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# TROPICAL MEDICINE JOURNAL

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**Volume 03, Number 02**

**CONTENTS**

# Risk Factors Analysis of Typhoid Fever Occurence of Inpatient in Kebumen Public Hospital in 2013

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## ABSTRACT

**Introduction:** Typhoid fever is a disease caused by infection of *Salmonella typhoid* and *paratyphoid* bacteria. There are 350-810 people who get this disease per 100.000 people and the percentage of death is 0.6-5%. Typhoid fever in Kebumen Regency always belongs to the big five diseases. The criteria are the number of in-patient in the hospital and the extraordinary occurrence for 4 years (from 2007 to 2010). This disease is related to unhealthy sanitation and bad individual hygiene practice.

**Objective:** To analyze the risk factors of typhoid fever occurrence of inpatient in Kebumen Public Hospital in 2013.

**Methods :** This research is an analytical observational research with control case study design. The sample subject was taken by using consecutive sampling method and there were 148 respondents, consisting of 74 case respondents and 74 control respondents. The data were analyzed by using McNemar (bivariate) test and conditional logistic regression (multivariate).

**Results :** Most respondents are in the age of 15-20 years old (32.43%), female (70.27%), the graduates of Senior/Vocational High School (29.05%) and student/university student (34.46%). The results of multivariable analysis are the risk factor of eating non-homemade snack habit is high ($p$=0.000; $OR$=5.586; $CI$ 95% 2.142-14.571) followed by the habit of washing hands before eating ($p$=0.003;$OR$=2.835; $CI$ 95% 1.433-5.609). Water clean sources, facility for defecation, defecation habit in latrine, and typhoid fever history in family are not the risk factors of typhoid fever occurrence of in-patient in Kebumen Public Hospital.

**Conclusion :** The risk to get typhoid fever in Kebumen Regency is higher on those whose habits of eating non-homemade snacks and not washing hand by using soap before eating. Therefore, the health officer should improve individual hygiene promotion and give information to society and those who manage food processing public place.

**Key Words:** Risk factors,Typhoid fever, Kebumen.

## INTISARI

**Pendahuluan:** Demam tifoid merupakan penyakit karena infeksi bakteri *Salmonella typhi* dan *paratyphi*. Angka kesakitan di Indonesia 350-810/100.000 penduduk dan kematian 0,6-5%. Demam tifoid di Kabupaten Kebumen selalu masuk dalam lima besar penyakit, urutan pertama terbanyak rawat inap rumah sakit, dan selama 4 tahun terjadi KLB (tahun 2007-2010). Penyakit ini berhubungan

dengan kondisi sanitasi lingkungan yang tidak sehat dan praktek higiene perorangan yang jelek.
**Tujuan:** Untuk menganalisis faktor risiko kejadian demam tifoid pada pasien rawat inap di Rumah Sakit Kabupaten Kebumen tahun 2013.
**Metode:** Penelitian ini adalah penelitian analitik observasional dengan rancangan studi kasus kontrol. Subyek sampel diambil secara *consecutive sampling*, terdiri dari 74 responden kasus dan 74 responden kontrol. Analisis data dengan uji *McNemar (bivariat)* dan *conditional logistic regression (multivariat)*.
**Hasil :** Responden paling banyak berumur 15-20 tahun 32,43%, berjenis kelamin perempuan (70,27%), tingkat pendidikan tamat SMA/SMK (29,05%) dan jenis pekerjaan pelajar/mahasiswa (34,46%). Hasil analisis multivariabel faktor risiko kebiasaan jajan di luar penyediaan rumah memiliki kemaknaan paling tinggi (*p*=0,000;*OR*=5,586; *CI* 95% 2,142-14,571) diikuti kebiasaan cuci tangan sebelum makan (*p*=0,003;*OR*=2,835; *CI* 95% 1,433-5,609). Sumber Air Bersih, fasilitas Buang Air Besar (BAB), kebiasaan BAB di jamban dan riwayat demam tifoid dalam keluarga tidak berhubungan dengan kejadian demam tifoid.
**Simpulan :** Risiko terkena demam tifoid di Kabupaten Kebumen lebih besar pada orang dengan kebiasaan jajan diluar penyediaan rumah dan kebiasaan tidak cuci tangan menggunakan sabun sebelum makan. Dengan demikian petugas kesehatan harus meningkatkan promosi higiene perorangan dan penyuluhan kepada masyarakat dan pengelola Tempat Umum dan Pengelolaan Makanan (TUPM).

