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

BMC Public Health - Receipt of Manuscript 'Association Between Percentage...'

3 messages

BMC Public Health <bmcpublichealth@biomedcentral.com> Fri, Aug 19, 2022 at 8:24 PM
To: santi-m@fkm.unair.ac.id

Ref: Submission ID 765bf511-c530-46dd-9968-a928a5be142a

Dear Dr Martini,

Thank you for submitting your manuscript to BMC Public Health.

Your manuscript is now at our initial Quality Check stage, where we look for adherence to the journal's submission guidelines, including any relevant editorial and publishing policies. If there are any points that need to be addressed prior to progressing we will send you a detailed email. Otherwise, your manuscript will proceed into peer review.

You can check on the status of your submission at any time by using the link below and logging in with the account you created for this submission:

https://researcher.nature.com/your-submissions?utm_source=submissions&utm_medium=email&utm_campaign=confirmation-email&journal_id=12889

To help with your article processing charge at acceptance, and to see if you're eligible for any waivers or BMC membership discounts, please click here:

https://payment.springernature.com/quote/identify/submission/765bf511-c530-46dd-9968-a928a5be142a

Kind regards,

Peer Review Advisors
BMC Public Health

Springer Nature offers an open access support service to make it easier for our authors to discover and apply for APC funding. For further information please visit http://www.springernature.com/gp/open-research/funding

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

Your partial submission to BMC Public Health

3 messages

BMC Public Health <bmcpublichealth@biomedcentral.com> Fri, Aug 19, 2022 at 12:35 PM
To: santi-m@fkm.unair.ac.id

Ref: Submission ID 765bf511-c530-46dd-9968-a928a5be142a

Dear Dr Martini,

Thank you for your recent submission to BMC Public Health, which you began on 19 August 2022 UTC. Please note that this submission is not yet complete.

To complete your submission, please log into the system using the following link and follow the instructions.

https://submission.nature.com/submission/765bf511-c530-46dd-9968-a928a5be142a

IMPORTANT: before completing your submission please check and ensure that your manuscript is formatted according to the submission guidelines (https://bmcpublichealth.biomedcentral.com/submission-guidelines), and adheres to relevant editorial and publishing policies.

All manuscripts are subject to an Initial Quality Check. Failure to adhere to our submission policies will result in the manuscript being returned to you before being sent to an Editorial Board Member.

Common reasons for a manuscript to fail the Initial Quality Check include:

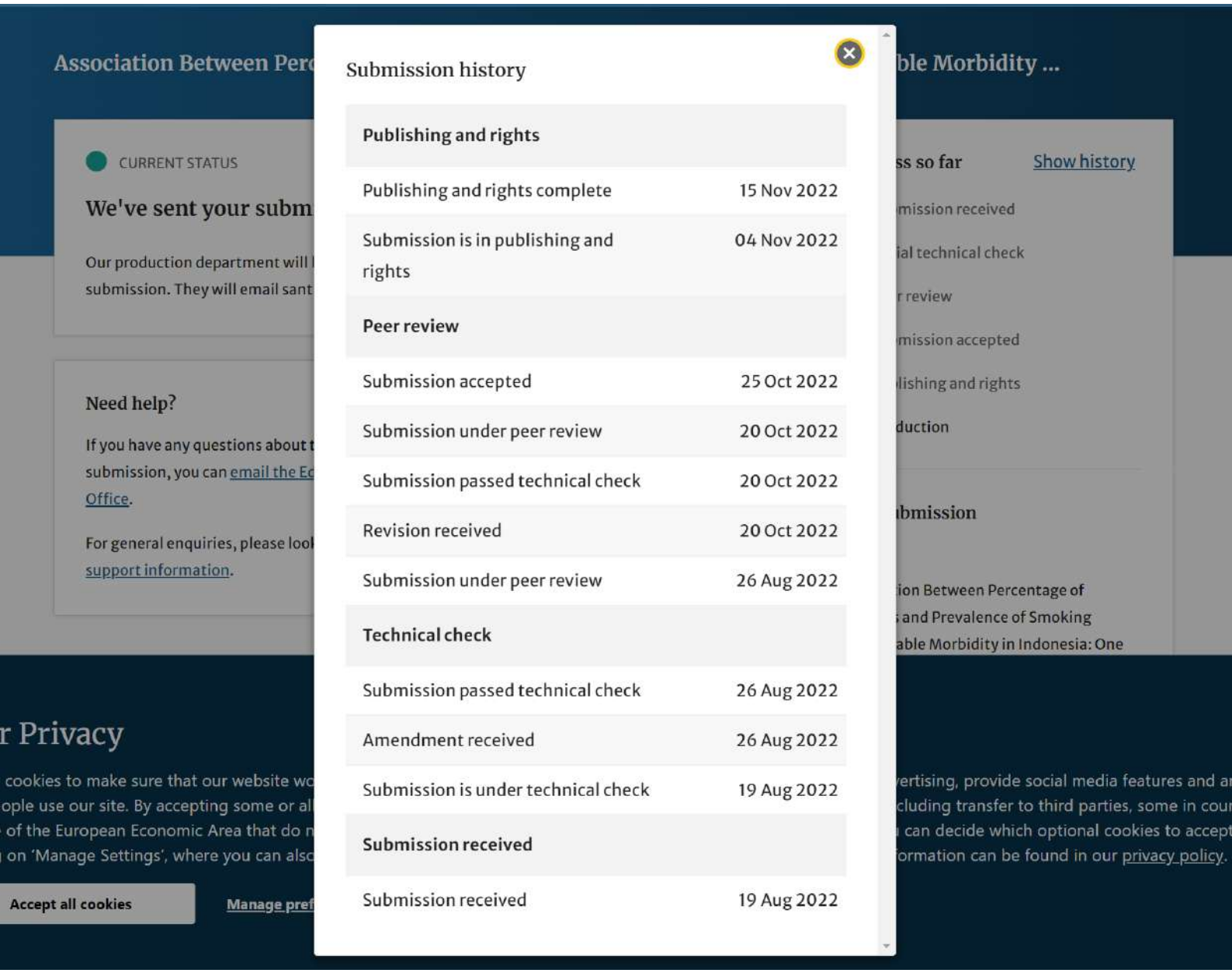
• Contributing author details not added to the online submission system
• Papers reporting experiments on live vertebrates and/or higher invertebrates missing statements of approval, accordance and (for human subjects) informed consent
• Lack of appropriate permission and/or credit for reproduced images

