Santi Martini <santi-m@fkm.unair.ac.id>

JPHR - J Public Health Res - paper #2309 - Submission Acknowledgement

1 message

Nadia Moscato <nadia.moscato@pagepress.org> Mon, Apr 5, 2021 at 2:29 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Dear Santi Martini,
thank you for submitting the manuscript " Determinants of Hepatitis A Infection among Students: A Case Study of an Outbreak in Jember, Indonesia" to the Journal of Public Health Research.

With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Manuscript URL: https://jphres.org/index.php/jphres/authorDashboard/submission/2309
Username: dr_santimartini

If you have any questions, please contact me.
Thank you for considering this journal as a venue for your work.

With best regards,
Nadia Moscato

JPHR - J Public Health Res - paper #2309 - Editor Decision - Minor Revisions

4 messages

Luigi Barberini <lbarberini@aoucagliari.it> Fri, Aug 13, 2021 at 2:48 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>, Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Santi Martini, Firman Suryadi Rahman,

Your paper entitled " Determinants of Hepatitis A Infection among Students: A Case Study of an Outbreak in Jember, Indonesia" has been examined by our external Referees and then re-evaluated in-house. All Referees agree that this manuscript is interesting and potentially acceptable for publication in our Journal.

However, a few changes should be made before publication: the Reviewers' forms below/comments attached indicate how your manuscript should be modified.
TO FACILITATE THE REVIEW PROCESS PLEASE MAKE ALL CHANGES IN YOUR MANUSCRIPT EASILY IDENTIFIABLE: YOU CAN DO THIS BY USING A DIFFERENT COLOR.

Should you choose to resubmit, please include a covering letter to explain, point-by-point, how you have modified your paper in answer to each of the Reviewers' comments.

Important: we recommend that you consult/download the Guidelines for Authors of this journal under Submission, as well as its current *Table of Contents*, to ensure that your revised manuscript is written in accordance with the Journal editorial standards (in particular, title page, tables and references style).

The revised manuscript, edited in **.doc** format, should be resubmitted electronically within **2/3 weeks** from the date of the *Editor Decision* message.

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3. Next to the heading **"REVISIONS"**, upload your revised paper by using the **"UPLOAD FILE"** button;
4. Inform the Editors that a revised version has been uploaded.

Although our Journal is potentially interested in this paper, please be aware that this is not a statement of acceptance or a promise to accept a revised manuscript. The final decision as to this paper's acceptability for publication will depend on how our current concerns are met.

Please note that if your manuscript is accepted you will not be able to make any changes to the authors, or order of authors, of your manuscript once the editor has accepted your manuscript for publication.
If you wish to make any changes to authorship before you resubmit your revisions, please reply to this email and ask for a 'Request for change in authorship' form which should be completed by all authors (including those to be removed) and returned to this email address.

Thank you very much for sending this interesting work to our Journal. We look forward to receiving a revised manuscript.

With best regards,
Luigi Barberini
University of Cagliari
lbarberini@aoucagliari.it

****

If improvements to the English language within your manuscript have been requested, you should have your manuscript reviewed by someone who is fluent in English. If you would like professional help in revising this manuscript, you can use any reputable English language editing service. We can recommend our affiliate **Charlesworth Author Service**s (https://www.cwauthors.com/) for help with English usage. Please note that use of an editing service is neither a requirement nor a guarantee of publication.

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Reviewer B:

For author: The introduction is quite clear but many of the words hepatitis A are repeated. The research method is appropriate and the variables are quite a lot. In the result please make the table view better. In the discussion explain examples of raw food (vegetable and fruits)

For editor: This article is good, it only needs minor corrections about redundant words, the information submitted is useful for prevention measures for Hepatitis A outbreaks, worthy of acceptance and publication.

Recommendation: Minor Revisions

Journal of Public Health Research

4 attachments

C-2309-FINAL.docx
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B-File Comment For Authors.docx
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Santi Martini <santi-m@fkm.unair.ac.id> Tue, Aug 24, 2021 at 6:34 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi,

Thank you very much for the information.
I'm going to revise it to respond to the comments.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

Preventing disease, Prolonging Life, and Promoting Health
through the Organized Efforts of Society *****

[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Tue, Aug 24, 2021 at 10:09 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi,

I'd like to inform you that I have uploaded the revised version.
Please check it.

Hope to hear from you soon the good news.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

Preventing disease, Prolonging Life, and Promoting Health
through the Organized Efforts of Society *****

On Fri, Aug 13, 2021 at 2:48 PM Luigi Barberini <lbarberini@aoucagliari.it> wrote:
[Quoted text hidden]

Firman Suryadi Rahman <firmansuryadirahman@gmail.com> Tue, Aug 24, 2021 at 10:25 AM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Thank you Bu Santi..
[Quoted text hidden]

Determinants of hepatitis A infection among students: A case study of an outbreak in Jember, Indonesia

Santi Martini, Firman Suryadi Rahman

[1]Department of Epidemiology, Faculty of Public Health, Universitas Airlangga

[2]Student at Doctoral Program of Public Health, Faculty of Public Health Universitas Airlangga

Correspondence Author: Santi Martini, santi-m@fkm.unair.ac.id

Abstract

Background: Hepatitis A often occurs in school among students in the form of an outbreak. The transmission was through fecal-oral (Common Source) provided that the epidemic curve is close to propagated. The aim of the current study was to analyze the determinants of Hepatitis A Infection among students.

Design and methods: This study was a case-control study which was conducted at SMAN Plus with a sample size of 80 students chosen by using simple random sampling. The data obtained were then analyzed using logistic regression with 95% confidence level ($\alpha = 0.05$), while the strength of the relationship between variables was identified using Odds Ratio (OR).

Results: Most of the students were at the age of 17 to 19 years old (65%) and male (57.5%). The average age in the case group was 17.1 years old, while in the control group was 16.75 years old. The habit of consuming raw foods ($p = 0.013$) as well as eating and drink at the same time during an activity ($p = 0.000$) had a significant influence on the outbreak of Hepatitis A in the curve epidemic of common source.

Conclusion: The outbreak is confirmed as a transmission occurs through fecal-oral which the common source epidemic curve. Risk factors that have been proven to be

related to Hepatitis A include consuming raw food, eating shared meals during an activity, and drinking with shared drinking utensils.

Keywords: hepatitis A, outbreak, high school, student,

Significance for Public Health: Hepatitis A still frequently occurs in Indonesia. Several Hepatitis A outbreaks have occurred in schools or Islamic boarding schools. The results of this research are expected to be an effort to provide scientific input to the Health and School Offices to prevent an outbreak of Hepatitis A in the school environment in the future.