**Kata Kunci:** faktor risiko, demam tifoid, Kebumen.

## INTRODUCTION

Typhoid fever is a disease caused by infection of *Salmonella typhi* and *paratyphi* bacteria. In 2000, it is assumed that typhoid fever caused more than 21.6 million cases and 216,510 deaths, and paratyphoid caused more than five million cases. More than 100/100000 population per year got this disease in South Asia, Middle Asia, Southeast Asia and southern part Africa. There are 70-80% cases and death of that number occurred in Asia, in which this disease became endemic[1].

Based on systematical review in several countries, the average number of typhoid fever from 1980 to 2009 is 0.1/100,000 people in East Europe and Middle Europe as well as Asia until 724.6/100,000 population in sub South Africa area. Meanwhile, the average number of paratyphoid occurrence is 0.8/100.000 people in sub-Africa and South Asia. Based on the review, it is estimated that in 2010 the number of typhoid fever case is 13.5 million or between 9.1-17.8 million[2].

In Indonesia, the typhoid case number is around between 350-810/100,000 population. From the case analysis in big hospitals in Indonesia, the average number of case is 500/100.000 population. It is assumed that death number is 0.6-5%[3]. The prevalence of national clinical typhoid fever is as many as 1.6%, are spread in all ages and in adult. The prevalence of clinical typhoid is frequently found in the age of 5-14 years old, i.e. 1.9%, lowest at infant (0.8%) and relatively higher in rural area (1.8%) compared than urban area (1.2%). The prevalence of typhoid tends to be higher at low education group (6.6%) compared to that of high education (2.1%)[4].

Typhoid fever in Kebumen Regency is always in the big five frequent disease, the first rank of

in-patients number in hospital, and for 4 years Extraordinary Occurrence happened from 2007 to 2010[5]. Typhoid fever is closely related to unhealthy environment condition and individual hygiene practice. Typhoid fever spreading is linked to implementation of clean life principle, i.e. spread by *faecal-oral* through hand, food/drink, water and soil that is source of causes[6].

The data of Kebumen Regency profile in 2011 show that there are 80.4% of the respondents whose healthy and clean habit which is still under the determined standard (85%). Most houses, sanitation and environment have not fulfilled the requirements. Some of the requirements are healthy house, healthy latrine, water waste management, access toward clean water, as well as public places and food processing[5]. However, up to now, there is no information and analysis about the risk factors of typhoid fever of inpatient in Kebumen Public Hospital. Thus, this research

## MATERIALS AND METHODS

The type of this research is analytical observational research with *Case Control Study* design. The number of sample is calculated by using calculation formula of population proportion[7], so the number of sample is 148 respondents, consisting of 74 case respondents and 74 control respondents. The source of data for research sample is derived from Kebumen Public Hospital, RS PKU Muhammadiyah Sruweng, PKU Muhammadiyah Gombong Hospital, and Palang Biru Gombong Hospital which were taken by using *consecutive sampling method.*

The independent variables in this research are clean water source, defecation facility, defecation habit, hand washing before eating habit, eating non-homemade snacks, and the history of typhoid fever disease in family. The dependent variable in this research is typhoid fever occurrence. The data collecting of the risk factors were obtained based on interview and observation in living environment of the respondents as well as the results of questionnaire.

Analysis of data was conducted by analytical and descriptive analysis using *McNemar (bivariate)* test, *odds ratio* value and *conditional logistic regression (multivariate).*

## RESULTS AND DISCUSSION

The respondents were spread in 64 villages in 11 districts. Most respondents were from Kebumen District as many as 36 respondents (24.33%), and there were at least 5 respondents from Pejagoan and Petanahan Districts respectively (3.38%). Based on the hospital the respondents were taken care, most respondents are from Kebumen Public Hospital (45.95%).

The result of O titers workup cases respondents most worth 1/400 (37.8%), the number of cases coming from Kebumen Public Hospital (76.5%). Most respondents are in the age of 15-20 years old (32.43%) and the least are in the age of $\geq$ 56 years old (2.71%). Based on sex, the respondents are female (70. 27%). Based on the educational level of the respondents, most respondents are the graduates of Senior High School/Vocational School (29.05%), and the least respondents do not graduate from Elementary School (2.70%). The most respondents' occupation is students/university students (34.46%) and the least occupation of the respondents is pensioner (0.68%).

