

Risk Factors Typhoid Fever Incidence at Lau Health Center, Kecamatan Lau, Maros 2021

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ABSTRACT

Introduction: Typhoid fever is a disease caused by the bacterium *Salmonella typhi*. Until now, disease fever typhoid still is problem for health in tropical countries including Indonesia. Knowing risk factor incident fever Typhoid at the Lau Public Health Center, Lau district, Maros regency in 2021.

Method: Research type analytic observational with case control design. The data analysis technique uses the chi-square statistical test.

Result: Typhoid Fever mostly found in the age 11-19 years as many as 21 people (*P-value* 0.049), gender obtained that the most in men as many as 22 people (*P-value* 0.014), level primary school education is obtained as many as 14 people (*P-value* 0.07), habit washes hand before eat less good obtained as many as 17 people (*P-value* 0.044), habit washes hand after a less CHAPTER good obtained as many as 19 people (*P-value* 0.013), habit eat / snack outside house obtained as many as 23 people (*P-value* 0.026), habit wash ingredients food less raw good obtained as many as 18 people (*P-value* 0.046) and sanitation, less environment, good obtained as many as 25 people *P-value* 0.041).

Conclusion: Based on results, study concluded that on the variable age, gender, education, habits wash hand before eats, habit washes hand after defecation, habit eats / snack outside home, custom wash ingredients food raw and sanitary environment own connection with factor risk incident fever typhoid in the health center Lau districts Maros in 2021.

Keywords: Typhoid fever; habit; salmonella typhi



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Introduction

Typhoid fever is a disease caused by Salmonella bacteria typhi or Salmonella typhosa of the genus Salmonella. Fever Typhoid very tight relation with hygiene or cleanliness. Bacteria Salmonella typhi like life in dirty food or land, so that if someone eats dirty food and during power stand her body low, so Salmonella bacteria typhi will attack the person's intestines

According to WHO (World Health Organization), estimates the worldwide incidence rate is between 1.6 and 33 million, with 500.000 – 600.000 deaths each year. Based on the report received from the South Sulawesi Province Disease Control and Environmental Health Office in 2016, it was obtained incident typhoid fever as many as 5,404 case. There are many possible factors causing incident fever typhoid as factor age, gender, sanitation environment, work, education, personal hygiene as well the place stay sufferer. Based on results research conducted by Abrian et al (2021), shows there is a connection between personal hygiene and sanitation environment with incident of fever typhoid

Then based on results research conducted Maghfiroh (2016) and Batubuaya (2017) mention that that be factor risk fever typhoid among them practice wash hand before eat, practice wash hand after defecation, condition the place disposal waste, processing food , habits eat out home , job respondents , and level income head family .

Method

This research used study quantitative observational with approach cross sectional because study this conducted by method collect dependent and independent data in one same time knowing the risk factors of fever disease of typhoid in patients Lau Health Center in 2021.

Result

Univariate analysis

Age

Table. 1 Typhoid Fever Analysis Based on Age

Age	Frequency (n)	(%)
Teenagers 11-19 years	41	62,1%
Adults 20-60 years	25	37,9%
Total	66	100%

Based on table 4.1 , the frequency of Typhoid Fever patients based on age, were 41 adolescent patients 11-19 years more (62.1 %) and adult patients 20-60 years, 25 patients (37.9 %) .

Gender

Table. 2 Analysis of Typhoid Fever Based on Gender

Gender	Frequency (n)	(%)
Male	34	51,5%
Female	32	48,5%
Total	66	100%

Based on table 4.2 , the results of patient frequency based on gender were obtained, where there were 34 male patients (51.5 %) and 32 female patients (48.5 %).

Education Level

Table. 3 Analysis of Typhoid Fever Based on Education Level

Education Level	Frequency (n)	(%)
Elementary school	26	39,4%
Junior high school	20	30,3%
Senior high school	10	15,2%
college	10	15,2%
Total	66	100%

Based on table 4.3 , the respondents were obtained based on Education level, where there were 26 elementary school patients (39.4%), 20 junior high school patients (30.3%), 10 high school patients (15.2%), and 10 college patients (15.2 %).

The habit of washing hands before eating

Table. 4 Analysis of Typhoid Fever Based on the Habit of Washing Hands before Eating

Hand washing before eating	Frequency (n)	(%)
Less good	26	39,4%
Good	40	60,6%
Total	66	100%

Based on table 4.4, the patient frequency results were obtained based on the habit of washing hands before eating, where patients were not good at washing hands as many as 26 patients (39.4 %) and patients were good at washing hands as many as 40 patients (60.6 %).