INTRODUCTION

Hepatitis A is generally transmitted through food and drinking contamination and person to person transmission of fecal-oral transmission route. This is significantly related to the behaviour of clean and healthy life.[1] Hepatitis A can transmit through fecal-oral through food and drinks which are contaminated by Hepatitis A Virus (VHA). VHA is thermostable, acid resistant, and resistant to bile. VHA can survive in room temperature for more than a month.[2,3] Hepatitis A in Indonesia occurs more frequently in rural area than urban area.[11]

Commented [WU1]: Redundent words

Hepatitis A can cause Extraordinary Event (Outbreak). There were 6 Extraordinary Events (KLB) with 279 sufferers in 2010, 9 KLB with 550 sufferers in 2011, 8 KLB with 369 sufferers in 2012, and 13 KLB with 504 cases in 2013.[3] In terms of the outbreak in 2013, there were 6 districts in East Java in which outbreaks occurred, including Jombang, Lamongan, Pacitan, Sidoarjo, Ponorogo, and Pasuruan with total 462 cases. In 2014, the outbreaks occurred in three districts, including Sidoarjo, Kediri and Surabaya with 59 cases. In 2015, KLB occurred in three districts as well, those are Probolinggo, Lamongan and Jember with 78 cases.[4]

Commented [WU2]: Change this word to outbreak, no need write KLB

Hepatitis A among school-aged children often occurred in the form of an outbreak. The transmission is *fecal oral* (*common source*) with epidemic curve approaches propagated. The transmission of Hepatitis A at school often related to drinking water and raw foods contaminated by HAV.[25-26] On school-aged children, Hepatitis A can occur asymptomatically. The outbreak of Hepatitis A on school-aged children in China was asymptomatic by 55.5.[24] This is proven by IgG antibody result which was HAV positive on school-aged children without Hepatitis A symptoms during an outbreak of Hepatitis A in China.

The outbreak of Hepatitis A in school environment in 2010-2020 in East Java occurred in Probolinggo, Jember, Bondowoso, Lamongan, Pacitan, and Surabaya.[28] The causes of Hepatitis A outbreak in the school environment are due to insufficient hand washing facilities and drinking water sources which are close to septic tank. In addition, it is also significantly related to the hygiene and sanitation of food seller in the school environment.[29]

Jember District is one of the districts which have high prevalence of hepatitis A in 2013, which is almost the same as the prevalence of Hepatitis A in East Java of 1%. In 2012, Hepatitis A outbreak occurred in Puger with 22 cases. Meanwhile, in 2013, Hepatitis A outbreak also occurred in Sumbersari Sub-District (39 cases), Patrang Sub-District (37 cases), and Kaliwates District (19 cases). In 2015, there was another Hepatitis A outbreak in Sukowono Sub-District.[5]

Repetitive outbreaks indicates that the primary preventive efforts are implemented poorly. This is caused by the determinants of the outbreak which are not identified yet. Therefore, this research aimed to analyze the risk factor of Hepatitis A outbreak on school-aged students in Jember District. Based on the initial assumption obtained from outbreak epidemiology investigation at SMAN Plus Sukowono on 7 October 2015, it was known that most of the students had poor personal hygiene. Most of them did not wash their hand after defecating and often consumed raw food. In addition, the hand washing and food utensils

facilities at the canteen were also poor because the water is limited and did not use running water.

RESEARCH METHODS

This study was an analytic observational study with a *case-control* design. This research was conducted at SMAN Plus Sukowono. The population in this study consisted of case population of all MAN Plus Sukowono students who suffered from Hepatitis A after the New Student Orientation and Basic Leadership Training activities in August 2015 and control population of all SMAN Plus Sukowono students who did not suffer from Hepatitis A after the New Student Orientation and Basic Leadership Training activities in August 2015. Based on the sample calculation using the *unmatched case-control* by using Epi Info 7, it obtained case samples of at least 40 students, with the comparison between the case and control sample was 1:1. Therefore the minimum samples needed for the research were 80 students taken using simple random sampling technique.

The independent variables in this research were knowledge, defecation behavior at school and at home, latrine at home, water consumption at school and at home, eating habit at canteen, raw food consumption habit, habit of buying food from mobile vendor, the use of shared of shared cutlery, room density, and shared eating and drinking activities during extracurricular activities. Meanwhile, the dependent variable was the incidence of hepatitis A.

The data collected in this study were primary data in the form of students' knowledge and behavior. The variables were measured through interviews with students and questionnaires filled by the respondents. Furthermore, the respondent characteristics are then presented in percentage form. Results of the study were analyzed using Chi-Square test with a 95% confidence level ($\alpha = 0.05$) to analyze the significant relationship between hepatitis A and the

independent variables as well as to interpret the relationship strength between the variables using Odds Ratio (OR).

RESEARCH RESULT

The distribution of respondent characteristics in this study is presented in the following table 1. Based on the table, the respondents in the case group were mostly aged 17 to 19 years old (65%), male (57.5%) and in class XII (42.5%). The average age of the case group was 17.1 years old, while the control group was 16.75 years old.

The epidemic curve based on case data shows that this outbreak is a common source. The total number of students who suffered from the clinical symptoms of Hepatitis A was 48 students. Reports said that the first time a student experienced symptoms was at 11 September, while on 1 October, there was no report of new cases.

The results of multivariable analysis found two independent variables that had a significant effect on hepatitis A outbreak, they are raw food consumption ($p = 0.013$) as well as eating and drinking habits together during extracurricular activities ($p = 0.000$). Meanwhile, the independent variables which were not significant are knowledge, defecating behavior at school, poor category of water drinking at school, often wearing cutlery together, handwashing after defecation, handwashing before meals, the low-income parent/guardian of the respondents, and the respondents density room.

The results of Logistic Regression analysis ($\alpha = 0.05$) indicates that the variable of eating raw food ($p = 0.013$) and the habit of eating and drinking together during extracurricular activities ($p = 0.001$) had a significant effect on the incidence of hepatitis A in SMA Plus Sukowono. Whereas knowledge, defecating behavior at school, water consumption at home, water consumption at school, eating habits in the canteen, buying food at mobile vendors,

washing hands behavior after defecating, washing hands before eating, parents/guardian income and room density are not significant on Hepatitis A.