The data were analyzed by using *bivariate McNemar* statistical analysis. The variable with risk of typhoid fever and *p-value* <0.25 is clean water source with *OR* 2 value; *CI* 95% 0.755 – 5,855; *p-value* 0.1892, the habit of washing hands

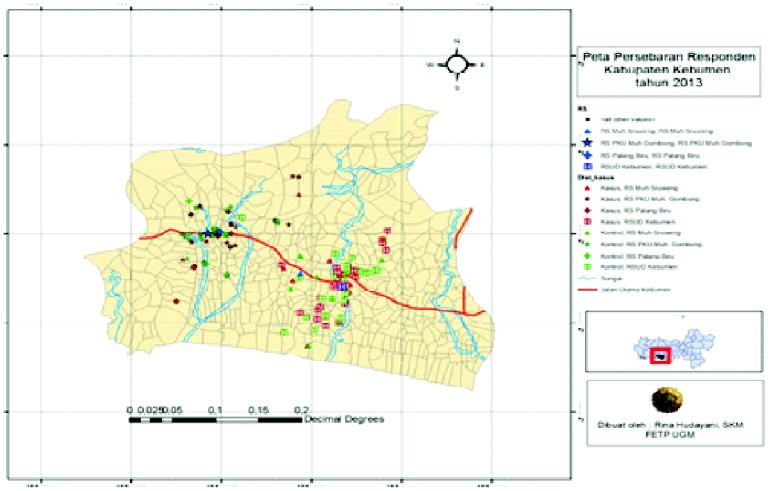


Figure 1. Distribution of Respondents Location

before eating with *OR* value is 8; *CI* 95% 1.073 – 354.981; *p-value* 0.0391 and eating non-homemade snacks with *OR* value 3.67; *CI* 95% 1.717 – 8.713; *p-value* 0,0003. Water clean source, defecation facility, defecation habit, and typhoid fever history in family are not the risk factors of typhoid fever occurrence on in-patient in Kebumen Public Hospital.

Table 1. Comparison of Conditional Logistic Regression Analysis of Models 1 and 2 Risk Factors for Typhoid Fever in Kebumen during 2013

| Logistic | OR | 95% CI | P |
|---|---|---|---|
| Model 1 | | | |
| Water source | 1,257 | 0,396 - 3,988 | 0,698 |
| The habit of washing hands | 2,688 | 1,297 - 5,569 | 0,008 |
| Eating non-homemade snacks | 5,661 | 2,151 - 14,898 | 0,000 |
| *Log likelihood* = -35,404514 | | *Pseudo* $R^2$ = 0,3098 | |
| Model 2 | | | |
| The habit of washing hands | 2,835 | 1,433 - 5,609 | 0,003 |
| Eating non-homemade snacks | 5,586 | 2,142 - 14,571 | 0,000 |
| *Log likelihood* = -35,480575 | | *Pseudo* $R^2$ = 0,3083 | |

For model 2 analysis, there were 2 variables which influence the typhoid fever occurrence. It is statistically shown that *p* value < 0.05. Those variables are washing hands before eating with *p* value = 0.003 (*OR*=2.835; *CI* 95% 1.433-5.609) and eating non-homemade snacks *p* = 0.000 (*OR*=5.586; *CI* 95% 2.142-14.571).

The results of this research are supported by many research concerning risk factors of typhoid fever which have ever conducted. Some of them are the research in Ujung Pandang with *OR* value = 29.8[8], the research in Semarang with *OR* value = 3.97[9], the research in Jatinegara with *OR* value = 1.91[10], the research in Purworejo with

*OR* value = 22.05[11], the research in Bengkulu OR = 2.567[12], the research in Bulungan with *OR* value = 2.62[13], and the research in Boyolali with *OR* value = 2.915[14].

Washing hands before eating with soap can be one of someone's hygiene indicators. Dirty or contaminated hands can transfer bacteria and pathogen virus from body, feces, or other sources to food[15]. Washing hands with soap which is followed by rinsing will eliminate many microbes in hands. Dirty or contaminated hands can transfer bacteria and pathogen virus from the body, feces, or other sources to food. Combination between activities of using soap as cleanser, rubbing with water flow will sweep away dirt particle containing microbe. Washing hands by using water and soap can become emulsifier to dissolve fat and oil on the surface of hand skin as well as rubbing by using brush also decreases microbe number faster than washing hands without soap[16].