Please note a recent change to our competing interests policy: specifically, the definition of 'competing interests' has broadened to include financial AND non-financial interests (details and guidelines at https://www.biomedcentral.com/getpublished/editorial-policies#competing+interests. When submitting your revised paper, please can you ensure this statement refers to 'competing interests' and, if applicable, also list any non-financial competing interests as outlined in our editorial policies? Please note that the Competing Interests statement on the system must match the Competing Interests statement provided in the article file.

Please contact us if you have any questions or require any assistance.

Kind regards,

Peer Review Advisors
BMC Public Health



Submission history

Publishing and rights	
Publishing and rights complete	15 Nov 2022
Submission is in publishing and rights	04 Nov 2022
Peer review	
Submission accepted	25 Oct 2022
Submission under peer review	20 Oct 2022
Submission passed technical check	20 Oct 2022
Revision received	20 Oct 2022
Submission under peer review	26 Aug 2022
Technical check	
Submission passed technical check	26 Aug 2022
Amendment received	26 Aug 2022
Submission is under technical check	19 Aug 2022
Submission received	
Submission received	19 Aug 2022

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

BMC Public Health: Amendment Required

4 messages

Shikha Mahato <bmcpublichealth@biomedcentral.com> Fri, Aug 26, 2022 at 1:51 AM
Reply-To: Shikha Mahato <bmcpublichealth@biomedcentral.com>
To: santi-m@fkm.unair.ac.id

Dear Prof. Santi Martini,

Re: "Association Between Percentage of Smokers and Prevalence of Smoking Attributable Morbidity in Indonesia: One Decade After Implementation of Smoke-Free Area Regulation"

Our Initial Quality Check of your submission has now taken place. As a result, we need you to address the following points before your manuscript can progress any further:

1) Affiliation of author Yayi Suryo Prabandari in manuscript is not matching exactly the same with authors affiliation on system.

2) We notice that figure 1 and 2 has not been referenced in the main text of your manuscript file. If figures are not cited in the manuscript they will not appear in the html (online) version if your paper is accepted for publication. Therefore, it is essential they are mentioned at least once in the text and, we strongly recommend, in the order in which they are numbered.

Your paper has been placed back in the menu of the submitting author. To access it, please use the following link, making sure you log in with the same email address you registered with:

https://submission.nature.com/submission/a57dfccc-a6fa-4c72-8117-c112b2729b05

(Press/Click on the above link to be automatically sent to the web page.)

Please make the requested amendments carefully, before selecting the “Submit manuscript” button on the “Review” page. Do not change anything else in your manuscript.

Meanwhile, if you have any questions, please feel free to contact me.

Sincerely,
Regards,
Shikha Mahato
Editorial Support at BMC

Santi Martini <santi-m@fkm.unair.ac.id> Fri, Aug 26, 2022 at 6:30 AM
To: Shikha Mahato <bmcpublichealth@biomedcentral.com>

Thank you for the information.

I'll check it out and revise it as soon as possible.

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

BMC Public Health: Decision on your manuscript

5 messages

BMC Public Health <bmcpublichealth@biomedcentral.com> Fri, Oct 7, 2022 at 11:12 PM
To: santi-m@fkm.unair.ac.id

Ref: Submission ID 765bf511-c530-46dd-9968-a928a5be142a

Dear Dr Martini,

Re: "Association Between Percentage of Smokers and Prevalence of Smoking Attributable Morbidity in Indonesia: One Decade After Implementation of Smoke-Free Area Regulation"

We are pleased to let you know that your manuscript has now passed through the review stage and is ready for revision. Many manuscripts require a round of revisions, so this is a normal but important stage of the editorial process.

Editor comments
Revise

To ensure the Editor and Reviewers will be able to recommend that your revised manuscript is accepted, please pay careful attention to each of the comments that have been pasted underneath this email. This way we can avoid future rounds of clarifications and revisions, moving swiftly to a decision.

Once you have addressed each comment and completed each step listed below, please log in here with the same email you used to submit your manuscript to upload the revised submission and final file:

https://submission.nature.com/submit-revision/765bf511-c530-46dd-9968-a928a5be142a

Alternatively, please visit https://researcher.nature.com/your-submissions to upload your revised submission and to track progress of any other submissions you might have.

CHECKLIST FOR SUBMITTING YOUR REVISION

1. Please upload a point-by-point response to the comments, including a description of any additional experiments that were carried out and a detailed rebuttal of any criticisms or requested revisions that you disagreed with. This must be uploaded as a 'Point-by-point response to reviewers' file.

Please note that we operate a transparent peer review process, where we publish reviewers' reports with the article, together with any responses that you make to reviewers or the handling Editor.

2. Please highlight all the amends on your manuscript or indicate them by using tracked changes.

3. Check the format for revised manuscripts in our submission guidelines, making sure you pay particular attention to the figure resolution requirements:

https://bmcpublichealth.biomedcentral.com/submission-guidelines

Finally, if you have been asked to improve the language or presentation of your manuscript and would like the assistance of paid editing services, we can recommend our affiliates, Nature Research Editing Service: https://authorservices.springernature.com/language-editing/ and American Journal Experts: https://www.aje.com/go/springernature

Please note that use of an editing service is neither a requirement nor a guarantee of publication. Free assistance is available from our resources page: https://www.springernature.com/gp/researchers/campaigns/english-language-forauthors

To support the continuity of the peer review process, we recommend returning your manuscript to us within 14 days. If you think you will need additional time, please let us know and we will aim to respond within 48 hours.