Habit of washing hands after defecating

**Table. 5 Analysis of Typhoid Fever Based on Washing Habits
Hands after defecate**

Hand washing After defecate	Frequency (n)	(%)
Less good	28	42,4%
Good	38	57,6%
Total	66	100%

Based on table 4.5, the results of patient frequency based on the Habit of Washing Hands after defecating, where 28 patients (42.4 %) were not good at washing hands and 38 patients (57.6 %) were good at washing hands.

Habits Eating/Snacking

Table.6 Analysis of Typhoid Fever Based on the Habits of Eating / Snacking Outside the Home

Habits of snacking outside	Frequency (n)	(%)
Often	37	56,1%
Rarely	29	43,9%
Total	66	100%

Based on table 4.6 , the patient frequency results were obtained based on the habit of snacking outside, where patients who often snacked were 37 patients (56.1%) and did not snack frequently as many as 29 patients (43.9%)

Washing Habits Food raw

**Table. 7 Analysis of Typhoid Fever Based on Material Washing Habits
Food Raw**

Habits of washing food material	Frequency (n)	(%)
often	28	42,4%
rarely	38	57,6%
Total	66	100%

Based on table 4.7 , the results of the frequency of Typhoid Fever patients based on the Habit of Washing Foodstuffs where patients who often wash food are 28 patients (4–2.4%) and do not wash frequently as many as 38 patients (5–7.6%)

Environmental Sanitation

Table. 8 Analysis of Typhoid Fever Based on Environmental Sanitation

Variable	Frequency (n)	(%)
Low	42	63,6%
High	24	36,4%
Total	66	100%

Based on table 4.8 , the patient frequency results are obtained based on Environmental Sanitation. Where based on clean water sanitation that is good as many as 24 patients (36.4%) and not good as many as 42 patients (63.6%).

Analysis Bivariate

Age

Table. 9 Relationship Age to Typhoid Fever Incidence

Age (Years)	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
11- 19	21 31.8%	20 30.3%	41 62.1 %	0.049	2,692
20 - 60	12 18.2 %	13 19.7 %	25 37.9 %		
Total	33 50%	33 50%	66 100%		

Based on Table. 9 is obtained data result that is the connection age between fever typhoid. Patient with aged 11-19 years who experienced fever typhoid as many as 21 people (31.8%) and those who don't experience fever typhoid as many as 20 people (30.3%). Whereas for patient with aged 20-60 years who experience fever typhoid as many as 12 people (19.7%) and those who do not experience fever typhoid as many as 13 people (18.2%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.049 (*P-value* <0.05). Then got concluded that there is significant relationship among age to fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 2.692. This signify ages 11-19 years potentially causing somebody experience fever typhoid of 2.692 times compared with those aged 20-60 years.

Gender

Table. 10 Gender Relations to Typhoid Fever Incidence

Gender	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
Man	22 33.3%	12 18.2%	34 51.5%	0.014	3,500
Woman	11 16.7%	21 31,8%	32 48,5%		
Total	33 50%	33 50%	66 100%		

Based on table 4.10 obtained the result of the data, the connection gender between fever typhoid . Patient

experienced man fever typhoid as many as 22 people (33.3%) and those who do not experience fever typhoid as many as 12 people (18.2%). Whereas for patient experienced women fever typhoid as many as 11 people (16.7%) and those who did not experience fever typhoid as many as 21 people (31.8%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.014 (*P-value* <0.05). Then got concluded that there is significant relationship among type sex to fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 3,500. This signify man potentially causing somebody experience fever typhoid by 3.5 times compared with girl.

Level of education

Table. 11 Relationship between Education Level and Typhoid Fever Incidence

Education	Typhoid Fever		Total	P- Value
	Yes	Not		
Elementary school	14 21.2%	12 4.5%	26 39.4 %	0.007
Junior high school	10 15.2%	10 15.2%	20 30.3%	
Senior high school	7 10.6 %	3 4.5 %	10 15.2 %	
College	2 3.0%	8 12.1%	10 15.2%	
Total	33 50%	33 50%	66 100%	

Based on table. 11 the result of the data found the connection between education and fever typhoid. Patient with experienced primary school education fever typhoid as many as 14 people (21.2%) and those who don't experience fever typhoid as many as 12 people (18.2%). For patient with experienced junior high school education fever typhoid as many as 10 people (15.2%) and those who don't experience fever typhoid as many as 10 people (15.2%). For patient with experienced high school education fever typhoid as many as 7 people (10.6%) and those who do not experience fever typhoid as many as 3 people (4.5%). Whereas for patient with education experienced universities fever typhoid as many as 2 people (3.0%) and those who do not experience fever typhoid as many as 8 people (12.1%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.07 (*P-value* <0.05). Then got concluded that there is significant relationship among education to fever typhoid.