Commented [WU3]: Redundent explanation

Discussion

The Ministry of Health of Indonesia stated that Hepatitis A can be spread through contaminated food, food and drinks which were not cooked as well as poor hygiene and sanitation. [6] Risk factors affecting the Hepatitis A outbreak in the Second High School is the consumption of raw food without being washed and eating together activities which have potential for food exchange. Open defecation behaviour was also frequently done by the students, especially outside school hours. Students generally do not have a latrine at home so they often did it at the river or in the garden. Open defecation is still prevalent in East Java. Open defecation can certainly increase the transmission risk of Hepatitis A.[7] Open defection done by students is in line with their latrine ownership at home. Students who did not have a latrine will tend to do open defection. Open defecation behavior will pollute rivers and even have the potential to pollute groundwater sources. This incident will cause Hepatitis A transmission if there is HAV in the feces.[9-10]

Raw food consumption without being washed by using clean water and cooked is one of the factors of Hepatitis A.[12] The contamination of water and food, vegetables and fruits that are not ripe, is one of the factors often occurred in Europe tens years ago. [13] At present, they are no longer face this problem. Good sanitation, personal hygiene, and comprehensive HAV vaccination make the country immune to HAV. It is different from particular regions in Indonesia which have bad sanitation and even aggravated by poor personal hygiene. One of them happened at the research location. In the case population, the unavailability of family latrine, do not wash hands after defecating, consuming raw food without washing and cooking it first, and consuming raw water are the behavior they do every day. The consumption

of raw food which is the cause of the outbreak also occurred in Hawaii. This study encourage the main allegation of Hepatitis A outbreak which is caused by the consumption of raw foods. Studies [14, 15] stated that the incidence of Hepatitis A outbreaks occurred after universal vaccination in these States. The main assumptions were derived from scallops, poke, sushi, raw tomatoes, and raw fish. The investigation suggested that the possible contamination originated from scallops imported from the Philippines.[15]

In an outbreak occurred in a high school, hepatitis A only occurred on school-aged children. Meanwhile, the community outside the school did not have any symptoms of Hepatitis A. Based on the calculation of common source epidemic curve and the environment conditions, especially school canteens, the causative narrowed to raw food consumption at one school event. The food consumed was *pecel* and *lalapan* which had raw vegetables. Field investigation to catering providers revealed that there were indeed raw vegetables given to participants. ELISA test results showed that among the 10 samples taken, 5 of them had HAV. Food samples cannot be taken for further testing, this is because the events that caused the outbreak had been occurred more than 1 month and the incubation period for Hepatitis A is 15-50 days with an average incubation period of 28-30 days.[17]

Commented [WU4]: Please explain this more detail, for example the lalapan consist of the what kind of vegetables

The FDA states that Hepatitis A often causes outbreaks, which are generally caused by HAV contamination in food and beverages, neighbourhoods, and catering.[16] Generally, there was differences between developed countries and developing countries. This is related to sanitation, hygiene, and HAV vaccination. In developed countries, Hepatitis A outbreaks generally occur due to imports of raw materials, frozen food, and fruits. The latest research stated that person-to-person transmission was found, especially among homeless people. [22] Meanwhile, in developing countries, this transmission is generally caused by inadequate food processing, hygiene, and sanitation. [18-20] Vaccination of Hepatitis A at a particular group still needs to be done to prevent hepatitis A in the future. [22]

Conclusion

Hepatitis A outbreak that occurred in Jember only occurred in one high school. The outbreak was confirmed through *fecal-oral* transmission of a common source epidemic curve. The risk factors proven to be significantly related to hepatitis A are defecation behaviors, latrine ownership, raw food consumption and shared eating and drinking.

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Declarations

- **Ethics approval and consent to participate**

  This Research already got ETICAL CLEREANCE CERTIFICATE No. 246/KEPK/ 2016 from Universitas Airlangga Health Research Ethical Clereance Commission. Informed consent was obtained from all participants and all methods were carried out in accordance with relevant guidelines and regulations

- **Consent for publication**

  The Authors declare that the results/data/figures in this manuscript have not been published elsewhere, nor are they under consideration.

- **Availability of data and materials**

  The Authors declare that that all the data is Available. Anyone that need the data can one access by mail me at santi.martini@fkm.unair.ac.id or contact the publsiher BMC or Nature

- **Competing interests**

The authors declare that they have no competing interests

- **Funding**

This Research was self funded

- **Authors' contributions**

Santi Martini = SA
Firman Suryadi Rahman = FSR
FSR and SA design research Created Questionnaire. FSR Collected ,Cleaned and analyzed data, SA and FSR prepared the first draft of the manuscript.

- **Acknowledgements**

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Authors' information (optional)

Dr. Santi Martini

Dean of Faculty of Public Health, Universitas Airlangga, Indonesia

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Table 1. Characteristics of Respondents

Category	Status		n (%)
	Case	Control	
Age			
15- <17	14 (35 %)	21	35 (43.7%)
17-19	26 (65%)	(52.5%)	45 (52.3%)
Total	40 (100%)	19	80 (100%)
Average	17.1	(37.5%)	
	years	40 (100%)	
		16.75	
		years	
Gender			
Man	23	18	41 (51.2%)
	(57.5%)	(45.0%)	
Women	17	22	19 (44.2%)
	(42.5%)	(55.0%)	
Total	40 (100%)	40 (100%)	80 (100%)
Class			
X	13	16	29 (36.2%)
	(32.5%)	(40.0%)	
XI	10	15	25 (31.2%)
	(25.0%)	(37.5%)	
XII	17	9 (22.5%)	26 (32.5%)
	(42.5%)		
Total	40 (100%)	40 (100%)	80 (100%)

Table 2. Multivariate analysis of the determinants of hepatitis A outbreak in SMA Plus Jember