Kind regards,

Elisardo Becoña
Editorial Board Member
BMC Public Health

Reviewer Comments:

Reviewer 1
- Authors should give a more detailed description of the used data
- The analysis is based on a simple association test? chi-squared test? if the data allow it, I would propose to the authors to carry out a regression analysis on the single individuals of the survey and not on the agglomerated data. Remember to check the validity of the regression assumptions (residuals with normal distribution).

Reviewer 2
This cross-sectional secondary analyses study aimed to understand the relationship between the high prevalence of smoking and the high prevalence of smoking-attributable morbidity. Also, the authors aimed to describe the Smoke Free Area (SFA) regulation in Indonesia. They describe SFA as "SFA is a room or area that is prohibited for production, sales, advertising, promotion or smoking" which is not a clear explanation. I would suggest adding more information on SFA regulation and cutting some info on the cost analysis from the introduction section.
In the methods section, when defining main variables: the smoking variable was defined as anyone smoking every day in the last month which was asked to respondents above 10 years old, however, the disease's variable was asked to respondents aged >15 years. This might introduce possible errors such as overestimating the prevalence of smoking and underestimating the prevalence of the disease at the district/city level. I would suggest to look if there are any differences in the categorization of the smoking variable (high vs low) if considering only the people above 15 years old.
In the analyses section, when presenting the analyses between the prevalence of smoking and the prevalence of smoking-attributable morbidity,

these analyses were done based on all 514 districts in the country. To see, how SFA affected on this association, the authors could present this data adjusted by the variable having or not having SFA regulation.
Overall, this was quite an interesting research.

Santi Martini <santi-m@fkm.unair.ac.id> Sat, Oct 8, 2022 at 5:10 AM
To: Arief Hargono <arief.hargono@fkm.unair.ac.id>, kurnia dwi artanti <kurnia-d-a@fkm.unair.ac.id>, rizma nastiti <rizmadwinastiti@gmail.com>

Aww. Pak Arief dan bu Kurnia,

Manuskrip PPKI masuk tahap review, mohon bantuan untuk memenuhi komen tsb.

Mengenai analysis individual menurut saya tidak mungkin dilakukan karena unit analysis bukan individu tapi district.

Bagaimana?

Wass.,
[Quoted text hidden]

Santi Martini <santi-m@fkm.unair.ac.id> Sat, Oct 8, 2022 at 5:13 AM
To: BMC Public Health <bmcpublichealth@biomedcentral.com>

Dear Editor,

Thank you for your email, the good news.

We're going to respons as the comments and upload it again through my account.

Best Regards,
[Quoted text hidden]

Bhargavi Kowligi <bmcpublichealth@biomedcentral.com> Wed, Oct 12, 2022 at 11:19 PM
Reply-To: Bhargavi Kowligi <bmcpublichealth@biomedcentral.com>
To: santi-m@fkm.unair.ac.id

Dear Dr Martini,

Thank you for your mail. We look forward to receiving your revised submission.

Have a good day!

Best regards,

Bhargavi Kowligi
Editorial Support at BMC

> On Fri, 7 Oct at 11:13 PM , Santi-m <santi-m@fkm.unair.ac.id> wrote:
> **[External - Use Caution]**
> [Quoted text hidden]

---

kurnia dwi artanti <kurnia-d-a@fkm.unair.ac.id> Thu, Oct 13, 2022 at 4:27 PM
To: Santi Martini <santi-m@fkm.unair.ac.id>

Ini masukan dari saya bu
YAng bertulis tinta merah
[Quoted text hidden]

Reviewer Comments masukan Nia.docx
14K

Reviewer Comments:

Reviewer 1
- Authors should give a more detailed description of the used data

Figure 1. The distribution of SFA regulations at the District/City level in Indonesia in 2021

Using mapping was made using the QGIS 3·16 application and District/City data with the 2021 SFA regulation sourced from data from the Indonesian Health Service Association (ADINKES) Data menggunakan data Riskesdas tahun 2017 dan 2018

Figure 2. Trendline of the prevalence of Smoke Attributable Morbidity from 2007 to 2018

Using data from 2018 National Basic Health Research and 2007

- The analysis is based on a simple association test? chi-squared test? if the data allow it, I would propose to the authors to carry out a regression analysis on the single individuals of the survey and not on the agglomerated data. Remember to check the validity of the regression assumptions (residuals with normal distribution).

Table 1. Show that Unit analisis used District/cities Kab/Kota.

The percentage of smoking is categorized as high if the percentage of smokers is above national percentage, was > 24·5% for the 2018 National Basic Health Research. While the diseases prevalence was categorized as high if the prevalence of diabetes was >1·5%; hypertension was >8·36%; URTI was >4·4%; pneumonia was >2·0%; lung tuberculosis was >0·42%; asthma was >2·4%; and mental emotional disorders was >9·8%. On the other hand, it is said to be low if the percentage of smokers and the prevalence of smoking-attributable morbidity are below the national figures.

Reviewer 2
This cross-sectional secondary analyses study aimed to understand the relationship between the high prevalence of smoking and the high prevalence of smoking-attributable morbidity. Also, the authors aimed to describe the Smoke Free Area (SFA) regulation in Indonesia. They describe SFA as "SFA is a room or area that is prohibited for production, sales, advertising, promotion or smoking" which is not a clear explanation. I would suggest adding more information on SFA regulation and cutting some info on the cost analysis from the introduction section.
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In the analyses section, when presenting the analyses between the prevalence of smoking and the prevalence of smoking-attributable morbidity, these analyses were done based on all 514 districts in the country. To see, how SFA affected on this association, the authors could present this data adjusted by the variable having or

not having SFA regulation.
Overall, this was quite an interesting research.