Washing Hands before Eating

Table. 12 Habit Relationship Wash Hands before Eating to Typhoid Fever Incidence

Wash Hands Before Eating	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
Not good	17 25.8%	9 13.6%	26 39.4%	0.044	2,883

Well	16 24.2%	24 36.4%	40 60.6%
Total	33 50%	33 50%	66 100%

Based on table 4.12 the result of the data found the connection between wash hand before eat and fever typhoid. The patient that has the less habit for washing hand has fever typhoid 17 people (25.8%) and those who do not experience fever typhoid as many as 9 people (13.6%). Whereas for the patient that good habits in wash hand before eating has fever typhoid 16 people (24.2%) and those who do not experience fever typhoid as many as 24 people (36.4%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.044 (*P-value* <0.05). Then got concluded that there is significant relationship among wash hand before eat to fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 2.883. This signifies wash hands before eat less good potentially causing somebody experience fever typhoid of 2.883 times compared with washing hand before eating.

Habit Washing Hands after Defecation

Table. 13 Relationship of Washing Habits Hands after defecate to Incident Typhoid Fever

Wash Hands After defecating	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
Not good	19 28.8%	9 13.6%	28 42.4%	0.013	3,619
Well	14 21.2%	24 36.4%	38 57.6%		
Total	33 50%	33 50%	66 100%		

Based on table 13, there is a connection between wash hand after defecating against fever typhoid. Less patient, good in wash hand after defecate experienced fever typhoid as many as 19 people (28.8%) and those who do not experience fever typhoid as many as 9 people (13.6%). Whereas for good patient wash hand after defecate experienced fever typhoid as many as 14 people (21.2%) and those who don't experience fever typhoid as many as 24 people (36.4%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.013 (*P-value* <0.05). Then got concluded that there is significant relationship among wash hand after defecate against fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 3.619. This signify wash hand after less defecate goods potentially causing somebody experience fever typhoid of 3.619 times compared with washing hand after defecate.

Habits of Snacking outside the House

Table. 14 Relationship between eating/ snacking habits outside the House against Incident Typhoid Fever

Eating or Snacking Habits	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
Not good	23 34.8%	14 21.2%	37 56.1%	0.026	3,121
Well	10 15.2%	19 28.8%	29 43.9%		
Total	33 50%	33 50%	66 100%		

Based on table. 14, the result of the data found the connection between habits of eating or snacking outside house to fever typhoid less patient good in habit eat or experienced snacks fever typhoid as many as 23 people (34.8%) and those who do not experience fever typhoid as many as 14 people (21.2%). Whereas for good patient habit eat or experienced snacks fever typhoid as many as 10 people (15.2%) and those who don't experience fever typhoid as many as 19 people (28.8%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.026 (*P-value* <0.05). Then got concluded that there is significant relationship among habit eat or snacking to fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 3.121. This signify habit eat or less snacks good potentially causing somebody experience fever typhoid of 3.121 times compared with habit eat or snacking.

Washing Foodstuffs Raw

Table. 15 Relationship of Washing Food stuffs Raw to Incident Typhoid Fever

Washing Raw Food	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
Not good	18 27.3%	10 15.2%	28 42.4%	0.046	2,760
Well	15 22.7%	23 34.8%	38 57.6%		
Total	33 50%	33 50%	66 100%		

Based on table. 15 the result of the data found the connection between wash food raw to fever typhoid. less patient good in wash food experienced raw fever typhoid as many as 18 people (27.3%) and those who do not experience fever typhoid as many as 10 people (15.2%). Whereas for good patient wash food experienced raw fever typhoid as many as 15 people (22.7%) and those who don't experience fever typhoid as many as 23 people (34.8%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.046 (*P-value* <0.05). Then got concluded that there is significant relationship among wash food raw to fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 2,760. This signify wash food less raw good potentially causing somebody experience fever typhoid by 2,760 times compared with wash food raw.