Category	Status		n	Univariate		Multivariate	
	Case	Control		p-value	OR (95% CI)	p-value	OR (95% CI)
Knowledge							
Bad	21 (52.5%)	22 (55.0%)	43	0.823	0.904 (40.375-2.179)	-	-
Good	19 (47.5%)	18 (45.0%)	37				
Defecation behavior at school							
Bad	8 (20.0%)	4 (10.0%)	12	0.218	2.250 (0.619-8.184)	0.466	1.933 (0.354-10.542)
Good	32 (80.0%)	36 (90.0%)	68				
Defacation behaviour at home							
Bad	25 (62.5%)	14 (35.0%)	39	0.015	3.095 (1.243-7.706)	-	-
Good	15 (37.5%)	26 (65.0%)	41				
Water Consumption at home							
Bad	0 (0%)	2 (5.0%)	2	0.999		-	-
Good	40 (100%)	38 (95.0%)	78				
Water Consumption at Schools							
Bad	22 (55.0%)	25 (62.5%)	47	0.496	0.733 (0.3-1.791)	-	-
Good	18 (45.0%)	15 (37.5%)	33				
Eating Habits in the Canteen							
Often	34 (85.0%)	34 (85.0%)	68	1.000	1 (0.293 - 3412)	-	-
Rarely	6 (15.0%)	6 (15.0%)	12				
Eating raw foods							
Often	27 (67.5%)	12 (30.0%)	39	0.001	4.846 (1.882-12.482)	0.013	5.035 (1.409-17.994)
Rarely	13 (32.5%)	28 (70.0%)	41				
Food Buying Habits at Mobile Vendors							
Often	18 (45.0%)	18 (45.0%)	36	1.000	1 (0.414 - 2.413)	-	-
Rarely	22 (55.0%)	22 (55.0%)	44				
Use of shared cutlery							
Often	25 (62.5%)	19 (47.5%)	44	0.179	1.842 (0.755-4.493)	0.968	1.027 (286-2.683)
Rarely	15 (37.5%)	21 (52.5%)	36				

Hand washing behavior after defecating						
Bad	11 (27.5%)	9 (22.5%)	20	0.606	1.307 (0.473-3.609)	-	-
Good	29 (72.5%)	31 (77.5%)	60				
Wash Hands Before Eating							
Bad	13 (32.5%)	11 (27.5%)	24	0.629	1.269 (0.487-3.3311)		
Good	27 (67.5%)	29 (72.5%)	56			-	-
The habit of eating and drinking together during extracurricular activities							
Not good	30 (75.0%)	12 (30.0%)	42	0.000	7.000 (2.615 - 18.738)	0.001	7.126 (2.314 - 21.945)
Good	10 (25.0%)	28 (70.0%)	38				

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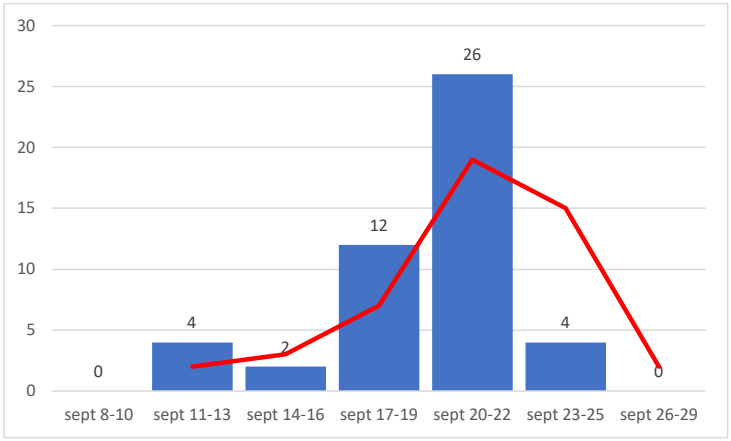

282

283 Figure 1 Epidemic Curve of Hepatitis A outbreak in Jember Senior high School

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285

Comment For Authors

- In the introduction is quite clear but many of the words hepatitis A are repeated (redundent sentence)
- In the research method is appropriate and the variables are quite a lot
- In the result please make the table view better
- In the discussion please explain more detail about the raw food, for example the lalapan consist of what kind of vegetables
- This article is good, it only needs minor corrections about redundent words, the information submitted is useful for prevention measures for Hepatitia A outbreaks, worthy of acceptance and publication.

Santi Martini <santi-m@fkm.unair.ac.id>

JPHR - J Public Health Res - paper #2309 - Submission Acknowledgement

1 message

Nadia Moscato <nadia.moscato@pagepress.org>
To: Santi Martini <santi-m@fkm.unair.ac.id>

Mon, Apr 5, 2021 at 2:29 PM

Dear Santi Martini,
thank you for submitting the manuscript " Determinants of Hepatitis A Infection among Students: A Case Study of an Outbreak in Jember, Indonesia" to the Journal of Public Health Research.

With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Manuscript URL: https://jphres.org/index.php/jphres/authorDashboard/submission/2309
Username: dr_santimartini

If you have any questions, please contact me.
Thank you for considering this journal as a venue for your work.

With best regards,
Nadia Moscato

JPHR - J Public Health Res - paper #2309 - Editor Decision - Minor Revisions

4 messages

Luigi Barberini <lbarberini@aoucagliari.it> Fri, Aug 13, 2021 at 2:48 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>, Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Santi Martini, Firman Suryadi Rahman,

Your paper entitled " Determinants of Hepatitis A Infection among Students: A Case Study of an Outbreak in Jember, Indonesia" has been examined by our external Referees and then re-evaluated in-house. All Referees agree that this manuscript is interesting and potentially acceptable for publication in our Journal.

However, a few changes should be made before publication: the Reviewers' forms below/comments attached indicate how your manuscript should be modified.
TO FACILITATE THE REVIEW PROCESS PLEASE MAKE ALL CHANGES IN YOUR MANUSCRIPT EASILY IDENTIFIABLE: YOU CAN DO THIS BY USING A DIFFERENT COLOR.

Should you choose to resubmit, please include a covering letter to explain, point-by-point, how you have modified your paper in answer to each of the Reviewers' comments.

Important: we recommend that you consult/download the Guidelines for Authors of this journal under Submission, as well as its current *Table of Contents*, to ensure that your revised manuscript is written in accordance with the Journal editorial standards (in particular, title page, tables and references style).

The revised manuscript, edited in **.doc** format, should be resubmitted electronically within **2/3 weeks** from the date of the *Editor Decision* message.

To submit the revised version:
1. Log in;
2. Click on the title of your paper;
3. Next to the heading **"REVISIONS"**, upload your revised paper by using the **"UPLOAD FILE"** button;
4. Inform the Editors that a revised version has been uploaded.

Although our Journal is potentially interested in this paper, please be aware that this is not a statement of acceptance or a promise to accept a revised manuscript. The final decision as to this paper's acceptability for publication will depend on how our current concerns are met.

Please note that if your manuscript is accepted you will not be able to make any changes to the authors, or order of authors, of your manuscript once the editor has accepted your manuscript for publication.
If you wish to make any changes to authorship before you resubmit your revisions, please reply to this email and ask for a 'Request for change in authorship' form which should be completed by all authors (including those to be removed) and returned to this email address.

Thank you very much for sending this interesting work to our Journal. We look forward to receiving a revised manuscript.