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

BMC Public Health: Decision on your manuscript

18 messages

BMC Public Health <bmcpublichealth@biomedcentral.com> Tue, Oct 25, 2022 at 12:29 PM
To: santi-m@fkm.unair.ac.id

Ref: Submission ID 765bf511-c530-46dd-9968-a928a5be142a

Dear Dr Martini,

Re: "Association Between Percentage of Smokers and Prevalence of Smoking Attributable Morbidity in Indonesia: One Decade After Implementation of Smoke-Free Area Regulation"

We're delighted to let you know that your manuscript has been accepted for publication in BMC Public Health.

Editor comments
Accept.

Prior to publication, our production team will check the format of your manuscript to ensure that it conforms to the standards of the journal. They will be in touch shortly to request any necessary changes, or to confirm that none are needed.

Checking the proofs

Once we've prepared your paper for publication, you will receive a proof. At this stage, please check that the author list and affiliations are correct. For the main text, only errors that have been introduced during the production process, or those that directly compromise the scientific integrity of the paper, may be corrected.

Please make sure that only one author communicates with us and that only one set of corrections is returned. As the corresponding (or nominated) author, you are responsible for the accuracy of all content, including spelling of names and current affiliations.

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Once again, thank you for choosing BMC Public Health, and we look forward to publishing your article.

Kind regards,

Elisardo Becoña
Editorial Board Member
BMC Public Health

- Please confirm if the author names are presented accurately and in the correct sequence.

- AQ2

Please check if the affiliations are presented correctly.

- AQ3

As per our journal style, article titles should not include capitalised letters unless these are proper nouns/acronyms. We have therefore used the article title "Association between percentage of smokers and prevalence of smoking attributable morbidity in Indonesia: one decade after implementation of smoke-free area regulation" as opposed to "Association Between Percentage of Smokers and Prevalence of Smoking Attributable Morbidity in Indonesia: One Decade After Implementation of Smoke-Free Area Regulation" as given in the submission system. Please check if this is correct.

- AQ4

Please check if the section headings are assigned to appropriate levels.

- AQ5

Figure 2 contains text below the minimum required font size of 6pts inside the artwork, and there is no sufficient space available for the text to be enlarged. Please provide replacement figure file.

- AQ6

Please check if the figure caption and citations are captured and presented correctly.

- AQ7

Please check if table header, data and captions of all tables are presented correctly.

- AQ8

As per standard instruction, the statement “The author(s) read and approved the final manuscript.” is required in the “Authors’ contributions” section. Please note that this was inserted at the end of the paragraph of the said section. Please check if appropriate.

- AQ9

Please provide complete bibliographic details of this references "1-3, 5, 8, 10, 11, 22".

(1)(2) (3) (4)(5)(6)(7)(8)

1. Badan Penelitian dan Pengembangan Kesehatan. Laporan Nasional Riset Kesehatan Dasar 2007 [Internet]. Laporan Nasional 2007. 2007. Available from: http://kesga.kemkes.go.id/images/pedoman/Riskesdas 2007 Nasional.pdf

2. Kementerian Kesehatan Republik Indonesia. Laporan Riset Kesehatan Dasar Indonesia 2013 [Internet]. Riskesdas 2013. 2013. Available from: https://www.litbang.kemkes.go.id/laporan-riset-kesehatan-dasar-riskesdas//

3. Kementerian Kesehatan Republik Indonesia. Laporan Nasional Riset Kesehatan Dasar Indonesia 2018 [Internet]. Riskesdas 2018. 2018. Available from: https://www.litbang.kemkes.go.id/laporan-riset-kesehatan-dasar-riskesdas//

4. Media Info BPJS Kesehatan. Info BPJS Kesehatan : Kinerja BPJS Kesehatan 2020 - Edisi 97 [Internet]. 2021. Available from: https://bpjs-kesehatan.go.id/bpjs/dmdocuments/31f940e42441c591f7fd604fd510e0ca.pdf

5. Centers for Disease Control and Prevention. Cigarette Smoking-Attributable Morbidity— United States, 2000. MMWR Morb Mortal Wkly … [Internet]. 2003 Sep;52(35):842–4. Available from: https://pubmed.ncbi.nlm.nih.gov/12966360/

6. Juanita. Kebijakan Kawasan Tanpa Rokok: Peluang Dan Hambatan. J Kebijak Kesehat Indones [Internet]. 2012;01(2):112–9. Available from: https://journal.ugm.ac.id/jkki/article/view/36014

7. Tobacco Control Support Center IAKMI. Fakta Tembakau Dan Permasalahannya di Indonesia [Internet]. Kemenkes RI. 2014. 1–190 p. Available from: tcsc-indonesia.org

8. Leone A. Smoking and Hypertension. J Cardiol Curr Res [Internet]. 2015 Mar 20;2(2):00057. Available from: https://medcraveonline.com/JCCR/smoking-and-hypertension.html

- AQ1
  - Please confirm if the author names are presented accurately and in the correct sequence.

    Answer:
    Correct
- AQ2

  Please check if the affiliations are presented correctly.