Sanitation Environment

Table. 16 Sanitation Relations Environment to Typhoid Fever Incidence

Environment sanitation	Typhoid Fever		Total	P- Value	Odds Ratio
	Yes	Not			
Low	25 37.9%	17 25.8%	42 63.6%	0.041	2,941
High	8 12,1%	16 24,2%	24 36,4%		
Total	33 50%	33 50%	66 100%		

Based on table.16 the result of the data found the connection between sanitation environment to fever typhoid less patient good in sanitation experiencing environment fever typhoid as many as 25 people (37.9%) and those who do not experience fever typhoid as many as 17 people (25.8%). Whereas for good patient sanitation experiencing environment fever typhoid as many as 8 people (12.1%) and those who do not experience fever typhoid as many as 16 people (24.2%). Based on the statistical test Chi-Square with SPSS is obtained score *P-values* of 0.041 (*P-value* <0.05). Then got concluded that there is significant relationship among sanitation environment to fever typhoid.

Based on table above is also obtained score *Odds Ratio* of 2.941. This signify sanitation low environment potentially causing somebody experience fever typhoid of 2.941 times compared with sanitation high environment.

Discussion

This research was conducted during the period October - December 2022 at the Lau Public Health Center, Lau District, Maros Regency. And get a sample of 66 samples. From the sample, the following discussion was obtained:

Age Relations to Typhoid Fever Incidence.

The data obtained were Typhoid Fever patients based on age, where there were 21 adolescent patients 11-19 years old (31.8 %) and 12 adult patients 20-60 years old (18.2 %). Based on the Statistical Square Chi-Test with SPSS, $p = 0.049$ (*P-value* <0.05) . So it can be concluded that there is a relationship between age and the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency. This research conducted on fever patients typhoid children and youth who treated in Home Sick Pertamina Star Amen city Lampung Year 2018 based on age highest exist at age teenager ⁽³⁶⁾.

Typhoid fever could happens to all age , At Age children 5-11 years is age school where in the group age the often do outside activity _ house , so that risky infected Salomonella typhi like snacking at school or outside house which not enough guaranteed cleanliness (consume food and drink which contaminated). There are factors hygiene, power stand body and milk contamination or product milk by carrier could causing

children more many contaminated *Salmonella typhi* ⁽³⁶⁾

Gender Relations against Typhoid Fever Incidence

The results obtained were 22 male patients (33.3 %) and 11 female patients (16.7 %). Based on the Statistical Square Chi-Test with SPSS, the value of $p = 0.014$ ($P - value < 0.05$). So, it can be concluded that there is a relationship between gender and the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency.

This research conducted by Maria in 2012, namely that men have more activities outside the home than women. More men consume ready-to-eat food or food stalls which usually contain a lot of flavoring and hygiene that is not guaranteed, compared to women who prefer to cook their own food so they pay more attention to the composition and cleanliness of the food. This habit makes men more susceptible to food-borne diseases such as typhoid if the food purchased is not hygienic. Based on this discussion, from a dietary perspective, men are more susceptible to disease than women. ⁽⁴⁰⁾

Educational Level Relationship to Typhoid Fever Incidence

The data obtained were typhoid fever patients based on education level, where elementary school patients were 14 patients (21.2 %), Junior high school patients were 10 patients (15.2%), high school patients were 7 patients (10.6 %), and D3 /Higher Education in 2 patients (3.0%). Based on the Square Statistical Chi-Test with SPSS, p value = 0.07 ($P - value < 0.05$). So, it can be concluded that there is a relationship between the level of education and the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency.

This is in line with firmawati's research (2021) that Education level matters to incident fever typhoid where Education level SD, SMP categorized low ⁽⁴¹⁾. Low level of knowledge could cause somebody no understand how guard hygiene and storage food so that could increase risk happening disease typhoid fever.

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The Relationship between the Habits of Washing Hands before Eating To Incident Typhoid Fever.

The results obtained were 17 patients (25.8%) who did not wash their hands well and 16 patients (24.2%) were good at washing their hands . Based on the Square Statistical Chi-Test with SPSS, $p = 0.044$ ($P - value < 0.05$) . So it can be concluded that there is a relationship between the habit of washing hands before eating with the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency.