With best regards,
Luigi Barberini
University of Cagliari
lbarberini@aoucagliari.it

****

If improvements to the English language within your manuscript have been requested, you should have your manuscript reviewed by someone who is fluent in English. If you would like professional help in revising this manuscript, you can use any reputable English language editing service. We can recommend our affiliate **Charlesworth Author Service**s (https://www.cwauthors.com/) for help with English usage. Please note that use of an editing service is neither a requirement nor a guarantee of publication.

****

Reviewer B:

For author: The introduction is quite clear but many of the words hepatitis A are repeated. The research method is appropriate and the variables are quite a lot. In the result please make the table view better. In the discussion explain examples of raw food (vegetable and fruits)

For editor: This article is good, it only needs minor corrections about redundant words, the information submitted is useful for prevention measures for Hepatitis A outbreaks, worthy of acceptance and publication.

Recommendation: Minor Revisions

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4 attachments

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49K

C-EC HAV.pdf
259K

B-Reviewer_Comments.docx
50K

B-File Comment For Authors.docx
14K

Santi Martini <santi-m@fkm.unair.ac.id> Tue, Aug 24, 2021 at 6:34 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi,

Thank you very much for the information.
I'm going to revise it to respond to the comments.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

Preventing disease, Prolonging Life, and Promoting Health
through the Organized Efforts of Society *****

[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Tue, Aug 24, 2021 at 10:09 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi,

I'd like to inform you that I have uploaded the revised version.
Please check it.

Hope to hear from you soon the good news.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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through the Organized Efforts of Society *****

On Fri, Aug 13, 2021 at 2:48 PM Luigi Barberini <lbarberini@aoucagliari.it> wrote:
[Quoted text hidden]

Firman Suryadi Rahman <firmansuryadirahman@gmail.com> Tue, Aug 24, 2021 at 10:25 AM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Thank you Bu Santi..
[Quoted text hidden]

JPHR - J Public Health Res - paper #2309 - Editor Decision - Acceptance

8 messages

Luigi Barberini <lbarberini@aoucagliari.it> Tue, Aug 24, 2021 at 3:32 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>, Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Author,

We are pleased to inform you that your paper entitled " Determinants of Hepatitis A Infection among Students: A Case Study of an Outbreak in Jember, Indonesia" has been **accepted for publication** in the Journal of Public Health Research.

To make accepted papers immediately available and citable, our journal offers the "**E-pub Ahead of Print**" publication system. It means that your article will be posted online before insertion in a regular issue in about two weeks from acceptance and can then be cited with its unique DOI number.

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3. the Article Processing Charge (EUR 700 + VAT 4%). We advise prompt payment as we are unable to produce publication files for the accepted articles until full payment has been received.

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Meanwhile, your manuscript will be scheduled into the first available issue/volume and once copyedited and paginated, you will receive the proofs for final approval.
Any final changes in manuscripts will be made at the time of last publication and will be reflected in the final electronic version of the issue.

With kind regards,
Luigi Barberini
University of Cagliari
lbarberini@aoucagliari.it

Journal of Public Health Research

2 attachments

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Santi Martini <santi-m@fkm.unair.ac.id> Wed, Aug 25, 2021 at 12:22 PM
To: Luigi Barberini <lbarberini@aoucagliari.it>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi,

Thank you so much for accepting my manuscript.
I have sent all the documents needed as a requirement to publish the paper to nadia.moscato@pagepress.org
I have also paid the APC.

Let me know if you received this email.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Fri, Nov 19, 2021 at 10:58 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>, Nadia Moscato <nadia.moscato@pagepress.org>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi,

How are you? Hope you're well.
I'd like to know when my paper will be published in the journal.
It's almost three months since the decision.

Looking forward to hearing the information. Thank you.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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On Tue, Aug 24, 2021 at 3:32 PM Luigi Barberini <lbarberini@aoucagliari.it> wrote:
[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Thu, Dec 16, 2021 at 7:14 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>, Nadia Moscato <nadia.moscato@pagepress.org>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Hello...Luigi.

I'd like to know about my manuscript since I didn't hear from you.
I hope you're doing well.
Please tell me about the progress. Thank you.

Best Wishes,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Mon, Jan 3, 2022 at 6:41 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>, Nadia Moscato <nadia.moscato@pagepress.org>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi and Nadia,

Happy New Year 2022. Wishing both of you a healthy and safe year ahead.

Best Wishes,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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through the Organized Efforts of Society *****

[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Thu, Jan 13, 2022 at 5:18 AM
To: Luigi Barberini <lbarberini@aoucagliari.it>, Nadia Moscato <nadia.moscato@pagepress.org>
Cc: Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Luigi and Nadia,

Hope you are doing well.
I'd like to know accepted my paper #2309 as put in the subject of this email. Because I didn't find it in my account of the scopus.

Let me know when the paper published. Thank you.

Best,
[Quoted text hidden]

Nadia Moscato <nadia.moscato@pagepress.org> Thu, Jan 13, 2022 at 5:15 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>
Cc: Luigi Barberini <lbarberini@aoucagliari.it>, Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Dr. Martini,

Your paper, prepublished in the Ahead of Print section of the Journal, is scheduled to be inserted into the first/second issue of 2022.
The scheduling of a regular issue is subject to a number of factors, including the acceptance date; actually, there are about 35 papers that have been accepted before yours, which have to be inserted in an issue.

You will receive the galleys for your proofreading as soon as they are prepared .

Thank you for your fine collaboration.

Kind regards,

Nadia Moscato
Head of Journal Division
PAGEPress Scientific Publications
via A. Cavagna Sangiuliani, 5
27100 Pavia, Italy
t. +39 0382 1549020
Skype: nadia.moscato

nadia.moscato@pagepress.org
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Santi Martini <santi-m@fkm.unair.ac.id> Wed, Feb 2, 2022 at 11:12 PM
To: Nadia Moscato <nadia.moscato@pagepress.org>
Cc: Luigi Barberini <lbarberini@aoucagliari.it>, Firman Suryadi Rahman <firmansuryadirahman@gmail.com>

Dear Nadia,

Hope you are doing well.
In regarding to your previous email, I'd like to know about the publication of my manuscript.
Looking forward to hearing from you. Thank you.