  Answer:
  May we make some changes regarding this, since a few months ago there was a reshuffle in the form of merging several departments in the Faculty of Public Health, Universitas Airlangga, whereby the Department of Epidemiology and the Department of Health Promotion were merged into 1 department, namely the Department of Epidemiology, Biostatistics, Population Studies and Health Promotion, Universitas Airlangga.
  So that authors :
  1. Santi Martini
  2. Kurnia Dwi Artanti
  3. Arief Hargono
  4. Sri Widati

  affiliations change to be the Department of Epidemiology, Biostatistics, Population Studies and Health Promotion, Universitas Airlangga
  Here the link of the official website of the Department as the proof of the change : https://fkm.unair.ac.id/departemen-epidemiologi-biostatistika-kependudukan-dan-pendidikan-kesehatan-ilmu-perilaku/
- AQ3

  As per our journal style, article titles should not include capitalised letters unless these are proper nouns/acronyms. We have therefore used the article title "Association between percentage of smokers and prevalence of smoking attributable morbidity in Indonesia: one decade after implementation of smoke-free area regulation" as opposed to "Association Between Percentage of Smokers and Prevalence of Smoking Attributable Morbidity in Indonesia: One Decade After Implementation of Smoke-Free Area Regulation" as given in the submission system. Please check if this is correct.

  Answer:
  Correct
- AQ4

  Please check if the section headings are assigned to appropriate levels.

  Answer:
  Correct
- AQ5

  Figure 2 contains text below the minimum required font size of 6pts inside the artwork, and there is no sufficient space available for the text to be enlarged. Please provide replacement figure file.

  Answer:
  Replacement figure has been uploaded in the attachment
- AQ6

  Please check if the figure caption and citations are captured and presented correctly.

  Answer:
  We have been uploaded the revised version of Figure 1, since the legend is misspelling which are 'exisence' (existence), and 'KTR' (SFA in Bahasa Indonesia)
- AQ7

  Please check if table header, data and captions of all tables are presented correctly.

  Answer:
  Correct
- AQ8

  As per standard instruction, the statement “The author(s) read and approved the final manuscript.” is required in the “Authors’ contributions” section. Please note that this was inserted at the end of the paragraph of the said section. Please check if appropriate.

  Answer:
  It has been already added
- AQ9

  Please provide complete bibliographic details of this references "1-3, 5, 8, 10, 11, 22".

  Answer:
  Bibliographic details have been revised

BMC Public Health

RESEARCH

Open Access

Association between percentage of smokers and prevalence of smoking attributable morbidity in Indonesia: one decade after implementation of smoke-free area regulation

Santi Martini[1*], Kurnia Dwi Artanti[1], Arief Hargono[1], Sri Widati[1], Abdillah Ahsan[2] and Yayi Suryo Prabandari[3]

Abstract

Background: For more than ten years, Indonesia has health law, one of which states that local governments are mandated to establish Smoke Free Area (SFA). The results of 2018 National Basic Health Research shows tobacco consumption is still quite high and increasing compared to the results of 2007 and 2013 National Basic Health Research. The burden of disease in Indonesia is increasing every year.

Methods: This study aims to describe SFA regulation and analyze the relationship between the percentage of smokers and the prevalence of smoking attributable morbidity. Data from the 2018 Basic Health Research in Indonesia with the number of units of analysis were 514 districts and cities level. The design of the study was cross-sectional study. The variables analyzed were the percentage of smokers, the prevalence of diabetes, hypertension, upper respiratory tract infections (URTI), pneumonia, lung tuberculosis, asthma, and mental emotional disorders. Geographical mapping of the distribution of District/City with Smoking-Free Areas was made using QGIS 3·16.

Results: Around 72% of districts/cities in Indonesia already had local regulations of SFA after more than ten years implementation of the regulation of the health law. There was a significant relationship between the high percentage of smokers and the high prevalence of diabetes (*p* value: 0·000, PR: 1·342, 95%CI 1·135 to 1·587), hypertension (*p* value: 0·000, PR 1·631, 95%CI 1·252 to 2·124), and lung tuberculosis (*p* value: 0·008, PR 1·219, 95%CI 1·049 to 1·417) at the District/City level. However, there was no significant association between URTI, pneumonia, asthma, and mental emotional disorders.

Conclusion: The percentage of smokers in an area was associated with diabetes, hypertension, and lung tuberculosis. The implementation of Smoke Free Area should be evaluated.

Keywords: Smoking, Public health, Hypertension, Diabetes mellitus, Tuberculosis, Mental health

Introduction

The proportion of the population aged 15 years who smoked and chewed tobacco in 2007 to 2013 in Indonesia tended to increase based on the 2007 National Basic Health Research by 34·2% and the 2010 National Basic

*Correspondence: santi-m@fkm.unair.ac.id

[1] Department of Epidemiology, Biostatistics, Population Studies and Health Promotion, Universitas Airlangga, Surabaya, Indonesia
Full list of author information is available at the end of the article

Health Research by 34·7% [1, 2]. While at National Basic Health Research 2013, the proportion of active smokers every day at the age of ten years and over was 33·4% which then decreased in 2018 to 24·3%. Nevertheless, conditions in Indonesia at this time indicate that tobacco consumption is still quite high. There are 60·8 million adult men and 3·7 million adult women who are smokers. The 2018 Basic Health Research showed that 62·9% of men and 4·8% of women aged 15 years and over were tobacco users [3]. In addition, the data also show an increasing trend of tobacco use among children and adolescents. The prevalence of smoking in the 10–19 years age group has increased from 7·2% in 2013 to 9·1% in 2018 or almost 20% higher than the prevalence in the previous five years.