This research conducted by Malau in 2015, tittle the relationship between the habit of washing hands before eating and the incidence of typhoid fever in the working area of the Bandarharjo Health Center in Semarang City, the results obtained were $p = 0.042$ with $OR = 2.870$ and $CI = 1.135-7.252$. The results of

another similar study by Pramitasari (2013) regarding the risk factors for typhoid fever at Ungaran Hospital concluded that the habit of not washing hands before eating and washing hands without using soap is a risk factor for typhoid fever ⁽³⁷⁾.

Also supported by research conducted by Prasad (2018) also states that dirty hands can transfer pathogenic bacteria from hands to food, so that the bacteria that enter can infect a person's body, so washing hands frequently after defecating and before eating using soap can reduce risk of typhoid fever. The results of this study can illustrate that the circumstances of cases and controls have quite clear differences, where in the group of cases who have a bad habit of washing their hands before eating more than those who have good habits. This shows that the habit of washing hands before eating has a significant effect on the incidence of typhoid fever, so self-awareness is needed to get used to washing hands with running water soap to prevent transmission of Salmonella typhi onto food from dirty hands ⁽³⁸⁾.

The Relationship between Hand Washing Habits After defecate to Incident Typhoid Fever

The results of the data were that 19 patients (28.8%) patients did not wash their hands well and 14 patients (21.2 %) were good at washing hands. Based on the Square Statistical Chi-Test with SPSS, $p = 0.013$ ($P\text{-value} < 0.05$). So it can be concluded that there is a relationship between the habit of washing hands after defecating with the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency

Research this aligned with study Maghfiroh, Arum Siwiendrayanti (2016) obtained results there is connection among habit wash hand after defecate with incidence of Typhoid Fever. Dirty hands or contaminated could move bacteria or viral pathogens from body, faces or other sources to food. Therefore, cleanliness hand with wash hand need get priority high, though Thing the often underestimated washing with soap as cleaning, scrubbing and rinsing with running water will wash away particle lots of dirt contain micro organization. ⁽²⁸⁾

The Relationship of Eating / Snacking Out to Typhoid Fever Incidence

The results of the data are that the patient often eats outside 23 patients (34.8%) and 10 patients (15.2%) infrequent *snacks*. < 0.05). So, it can be concluded that there is a relationship between snacking outside and the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency.

This is in line with the research conducted by Nada Khairunnisa in 2020, namely the relationship between snacking habits with incident fever typhoid in children age school is taken care of stay HOSPITAL petala earth Riau province in 2020, the results obtained were $p = 0.026$ with $OR = 5.571$ ⁽⁴⁵⁾. The results of other studies are similar namely by Volard (2013) that the habit of snacking or eating outside the provision of the home is a risk factor for the incidence of typhoid fever in inpatients at Ungaran Hospital. The behavior of food handlers influences food contamination. A food handler is encouraged to adopt healthy

behaviors related to food handling, including washing hands before handling or processing food. food obtained from roadside food vendors is significantly associated with the transmission of typhoid fever (OR=3.34) and also in another study found that street food or beverage vendors or itinerants more often did not wash their hands before preparing food, had direct contact with food and less educated than restaurants and stalls ⁽⁴²⁾

Relationship of Washing Raw Foods to Incident Typhoid Fever

The results of the data obtained were that there were 15 patients (22.7 %) who often washed food and did not wash frequently food as many as 18 patients (27.3 %)). Based on the Statistical Square Chi-Test with SPSS, p value = 0.046 (*P-value* <0.05). So it can be concluded that there is a relationship between Handwashing Habits and the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency.

Syapila's research in 2018 that found Salmonella contamination sp in vegetables can come from irrigation water contaminated with sewage, soil, or animal manure used as fertilizer. In addition, vegetables that grow around wastewater disposal can also be contaminated with Salmonella bacteria sp. In this study most of the respondents had washed the vegetables to be consumed using running water. Consuming raw vegetables will not be a problem if consumed in the right way, namely by washing thoroughly before consumption to remove dirt, chemicals such as pesticides, and Salmonella bacteria. typy. So that it can reduce the transmission of typhoid fever through raw food ⁽³⁹⁾.

Environmental Sanitation Relations to Incident Typhoid Fever

The obtained data result based on clean water sanitation that is good as many as 8 patients (12.1 %) and not good as many as 25 patients (37.9%). Based on the Statistical Square Chi-Test with SPSS, p value = 0.041 (*P-value* <0.05). So it can be concluded that there is a relationship between Environmental Sanitation and the incidence of Typhoid Fever at the Lau Health Center, Lau District, Maros Regency.