Best.,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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KOMISI ETIK PENELITIAN KESEHATAN
HEALTH RESEARCH ETHICS COMMITTEE
FAKULTAS KESEHATAN MASYARAKAT UNIVERSITAS AIRLANGGA
FACULTY OF PUBLIC HEALTH AIRLANGGA UNIVERSITY

KETERANGAN LOLOS KAJI ETIK
DESCRIPTION OF ETHICAL APPROVAL
"ETHICAL APPROVAL"

No : 246-KEPK

Komite Etik Penelitian Kesehatan Fakultas Kesehatan Masyarakat Universitas Airlangga dalam upaya melindungi hak asasi dan kesejahteraan subyek penelitian kesehatan, telah mengkaji dengan teliti protokol berjudul :
The Ethics Committee of the Faculty of Public Health Airlangga University, with regards of the protection of Human Rights and welfare in medical research, has carefully reviewed the research protocol entitled :

"MODEL PENCEGAHAN HEPATITIS A PADA KEJADIAN LUAR BIASA DI SMA PLUS SUKOWONO KABUPATEN JEMBER TAHUN 2015"

Peneliti utama : Firman Suryadi Rahman, S.KM.
Principal Investigator

Nama Institusi : Fakultas Kesehatan Masyarakat Universitas Airlangga
Name of the Institution

Dan telah menyetujui protokol tersebut di atas.
And approved the above-mentioned protocol

Surabaya, 29 April 2016
Ketua, *(CHAIRMAN)*

KOMISI ETIK PENELITIAN KESEHATAN
KEPK
FKM-UA

Prof. Bambang W., dr., M.S., M.CN., Ph.D., Sp.GK.
NIP. 194903201977031002

Journal of Public Health Research (paper no. 2309) - Proofreading request

5 messages

Nadia Moscato <nadia.moscato@pagepress.org> Wed, Feb 9, 2022 at 1:20 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Dear Author,

Your paper "*Determinants of hepatitis A infection among students: A case study of an outbreak in Jember, Indonesia*", pre-published as "Advance Online", has been included into the **1st issue of 2022** and now needs to be proofread by following these steps.

1. Proof the galley in PDF format provided (enclosed). **Table 2 is not cited in the text: please instruct as on where to cite it.**

2. Please note the following:
- At proofreading stage it is not possible to make any changes other than minor amendments: please restrict your alterations to the correction of factual errors or misspellings. Avoid changes that will cause large amounts of text to move to different pages as it will affect the numbering of index entries, creating extra work and cost.
- Hyphenation of words is not questionable. Hyphens to separate syllables are automatically generated by the computer program, in accordance with the official English syllabification.
- If corrections are needed (only minor typographical and format), send a copy (via email) of the PDF, highlighting where they have to be done and accompanied by an email with the list of changes.
- Please note that your article has been edited for Journal style and for standard Editorial rules. Changes that are against Journal style or standard Editorial rules will not be made.

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To allow for PDF proofing, low-resolution images may have been used in your proof file. However, high-resolution images (if made available) will be used in the final published version.

Please ensure you check the entire article carefully. Please return corrected proofs and any related material within 2 working days.

3. Email the Editor with your possible corrections.

Thank you for your fine collaboration.

Journal of Public Health Research
PAGEPress Office

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Santi Martini <santi-m@fkm.unair.ac.id> Wed, Feb 9, 2022 at 10:27 AM
To: Firman Suryadi rahaman <firmansuryadirahman@gmail.com>

Tolong ditindaklanjuti ya.

Wass.,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

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Firman Suryadi Rahman <firmansuryadirahman@gmail.com> Wed, Feb 9, 2022 at 3:17 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Alhamdulillah, akhirnya keluar gallery Proof injih Bu Santi..
[Quoted text hidden]

Firman Suryadi Rahman <firmansuryadirahman@gmail.com> Wed, Feb 9, 2022 at 5:27 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Assalamualaikum wr wb
yth Bu Santi berikut file yg telah diberikan notes lokasi table 2
kita diberi waktu 2 hari Bu Santi..
jika Bu Santi setuju, mohon berkenan mengirimkan pada Nadia dan Luigi

Thank You Very Much
Firman Suryadi Rahman, S.KM, M.Epid
Student in Doctoral Program of Public Health,
Faculty of Public Health
Universitas Airlangga- Surabaya, Indonesia
firmansuryadirahman@gmail.com || firman.suryadi.rahman-2018@fkm.unair.ac.id
0857 49 48 47 17
085 70000 90 99

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2309- insert table 2 done.pdf
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Santi Martini <santi-m@fkm.unair.ac.id> Wed, Feb 9, 2022 at 2:09 PM
To: Nadia Moscato <nadia.moscato@pagepress.org>
Cc: Firman Suryadi rahaman <firmansuryadirahman@gmail.com>, Luigi Barberini <lbarberini@aoucagliari.it>

Dear Nadia,

Thank you very much for the information.
Here I sent the manuscript that has been revised as you mentioned.
Let me know if you received it. I hope the revision has been completed.

Best,

Santi Martini
Faculty of Public Health
Universitas Airlangga (www.fkm.unair.ac.id)
Surabaya INDONESIA

Preventing disease, Prolonging Life, and Promoting Health
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[Quoted text hidden]

[Quoted text hidden]

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Article

Determinants of hepatitis A infection among students: A case study of an outbreak in Jember, Indonesia

Santi Martini,[1] Firman Suryadi Rahman[2]

[1]Division of Epidemiology, Faculty of Public Health, Universitas Airlangga, Surabaya; [2]Doctoral Program of Public Health, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

Abstract

Background: Hepatitis A often occurs in school among students in the form of an outbreak. The transmission was through fecal-oral (common source) provided that the epidemic curve is close to propagated. The aim of the current study was to analyze the determinants of Hepatitis A infection among students.

Design and methods: This study was a case-control study which was conducted at SMAN Plus with a sample size of 80 students chosen by using simple random sampling. The data obtained were then analyzed using logistic regression with 95% confidence level (α = 0.05), while the strength of the relationship between variables was identified using odds ratio (OR).

Results: Most of the students were at the age of 17 to 19 years old (65%) and male (57.5%). The average age in the case group was 17.1 years old, while in the control group was 16.75 years old. The habit of consuming raw foods (p=0.001) as well as eating and drink at the same time during an activity (p=0.000) had a significant influence on the outbreak of Hepatitis A in the curve epidemic of common source.

Conclusion: The outbreak is confirmed as a transmission occurs through fecal-oral which the common source epidemic curve. Risk factors that have been proven to be related to hepatitis A include consuming raw food, eating shared meals during an activity, and drinking with shared drinking utensils.

