective of this project is to determine the effect of the presence of E. coli in the household on the potential for contracting diarrhea. Our group constructed three least square regression models, with each consecutive model including additional variables. Our findings suggest that a presence of E. coli does in fact increase the potential of contracting diarrhea. With an increase in E. coli, diarrhea presence increases by .209. Given these findings we believe it is imperative that providing awareness regarding the dangers of E.coli and methods by which E. coli presence can be managed is an imperative component of health improvement initiatives in Nepal.

## Literature Review

In our preliminary research we discovered that E. coli is present in an astounding number of people in many developing countries, such as Nepal. In an investigative research paper researchers determined that E. coli was present in 18% percent of subjects treated in Bangladesh, and an astonishing 33% in Mexico. Furthermore, the study continued to elaborate on the detrimental health consequences of E. coli. Per, Qadri et. al., 330,000 deaths of children under 5 were directly associated with E. coli worldwide. Diarrhea also results in a significant economic burden to those who contract it in developing countries. In a study conducted by Sarker et. al., in Bangladeshi hospitals the treatment costs alone were found to be \$110.10, this accounted for 21.41% of annual income in poor households. Given these findings it seems paramount to determine ways in which E. coli transmission can be eliminated in Nepal.

## Hypothesis

We hypothesize that with the presence of E.coli in a household, there is an increased risk of getting diarrhea

## Models And Methods

1. Diarrhea =  $\beta_0 + \beta_1 \text{ecoli\_rank} + \epsilon_i$
2. Diarrhea =  $\beta_0 + \beta_1 \text{ecoli\_rank} + \beta_2 \text{Flushtoilet} + \epsilon_i$
3. Diarrhea =  $\beta_0 + \beta_1 \text{ecoli\_rank} + \beta_2 \text{Flushtoilet} + \beta_3 \text{HandWash} + \beta_4 \text{Washutensils} + \beta_5 \text{typetreatment} + \epsilon_i$

## Variables and Empirical Results

Variable	Obs	Mean	Std. Dev.	Min	Max
Diarrhea	748	.2245989	.4175972	0	1
ecoli_rank	313	.3482428	.4771763	0	1
HandWash	748	1.740642	.479408	0	2
WashUtensil	745	.9973154	.0517779	0	1
TypeTreatment	748	.3048128	.4606361	0	1
Flushtoilet	748	.6671123	.471562	0	1

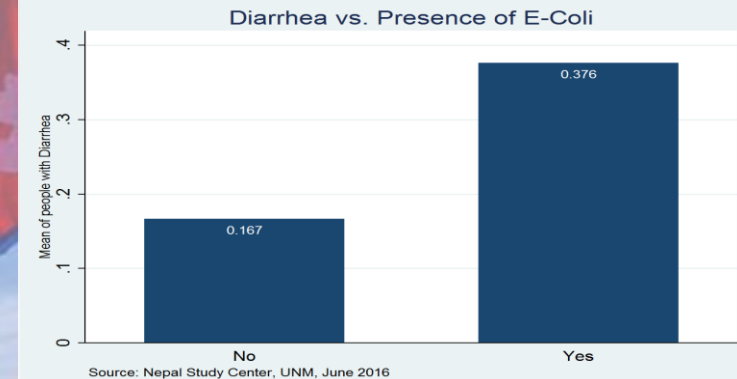
VARIABLES	Factors Causing Diarrhea		
	(1) Multivariate Model 1	(2) Multivariate Model 2	(3) Multivariate Model 3
ecoli_rank	0.209*** (0.049)	0.173*** (0.052)	0.124** (0.055)
HandWash			-0.101** (0.049)
WashUtensil			-0.431 (0.418)
TypeTreatment			-0.090* (0.051)
Flushtoilet		-0.108** (0.052)	-0.085 (0.052)
Constant	0.167*** (0.029)	0.248*** (0.049)	0.876** (0.414)
Observations	313	313	312
R-squared	0.055	0.068	0.096
Adjusted R-squared	0.0516	0.0619	0.0817
F-stat	17.98	11.29	6.54
n	313	313	312

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Diarrhea/Dysentery	Is Ecoli present in water?		
	No	Yes	Total
0	170	68	238
[1] Got Sick	34	41	75
Total	204	109	313

Pearson chi2(1) = 17.1099 Pr = 0.000

## Graphs



## Conclusions

The results of our study indicates that our initial hypothesis which states the presence of E.coli in a household means an increased risk of getting diarrhea is supported by the coefficient for the E.coli level which is significant throughout all three models. In addition to this, our chi2-value indicates that there is a strong correlation and significant in the 99% level, when compared to the chi2-critical value. The biggest step to avoiding diarrhea would be to do awareness programs to teach the people ways to prevent E.coli is the household though washing hands, washing utensils, teaching effective water treatment techniques and showing the importance of flush toilets.

## Reference

- Qadri, F., Svennerholm, A. M., Faruque, A. S., & Sack, R. B. (2005). Enterotoxigenic Escherichia coli in developing countries: epidemiology, microbiology, clinical features, treatment, and prevention. *Clinical microbiology reviews*, 18(3), 465-83.
- Sarker, A. R., Sultana, M., Mahumud, R. A., Ali, N., Huda, T. M., Salim Uzzaman, M., Haider, S., Rahman, H., Islam, Z., Khan, J., Van Der Meer, R., ... Morton, A. (2018). Economic costs of hospitalized diarrheal disease in Bangladesh: a societal perspective. *Global health research and policy*, 3, 1. doi:10.1186/s41256-017-0056-5