This is in line with opinion Widoyono in 2011 that clean water facilities is one _ means sanitation that is not lost importance related with incident fever typhoid . Principle transmission fever typhoid is through faecal -oral, germs originate from feces or urine sufferer or even carrier (carrier disease that is not sick) who entered to in body through water and food. Use of polluted drinking water germs in a manner bulk often responsible answer to happening Extraordinary Events (KLB) ⁽⁴³⁾.

research conducted by Namrata Prasad in 2018 own facility sanitation that is not repaired or damaged (OR = 4.30; 95% CI 1.14-16.21) in a manner significant associated with fever typhoid as well as in line with research by Nurvina Wahyu Artanti (2012), which shows that clean water facilities with incident fever typhoid obtained from p value = 0.004 (<0.05) and OR of 2.215 which means that respondents who have

clean water facilities no fulfil condition have risk for affected by Typhoid Fever 2.215 times more big from the respondent have clean water facilities fulfil terms ⁽⁴⁴⁾ .

Conclusion

Based on results, study concluded that on the variable age, gender, education, habits wash hand before eats, habit washes hand after defecation, habit eats / snack outside home, custom wash ingredients food raw and sanitary environment own connection with factor risk incident fever typhoid in the health center Lau districts Maros in 2021.

References

1. Oktavia Gunawan D, Indriani L, Dewi M. Evaluation Giving Antibiotics in Typhoid Fever Patients at the Inpatient Installation of Azra Hospital, Bogor City . *Fitofarmaka J Ilm Farm* . 2020;10(1):54-64. Doi:10.33751/Jf.V10i1.1938
2. Sundari M, Rizqoh D, Bate'e Gj . Identification Bacteria Salmonella Sp. In Children with Typhoid Fever Aged 5-14 Years Using the Widal Test Method at Medan Adventist Hospital in 2018. *J Anal Lab Med* . 2021;6(1):6-12. Doi:10.51544/Jalm.V6i1.1893
3. Fitriani F, Sukmana M. Personal Hygiene And Knowledge As A Typhoid Fever Risk Factor In Muna City Hospital. *J Case Past Bumi Kalimantan* . 2020;3(2):3 Doi:10.30872/J.Case.Pass.Cal.V3i2.4763
4. Idrus Hh , Yuniati L, Fadilah Am, Mangarengi Y, Sodikah Y. Effectiveness Extract Sapodilla Fruit (Achras Zapota L.) Against Salmonella Typhi Using The Diffuse Agar Method . *Umm Med J* . 2019;3(1):1-11. Doi:10.33096/Umj.V3i1.30
5. Pratiwi Ri, Putri Ar. Ratio Effectiveness of Ceftriaxone and Cevitaxim in Pediatric Patients with Typhoid Fever . *J Ilm Manuntung* . 2022;8(1):8-13.
6. Prayudha , Palancoi Na, Jalaluddin S. Profile Leukocyte Count in Children with Typhoid Fever at Dr. Tadjuddin Chalid Makassar. *J Health Sciences* . 2021;02:2-7.
7. Idrus Hh, Hatta M, Febriza A, Kasim Vna. Antibacterial Activities Of Sapodilla Fruit Extract Inhibiting Salmonella Typhi On Mice Balb/C. *Int J Appl Pharm*. 2019;11(Special Issue 5):121-126. Doi:10.22159/Ijap.2019.V11s5.T0095
8. Rahmawati Rr. Influencing Risk Factors _ Incidence of Typhoid Fever in the Work Area Public health center Binacal Regency Bondowoso . *Med Technol Public Heal J* . 2020;4(2):224-237. Doi:10.33086/Mtphj.V4i2.1689
9. Mustofa Fl, Rafie R, Megamelikna B. The Relationship of Determinant Factors With Typhoid Fever Incidence in Patients Stay at Pertamina Bintang Amin Hospital in 2018. *J Med Malahayati* . 2020;4(4):50-51.
10. Abrian Eo , Yasnani, Nurmaladewi . Related Factors With Incidence of Typhoid Fever in the Work Area Public health center Tirawuta Regency East Kolaka . *J Health Halu Oleo Univ* . 2021;2(1):1-10.
11. Ulfa F, Handayani Wow . Incidence of Typhoid Fever in the Work Area Public health center Pagiyanten . *Higeia (Journal Public Heal Res Dev* . 2018;2(2):227-238. Doi:10.15294/Higeia.V2i2.17900
12. Afifah Nr, Pagawa Etp . Typhoid Fever Incidence Age 15-44 Years . *Higeia J Public Heal Res Dev* . 2019;3(2):263-273.
13. Sari Tw, Wahyuni S. Relations Knowledge And Attitude With Behavior Prevention of Typhoid Fever in Hospitalists Food . *Phot J Science and Health* . 2021;12(1):1-11. Doi:10.37859/Jp.V12i1.3166
14. Murzalina C. Examination Laboratory For Support Typhoid Fever Diagnostics . *J Health Cehadum* . 2019;1(3):61-68.
15. Ramada Ga. *Characteristics Sufferers of Typhoid Fever in Children at Rsu Karsa Husada - Batu City in 2018-2020* . Maulana Malik Ibrahim State Islamic University; 2021.
16. Mayasari D, Pratiwi A. Relations Immune Response And Stress With the Recurrence Rate of Typhoid Fever in Communities in the Puskesmas Area Colomadu Karanganyar . *Knowledgeable _ Nursing* . 2009;2(1):13-18.
17. Ramaningrum G, Anggraheny Hd , Putri Tp. Influencing Factors Incidence of Typhoid Fever in Children in Hospital Tugurejo Semarang The Factors That Affect the Incidence Of Typhoid Fever In Children In Tugurejo Hospital, Semarang Based on Data Obtained from the Java Provincial Health Office . 2014;(2):1-8.
18. Seran Er, Palandeng H, Kallo Vd . Personal Hygiene Relationship With Incident Typhoid Fever . *Nursing Ejournal*