Introduction

Hepatitis A is generally transmitted through food and drinking contamination and person to person transmission of faecal-oral transmission route. This is significantly related to the behaviour of clean and healthy life.[1] Hepatitis A virus (HAV) is thermostable, acid resistant, and resistant to bile. HAV can survive in room temperature for more than a month.[2,3] Hepatitis A in Indonesia occurs more frequently in rural area than urban area.[4]

Hepatitis A can cause extraordinary event (outbreak). There were 6 outbreaks with 279 sufferers in 2010, 9 outbreaks with 550 sufferers in 2011, 8 outbreaks with 369 sufferers in 2012, and 13 outbreaks with 504 cases in 2013.[3] In terms of the outbreak in 2013, there were 6 districts in East Java in which outbreaks occurred, including Jombang, Lamongan, Pacitan, Sidoarjo, Ponorogo, and Pasuruan with total 462 cases. In 2014, the outbreaks occurred in three districts, including Sidoarjo, Kediri and Surabaya with 59 cases. In 2015, KLB occurred in three districts as well, those are Probolinggo, Lamongan and Jember with 78 cases.[5]

Hepatitis A among school-aged children often occurred in the form of an outbreak. The transmission is faecal oral (common source) with epidemic curve approaches propagated. The transmission of hepatitis A at school often related to drinking water and raw foods contaminated by HAV.[6,7] On school-aged children, hepatitis A can occur asymptomatically. The outbreak of hepatitis A on school-aged children in China was asymptomatic by 55.5.[8] This is proven by IgG antibody result which was HAV positive on school-aged children without hepatitis A symptoms during an outbreak of hepatitis A in China.

The outbreak of Hepatitis A in school environment in 2010-2020 in East Java occurred in Probolinggo, Jember, Bondowoso, Lamongan, Pacitan, and Surabaya.[9] The causes of Hepatitis A outbreak in the school environment are due to insufficient hand washing facilities and drinking water sources which are close to septic tank. In addition, it is also significantly related to the hygiene and sanitation of food seller in the school environment.[10]

Jember District is one of the districts which have high prevalence of hepatitis A in 2013, which is almost the same as the prevalence of hepatitis A in East Java of 1%. In 2012, hepatitis A outbreak occurred in Puger with 22 cases. Meanwhile, in 2013, hepatitis A outbreak also occurred in Sumbersari Sub-District (39 cases), Patrang Sub-District (37 cases), and Kaliwates District (19 cases). In 2015, there was another hepatitis A outbreak in Sukowono Sub-District.[11]

Repetitive outbreaks indicates that the primary preventive efforts are implemented poorly. This is caused by the determinants of the outbreak which are not identified yet. Therefore, this research aimed to analyse the risk factor of hepatitis A outbreak on school-aged students in Jember District. Based on the initial assumption obtained from outbreak epidemiology investigation at SMAN Plus Sukowono on 7 October 2015, it was known that most of the students had poor personal hygiene. Most of them did not wash their hand after defecating and often consumed raw food.

Significance for public health

Hepatitis A still frequently occurs in Indonesia. Several hepatitis A outbreaks have occurred in schools or Islamic boarding schools. The results of this research are expected to be an effort to provide scientific input to the Health and School Offices to prevent an outbreak of hepatitis A in the school environment in the future.

In addition, the hand washing and food utensils facilities at the canteen were also poor because the water is limited and did not use running water.

Design and methods

This study was an analytic observational study with a case-control design. This research was conducted at SMAN Plus Sukowono. The population in this study consisted of case population of all SMAN Plus Sukowono students who suffered from Hepatitis A after the New Student Orientation and Basic Leadership Training activities in August 2015 and control population of all SMAN Plus Sukowono students who did not suffer from hepatitis A after the New Student Orientation and Basic Leadership Training activities in August 2015. Based on the sample calculation using the *unmatched case-control* by using Epi Info 7, it obtained case samples of at least 40 students, with the comparison between the case and control sample was 1:1. Therefore, the minimum samples needed for the research were 80 students taken using simple random sampling technique. The independent variables in this research were knowledge, defecation behaviour at school and at home, latrine at home, water consumption at school and at home, eating habit at canteen, raw food consumption habit, habit of buying food from mobile vendor, the use of shared of shared cutlery, room density, and shared eating and drinking activities during extracurricular activities. Meanwhile, the dependent variable was the incidence of hepatitis A.

The data collected in this study were primary data in the form of students' knowledge and behaviour. The variables were measured through interviews with students and questionnaires filled by the respondents. Furthermore, the respondent characteristics are then presented in percentage form. Results of the study were analysed using Logistic Regression with a 95% confidence level (α=0.05) to analyse the significant relationship between hepatitis A and the independent variables as well as to interpret the relationship strength between the variables using odds ratio (OR).

Results

The distribution of respondent characteristics in this study is presented in the following Table 1. The respondents in the case group were mostly aged 17 to 19 years old (65%), male (57.5%) and in class XII (42.5%). The average age of the case group was 17.1 years old, while the control group was 16.75 years old.

The epidemic curve (Figure 1) based on case data shows that this outbreak is a common source. The total number of students who suffered from the clinical symptoms of Hepatitis A was 48 students. Reports said that the first time a student experienced symptoms was at 11 September, while on 1 October, there was no report of new cases.

The results of multivariable analysis found two independent variables that had a significant effect on hepatitis A outbreak, they are raw food consumption (p=0.001) as well as eating and drinking habits together during extracurricular activities (p=0.000). Meanwhile, the independent variables which were not significant are knowledge, defecating behaviour at school, poor category of water drinking at school, often wearing cutlery together, handwashing after defecation, handwashing before meals, the low-income parent/guardian of the respondents, and the respondents' density room.

Discussion

The Ministry of Health of Indonesia stated that Hepatitis A can be spread through contaminated food, food and drinks which were not cooked as well as poor hygiene and sanitation.[12] Risk factors affecting the hepatitis A outbreak in the second High School is the consumption of raw food without being washed and eating together activities which have potential for food exchange. Open defecation behaviour was also frequently done by the students, especially outside school hours. Students generally do not have a latrine at home so they often did it at the river or in the garden. Open defecation is still prevalent in East Java. Open defecation can certainly increase the transmission risk of hepatitis A.[7] Open defection done by students is in line with their latrine ownership at home. Students who did not have a latrine will tend to do open defection. Open defecation behaviour will pollute rivers and even have the potential to pollute groundwater sources. This incident will cause hepatitis A transmission if there is HAV in the faeces.[13,14]