Trends in the number of non-communicable diseases cause changes in the burden of disease in Indonesia. Cases of catastrophic disease or diseases that require special expertise and therapy in handling, using sophisticated medical devices and/or requiring lifelong health services continue to increase [4]. It can be noticed from the absorption of health fund claims from the treatment of catastrophic diseases which is high in Indonesia. Each year, about 17–19% of the total cost of health care is for catastrophic diseases. The results of the National Health Insurance of Indonesia (BPJS Kesehatan) report on the use of catastrophic disease funds show that the total cost reached IDR 55·41 trillion or 18·58% of the total cost of health services in 2018 to 2020 [5]. The catastrophic disease with the highest cases and costs was heart disease with 13.041.463 cases and a cost of 10·2 trillion, in the second rank was cancer with 2.452.749 cases and cost of 3·5 trillion, and stroke in the third position with 2.127.609 cases and a cost of 2·5 trillion [6]. Many risk factors related to catastrophic disease, but the main cause is unhealthy lifestyle. Most of these catastrophic diseases are included in the list of diseases related to smoking called Smoking-Attributable Morbidity (SAM). The Centers for Disease Control and Prevention (CDC) regularly publish estimates of smoking-related mortality and the economic costs but the burden of smoking-related disease in the population has been less studied [7]. Estimates of smoking-attributable morbidity in the United States in 2000 found that 8·6 million people had 12·7 million smoking-attributable morbidity [8]. Diseases that are mostly the cause are chronic bronchitis and emphysema or are often classified as chronic obstructive lung disease (COPD).

The health and economic impacts of tobacco consumption outweigh the overall contribution of the tobacco business. Data from the Indonesian Ministry of Health estimates that the total direct and indirect costs of smoking reached almost IDR 440 trillion (USD 34 billion) in 2015. Then, if added to the impact of exposure to secondhand smoke and the lost opportunity cost of spending on tobacco i.e. spending that can be used to buy other commodities such as essential food, is much higher compare to the overall of the tobacco business. In addition, tobacco use also has a significant impact on public health because it can lead to the emergence of various chronic diseases in the productive age, which in turn causes high morbidity and premature mortality. Based on data from the World Health Organization [9], tobacco use in Indonesia is estimated to be the biggest cause of death for smokers, with around 225.700 people dying prematurely or about 15% of all deaths.

Indonesia has several rules controlling tobacco such as Tobacco Advertising, Promotion, and Sponsorship (TAPS) ban and pictorial health warnings on the tobacco packaging and labeling. Another effort of the Indonesian government in preventing and overcoming the adverse effects of cigarette smoke is the application of Smoke Free Area (SFA) in accordance with Law Number 36 of 2009 concerning Health which requires Local Governments to establish a Smoke Free Area. SFA is a room or area that is prohibited for production, sales, advertising, promotion or smoking. Smoke Free Area here in after abbreviated as SFA, is a room or area that is declared prohibited for smoking or producing, selling, advertising, and/or promoting tobacco products. Based on these regulations, the non-smoking areas include health service facilities; place of teaching and learning process; where children play; worship place; public transportation; workplace; and public places and other designated places. The SFA designated as an effort to protect the community against the risk of health problems resulted of the polluted environment by cigarette smoke. The regional governments in Indonesia are obliged to establish a smoke-free area in each of its territory. As a policy concession, specifically for workplaces, public places, and other places, it may provide a certain place for smoking, which is commonly called a smoking room. Any person who intentionally violates the SFA as referred to the law, shall be subject to a maximum fine of Rp. 50,000,000.00 (fifty million rupiah). Tobacco control regulations in various countries have succeeded in protecting non-smokers, increasing smoking cessation, and reducing cigarette consumption [10]. Since this law was passed in 2009, various regions in Indonesia have begun to make regulations regarding SFA in their respective regions, but until now this rule has not been 100% implemented in all regions. In 2012 out of 497 regencies/cities in Indonesia, only 22 regencies/cities had local regulations on SFA, and then in 2014 the number of regencies/cities that had local regulations on SFA increased to 49 spreads over 13 provinces (out of 34 provinces) in Indonesia [11].

Cigarettes are still a problem in Indonesia with a high number of consumers. Smoke Free Areas as an effective form of protection from the dangers of cigarette smoke, provide a clean and healthy environment, and expected to control smoking behavior which can affect the number of smokers in each area. Cigarette taxes provide support to local governments to achieve better health services. This study aims to describe the Smoke Free Area regulation and analyze the relationship between the percentage of smokers and the prevalence of smoking attributable morbidity.

Method

This study uses a quantitative method with a cross-sectional design. Secondary data was obtained from the 2018 Basic Health Research national survey data. Basic Health Research is a 5-year survey conducted by the Ministry of Health of the Republic of Indonesia that describes information on health status and information on the magnitude of the problem of risk factors related to health status, as a consideration in formulating health development policies in Indonesia. Until this manuscript was compiled, the latest Basic Health Research and the data officially published is in 2018. The unit of analysis used in this study was 514 districts/cities in Indonesia. The variables studied were the percentage of smokers and outcome of this study were the prevalence of smoking-attributable morbidity, namely diabetes, hypertension, upper respiratory tract infections (URTI), pneumonia, asthma, lung tuberculosis, and mental emotional disorders. The measurement result category of these variables is divided to be high if the percentage or prevalence of smokers and smoking-related diseases is above the national figure. The percentage of smoking is categorized as high if the percentage of smokers is above national percentage, was > 24·5% for the 2018 National Basic Health Research. While the diseases prevalence was categorized as high if the prevalence of diabetes was > 1·5%; hypertension was > 8·36%; URTI was > 4·4%; pneumonia was > 2·0%; lung tuberculosis was > 0·42%; asthma was > 2·4%; and mental emotional disorders was > 9·8%. On the other hand, it is said to be low if the percentage of smokers and the prevalence of smoking-attributable morbidity are below the national figures. Data analysis using Chi-Square Test and Prevalence Ratio.