The use of a spoon when eating to prevent the entry of pathogens into the mouth. However, in this study the respondents case only occasionally use soap to wash cutlery (79.73%), always wash utensils with soap (8.11%), and never do not use soap (12,16%).

The availability of snacks sellers in stalls or street side are needed by some people due to their cheap price for those who are in low economic level. However, most sellers have low educational background as well as they do not appreciate safety and hygiene of the foods sold so that they are risky for people's health. The sellers in street side have lacks in the facility of frozen food storage, ripe food storage, the habit of washing hands and washing dishes as well as the low standard of hygiene[10].

The results of this research are supported by many research concerning the risk factors of typhoid fever occurrence which have been done, such as: the research in Ujung Pandang *OR*=45,6[8], the research in Purworejo with *OR* value = 5.8[11], the research in Bengkulu with *OR* value = 2.99[12], the research in Bulungan with *OR* value = 2.204[14], and the research in Boyolali with *OR* value = 2.350[15]. This research is different from that conducted in Turkey which states that there is no meaningful correlation between eating non-homemade snacks habit and typhoid fever occurrence (p=0.9)[17].

Research on the presence of Salmonella in food and drinks at roadside food vendors and canteen in Depok, West Java showed that of the 29 food samples were examined , including 5 positive Salmonella . Positive samples found in coconut juice ( 2 places ), ice cocktails, traditional cold drinks, and vegetable salads. The existence of Salmonella due to several factors , among others is a bacterial contamination of raw materials, poor personal hygiene conditions, bacterial contamination in the water source, and the processing and presentation of food and beverages are not bersih[18]. Research on fruit juices (orange juice, apple, watermelon, star fruit, and carrot juice ) in Malaysia in the prevalence of Salmonella spp can result (34 %), S. typhi (20 %) and S. typhimurium (10 %). In S. typhi, the greatest prevalence of carrot juice (40 %). The existence of Salmonella due to several factors, among others is a bacterial contamination of raw materials, poor sanitary conditions, also pay less attention to time and temperature beverage[19].

Health Department Kebumen routine monitoring of food beverage, food beverage

sampling, shipping and inspection of food and beverage samples, monitoring food before Eid, as well as to guide the domestic industry. However, the percentage coverage Public Places and Food Processing (TUPM) healthy Kebumen still below the standard set which is 16.89 % of the supposed 80 % . Seeing such conditions, all health workers especially environmental health officers must be even harder in monitoring TUPM .

It is suggested that Health Agency and Public Health Center improve environment health promotion and individual hygiene, especially the habit of washing hands by using soap and not eating non-homemade snacks in any place. Besides, the investigation activities in Public Places and Food Processing Improving clean and healthy behavior, especially the habit of washing hands with soap before eating and not eating non-homemade snacks in any place is also important.

## CONCLUSION

The risk factors of typhoid fever occurrence in Kebumen Regency is caused by the habits, such as not washing hand with soap before eating and eating non-homemade snacks. Water clean source, defecation facility, defecation habit, and typhoid fever history in family are not the risk factors of typhoid fever occurrence on in-patient in Kebumen Public Hospital.

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**Sample References**

**Scientific Journal**

1. *Standard journal article*

   You CH, Lee KY, Chey RY, Menguy R. Electro-gastro-graphic study of patients with unexplained nausea, bloating and vomiting. Gastroenterology 1980; 79(2):311-14.

   Goate AM, Haynes AR, Owen MJ, Farral M, James LA, Lai LY, et al. Predisposing locus for Alzheimer's disease on chromosome 21. Lancet 1989;1:352-55.

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   The Royal Marsden Hospital Bone-marrow Transplantation. Team. Failure of syngeneic bone-marrow graft without preconditioning in post-hepatitis marrow aplasia. Lancet 1977;2:742-44.

3. *No author given*

   Coffee drinking and cancer of the pancreas [editorial]. BMJ 1981;283-628.

4. *Article not in English*

   Massone L, Borghi S, Pestarino A, Piccini R, Gambini C. Localisations palmaires purpuriques de la dermatite herpetiforme. Ann Dermatol Venereol 1987;114:1545-47.

5. *Volume with supplement*

   Magni F, Rossoni G, Berti F, BN-52021 protects guinea-pig from heart anaphylaxis. Pharmacol Res Commun 1988;20 Suppl 5:75-78.

6. *Issue with supplement*

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