- . 2015;3(2):1-8.
19. Khairunnisa S, Hidayat Em , Herardi R. Relations Leukocyte Count And Percentage Lymphocytes Against Fever Levels In Pediatric Patients With Typhoid Fever In Hospital Budhi Asih Year 2018 – October 2019. *Seminar Nas Ris Kedokt* . Published Online 2020:60-69.
 20. Pramitasari Op. Risk Factors Incident Typhoid Fever in Patients Who Are Treated at the Ungaran Regional General Hospital . *J Health Mass* . 2013;2(1):1-10.
 21. Laila On, Khambali , Sulistio I. Behavior , Sanitation Home Environment and Typhoid Fever Incidence . *J Researcher Sound Health Forikes* . 2022;13(2):525-529.
 22. Malau Vm , Budiyo , Yusniar . Connection Hygiene Individual and Sanitation Household Food _ With Incidence of Typhoid Fever in Children Aged 5-14 Years in the Work Area Public health center Bandarharjo City of Semarang. *J Health Community Diponegoro University* . 2015;3(1):18548.
 23. Wulandari, P., Dina, R., & Rahayu A. The relationship between clean and healthy living behavior and Incidence of Typhoid Fever in the Work Area Public health center Upai Kotamobagu City Year 2015. *J Ilm Farm* . 2016;5(2):266-275. <https://Ejournal.Unsrat.Ac.Id/Index.Php/Pharmacon/Article/View/12215>
 24. Rosdiana Dha . *Relationship Personal Hygiene And Contact History With Incidence of Typhoid Fever in the Work Area District Health Center Kare Madison* . 2019.
 25. Yuliawati D, Ramadhani Nr, Sri Ld , Yuliawati S. Quality Bacteriological Based on Presence of Salmonella Sp in Lettuce (*Lactusa Sativa*). *J Jambi Public Health* . 2017;1(1):11-18.
 26. Husna S, Fitriani, Lisna. Connection Healthy Living Behavior With Typoid Fever Incidence in Children at the Lamaddukelleng General Hospital Regency Wajo . *J Ilm Mappadising* . 2020;2(2):140. <http://Ojs.Lppmuniprima.Org/Index.Php/Mappadising>
 27. Maghfiroh Ae. *Connection Practice Hand Wash , Condition The place Relation Garbage , Ownership of Wastewater and Sanitation Facilities Food With Typhoid Fever Incidence in Kelurahan Mlatibaru East Semarang District* . Semarang State University; 2015.
 28. Maghfiroh Ae, Siwiendrayanti A. Relations Wash Hands, Place Garbage , Spal Ownership , Sanitation Food With Typhoid Fever . *J Pen Med* . 2016;6(1):34-45. <http://Jurnal.Unikal.Ac.Id/Index.Php/Medika/Article/View/376>
 29. Irmawanti Elementary School *Relations Between Behaviors Hygiene Individual and Sanitation Environment With Incidence of Typhoid Fever in the Work Area Public health center scene Regency Purbalingga* . Semarang State University; 2016. <https://Lib.Unnes.Ac.Id/27948/>
 30. Fadholah A, Rahmawati Lm , Rahmawati R. Description of Sanitation Environment in Santriwati Sufferers of Typhoid Fever at Darussalam Gontor Putri Modern Islamic Boarding School 1. *Pharmasipha Pharm J Islam Pharm* . 2021;5(2):50-56.