Smoker variable is population with smoking habit every day in the last one month which was asked to respondents with age more than ten years. The diseases variable was asked to respondents aged > 15 years. Diagnosed of diabetes mellitus based on American Diabetic Association criteria, hypertension based on Joint National Committee (JNC) VII, asthma based on medical doctor examination, lung tuberculosis based on thorax photo or sputum examination or both, pneumonia based on three questions (thorax photo, medical doctor examination and, symptoms), URTI based on two questions (medical doctor examination and symptoms), and mental emotional disorders based on 20 questions of Self-Reporting Questionnaire (SRQ). All of those data could be accessed on the official website https://www.litbang.kemkes.go.id/laporan-riset-kesehatan-dasar-riskesdas//. Furthermore, the mapping was made using the QGIS 3·16 application and District/City data with the 2021 SFA regulation sourced from data from the Indonesian Health Service Association (ADINKES) [12]. The Indonesian Health Service Association (ADINKES) is an association organization established to meet the aspirations and participation of Health Offices throughout Indonesia. ADINKES has a vision to become the main partner of the Government and Regional Governments throughout Indonesia in realizing the Health Service and its Technical Implementation Units as a trusted and reliable health affairs implementer.

Results

In 2021, out of 514 districts/cities in Indonesia, there are 369 districts/cities (71·8%) that already had SFA regulations in their regions and as many as 145 districts/cities (28·2%) did not have regulations on SFA in the area (Fig. 1). The number was much higher than the number of the districts/cities with SFA regulation before 2009. These regulations can be in the form of local regulations; regent's or mayor's regulations; or decrees. Local regulations were formed based on an agreement between the government (executive role) and parliament (legislative role). While other regulations are made only by the government (executive role) without involving parliament.

The condition of the prevalence of Smoke Attributable Morbidity from 2007 to 2018 shows the difference between before the regional regulation on Non-Smoking Areas in 2009 and the allocation of cigarette taxes for the health sector was implemented, with the condition after the enactment of regional regulations on non-smoking areas that have been implemented by most regions in Indonesia, as well as affirmation of the allocation of cigarette taxes for the health sector (Fig. 2). The data is analyzed from 72% districts/cities that have SFA which the total is 344 districts/cities (districts/cities with expansion and missing data in 2007 are not included). The trendline of each Smoke Attributable Morbidity shows the number of districts/cities with hypertension, pneumonia, asthma, and TB in the high category has increased. Meanwhile, the number of districts/cities with diabetes, URTI and mental emotional disorders in the high category has decreased.

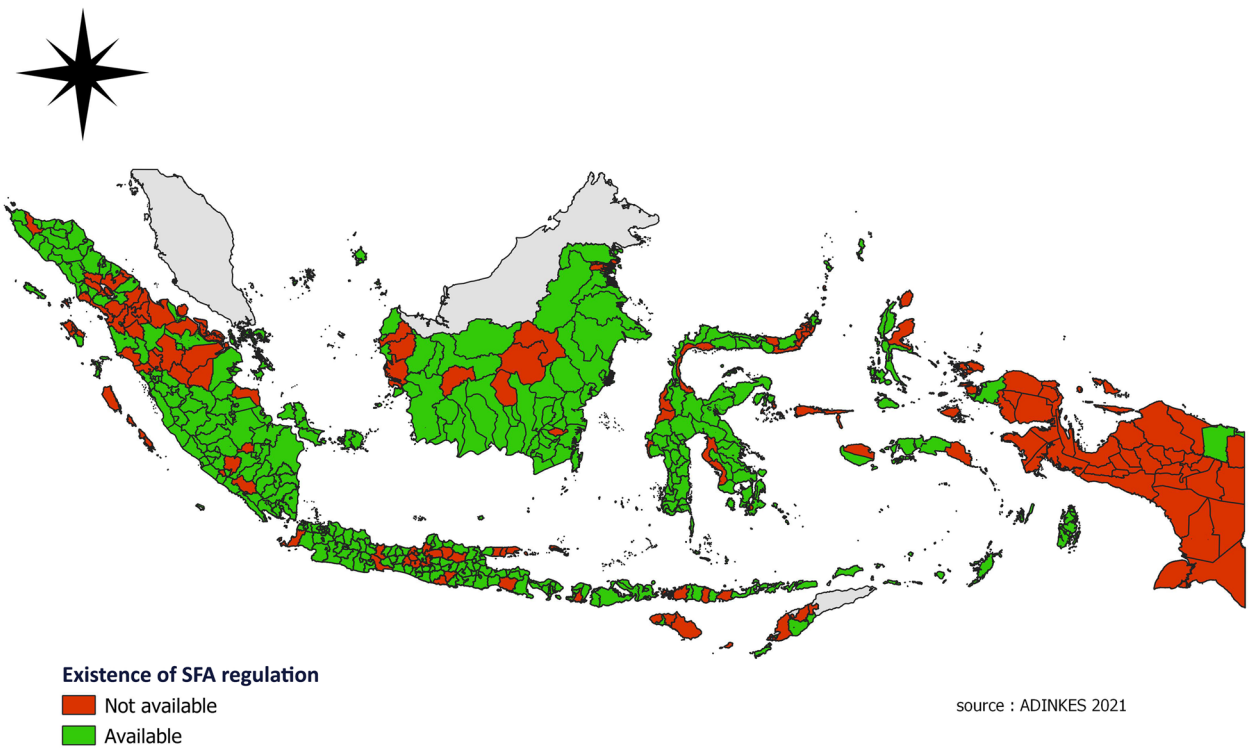

Fig. 1 The distribution of SFA regulations at the District/City level in Indonesia in 2021

Overview of Smoking Attributable Morbidity in Districts/Cities of Indonesia

The percentage of smokers in districts or cities according to 2018 National Basic Health Research with a high category was 217 districts/cities (43·8%) after ten years implementation of Health Law. It showed that as many as 217 districts or cities in Indonesia had more than 24·3% of smokers. The number of districts/cities which had high prevalence of diabetes were 322 districts/cities (64·5%). It meant that 322 districts/cities had prevalence of diabetes more than 1·5% as the national figure. The number of districts/cities which had high prevalence of hypertension were 218 districts/cities (44·6%). It meant that 218 districts/cities had prevalence of hypertension more than 8·36% as the national figure. The number of districts/cities which had high prevalence of lung tuberculosis were 196 districts/cities (45·3%). It meant that 196 districts/cities had prevalence of lung tuberculosis more than 0·42% as the national figure. While the disease with the high category and the lowest number was pneumonia with 151 districts/cities (30·4%). It meant that 151 districts/cities had prevalence of pneumonia more than 2·0% as the national figure (Table 1).