Raw food consumption without being washed by using clean water and cooked is one of the factors of hepatitis A.[15] The contamination of water and food, vegetables and fruits that are not ripe, is one of the factors often occurred in Europe ten years ago.[16] At present, they are no longer face this problem. Good sanitation, personal hygiene, and comprehensive HAV vaccination make the country immune to HAV. It is different from particular regions in Indonesia

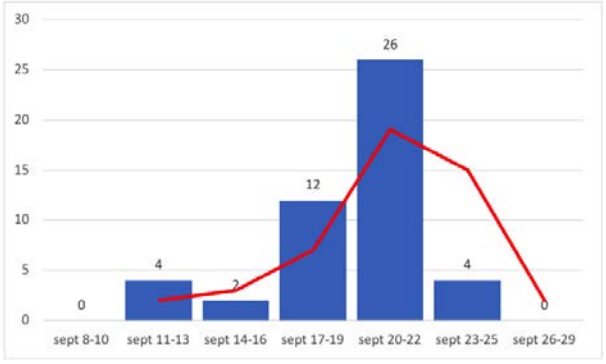

Figure 1. Epidemic curve of hepatitis A outbreak in Jember Senior High School.

Table 1. Characteristics of respondents.

Variable	Status		n (%)
	Case	Control	
Age			
15- <17	14 (35%)	21 (52.5%)	35 (43.7%)
17-19	26 (65%)	19 (37.5%)	45 (52.3%)
Total	40 (100%)	40 (100%)	80 (100%)
Average	17.1 years	16.75 years	
Gender			
Man	23 (57.5%)	18 (45.0%)	41 (51.2%)
Women	17 (42.5%)	22 (55.0%)	19 (44.2%)
Total	40 (100%)	40 (100%)	80 (100%)
Class			
X	13 (32.5%)	16 (40.0%)	29 (36.2%)
XI	10 (25.0%)	15 (37.5%)	25 (31.2%)
XII	17 (42.5%)	9 (22.5%)	26 (32.5%)
Total	40 (100%)	40 (100%)	80 (100%)

which have bad sanitation and even aggravated by poor personal hygiene. One of them happened at the research location. In the case population, the unavailability of family latrine, do not wash hands after defecating, consuming raw food without washing and cooking it first, and consuming raw water are the behaviour they do every day. The consumption of raw food which is the cause of the outbreak also occurred in Hawaii. This study encourages the main allegation of hepatitis A outbreak which is caused by the consumption of raw foods. Studies[17,18] stated that the incidence of Hepatitis A outbreaks occurred after universal vaccination in these states. The main assumptions were derived from scallops, poke, sushi, raw tomatoes, and raw fish. The investigation suggested that the possible contamination originated from scallops imported from the Philippines.[18]

In an outbreak occurred in a high school, hepatitis A only occurred on school-aged children. Meanwhile, the community outside the school did not have any symptoms of hepatitis A. Based on the calculation of common source epidemic curve and the environment conditions, especially school canteens, the causative narrowed to raw food consumption at one school event. The food consumed was *pecel* and *lalapan* which had raw vegetables. *Lalapan* called for raw food in local language which consist of bean, mustard, cabbage, cucumber, eggplant and long beans. Field investigation to catering providers revealed that there were indeed raw vegetables given to participants. ELISA test results showed that among the 10 samples taken, 5 of them had HAV. Food samples cannot be taken for further testing, this is because the events that caused the outbreak had been occurred more than 1 month and the incubation period for hepatitis A is 15-50 days with an average incubation period of 28-30 days.[19]

The FDA states that hepatitis A often causes outbreaks, which are generally caused by HAV contamination in food and beverages, neighbourhoods, and catering.[20] Generally, there was differences between developed countries and developing countries. This is related to sanitation, hygiene, and HAV vaccination. In developed countries, hepatitis A outbreaks generally occur due to imports of raw materials, frozen food, and fruits. The latest research stated that person-to-person transmission was found, especially among homeless people.[21] Meanwhile, in developing countries, this transmission is generally caused by inadequate food processing, hygiene, and sanitation.[22-24] Vaccination of hepatitis A at a particular group still needs to be done to prevent hepatitis A in the future.[21]

Table 2. Multivariate analysis of the determinants of hepatitis A outbreak in SMA Plus Jember.

Variable	Status		n	Significance	
	Case	Control		p-value	OR (95% CI)
Knowledge				0.823	0.904 (0.375-2.179)
Bad	21 (52.5%)	22 (55%)	43		
Good	19 (47.5%)	18 (45%)	37		
Defecation behaviour at school				0.218	2.250 (0.619-8.184)
Bad	8 (20%)	4 (10%)	12		
Good	32 (80%)	36 (90%)	68		
Water consumption at home				0.999	1
Bad	0 (0%)	2 (5%)	2		
Good	40 (100%)	38 (95%)	78		
Water consumption at schools				0.496	0.733 (0.300-1.791)
Bad	22 (55.0%)	25 (62.5%)	47		
Good	18 (45.0%)	15 (37.5%)	33		
Eating habits in the canteen				1.000	1 (0.293 -3412)
Often	34 (85.0%)	34 (85%)	68		
Rarely	6 (15.0%)	6 (15%)	12		
Eating raw foods (*lalapan*)				0.001*	4.846 (1.882-12.482)
Often	27 (67.5%)	12 (30%)	39		
Rarely	13 (32.5%)	28 (70%)	41		
Food buying habits at mobile vendors				1.000	1 (0.414 -2.413)
Often	18 (45%)	18 (45%)	36		
Rarely	22 (55%)	22 (55%)	44		
Use of shared cutlery				0.179	1.842 (0.755- 4.493)
Often	25 (62.5%)	19 (47.5%)	44		
Rarely	15 (37.5%)	21 (52.5%)	36		
Hand washing behaviour after defecating				0.606	1.307 (0.473- 3.609)
Bad	11 (27.5%)	9 (22.5%)	20		
Good	29 (72.5%)	31 (77.5%)	60		
Wash hands before eating				0.629	1.269 (0.487- 3.3311)
Bad	13 (32.5%)	11 (27.5%)	24		
Good	27 (67.5%)	29 (72.5%)	56		
The habit of eating and drinking together during extracurricular activities				0.000*	7.000 (2.615 -18.738)
Not good	30 (75%)	12 (30%)	42		
Good	10 (25%)	28 (70%)	38		

*p<0.000.

Conclusions

Hepatitis A outbreak that occurred in Jember only occurred in one high school. The outbreak was confirmed through faecal-oral transmission of a common source epidemic curve. The risk factors proven to be significantly related to hepatitis A are defecation behaviours, latrine ownership, raw food consumption and shared eating and drinking.

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Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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