 31. Andayani , Fibriana A. Incidence of Typhoid Fever in the Work Area Public health center Karangmalang . *Higeia J Public Heal Res Dev* . 2018;2(1):57-68. <http://Journal.Unnes.Ac.Id/Sju/Index.Php/Higeia>
 32. Levani Y, Prastya Ad. Typhoid Fever : Manifestations Clinical , Options Therapy And Views In Islam. *Al- Iqra Med J J Berk Science Medicine* . 2020;3(1):10-16.
 33. Idris Hh , Hatta M, Budu . Role Of High Motility Group Box 1 (Hmgb-1) In Inflammation On Salmonella Typhi Bacterial Infection. *Online Int Conf Life Sci* . 2020;1:1-11.
 34. Idrus Hh , Febriza A, Novarina Kasim V, et al. Achras Zapota L Extract Reduces Levels Of Soluble Tumor Necrosis Alpha (Tnf -A) Of Salmonella Typhi. *Int Conf Biomed Sci* . Published Online 2019:2-8.
 35. Hardianto D. Review of Rapid Diagnosis and Treatment Methods Infection Salmonella Typhi. *J Biotechnol Biosciences Indonesia* . 2019;6(1):149. Doi:10.29122/Ibbi.V6i1.2935
 36. Ladyani , F. 2018. Characteristics of Typhoid Fever Patients in Children and Adolescents at the Pertamina Bintang Amin Hospital in Lampung . Page : 628
 37. Malau. 2015. Household Food with the Incidence of Typhoid Fever in Children Aged 5-14 Years in the Work Area of the Bandarharjo Health Center . Semarang city. Pages: 589-598
 38. Prasad, N., Jenkins, A. P., Naucukidi, L., Rosa, V., Sahu-Khan, A., Kama, M., Crump, J. A. 2018. Epidemiology And Risk Factors For Typhoid Fever In Central Division, Fiji: A Case-Control Study, 2014–2017. *Plos Neglected Tropical Disease*, 12(6): 1-14
 39. Syapila Paul O. 2018. Factors Associated With The 2012 Typhoid Fever Outbreak In Mufulira District, Zambia: A Case Control Study. *Health Zambia Bull*, 2(2): 8–16
 40. Mary. Herawati Mh, Ghani L, Pramonod . The Relationship between Determinant Factors and the Incidence of Typhoid Fever in Indonesia in 2012 (Association Of Determinants factors with Prevalence Of Typhoid in Indonesia). *Media Researchers and Health Developers*. 2009; 19(4):165-173
 41. Firmawati, F., & Liputo , S. (2021). Connection Knowledge And Attitude With Worry Family Patient Typhoid in

- the Children's Room of Rsu Dr. Mm. Dunda Limboto . *Olive (Journal Health Sciences)* , 4 (1).
42. Vollaard Am, Ali S., Van Asten Hagh, Et Al. Risk Factor For Typhoid Fever And Paratyphoid Fever In Jakarta, Indonesia. *Journal Of The American Medical Association*. 2013;291:2607-15.
- 43 . Widoyono . 2011. *Tropical Diseases*. Erlangga , Jakarta
- 44 . Namrata Prasad , 2018 *Epidemiology And risk Factors For Typhoid Fever In Central Division , Fiji, 2014–2017: A Case-Control Study \)*
45. Khairunnisa, N., Rany, N., & Kursani , EK (2021). Connection Habit Snacking With Typhoid Fever Incidence in Children Inpatient School _ HOSPITAL Petala Bumi Riau Province _ Year 2020: Correlation Buying Snack Habits And Typhoid Fever In Children At School Age In–Patients At Petala Bumi Hospital, Riau Province In 2020. *Media Kesmas (Public Health Media)* , 1 (3), 816-824.