The Association between Smoking and Smoking-Attributable Morbidity in Districts/Cities of Indonesia

Result of the analysis of the association between the percentage of smokers and the prevalence of smoking-attributable morbidity showed significant results with p value $< 0{\cdot}005$ on the variables of diabetes mellitus ($p = 0{\cdot}000$), hypertension ($p = 0{\cdot}000$), and lung tuberculosis ($p = 0{\cdot}008$). Districts/Cities with a high percentage of the category had a risk of 1·342 times (CI; 1·135-1·587) to be districts/cities with a high prevalence of diabetes, 1·631 times (CI: 1·252-2·124) with high prevalence of hypertension, and 1·219 times (CI: 1·049 − 1·417) with high prevalence of lung tuberculosis as well. However, URTI, pneumonia, asthma, and mental emotional disorders were not associated significantly with the percentage of smokers. Although pneumonia ($p = 0{\cdot}051$) and mental emotional disorders ($p = 0{\cdot}061$) had p values that were close to significant value (Table 2).

Discussion

Smoke Free Area regulation is one of the government's efforts to control diseases caused by smoking and exposure to cigarette smoke in the environment.

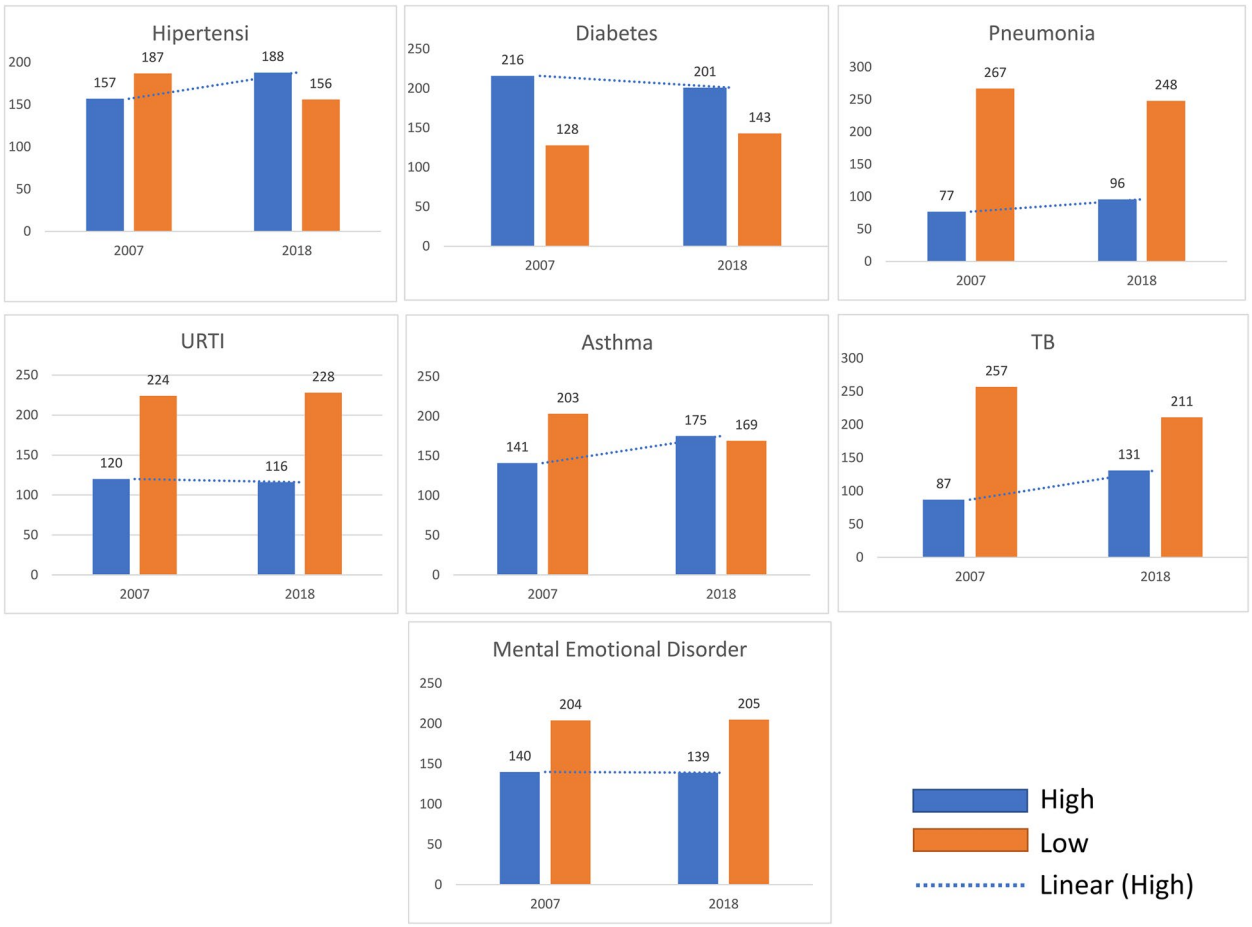

Fig. 2 Trendline of the prevalence of Smoke Attributable Morbidity from 2007 to 2018

Table 1 Description of Districts/Cities with percentage of Smokers and Prevalence of Smoking Attributable Morbidity in Indonesia

Variable	District and City ($n=514$)		Missing data
	High (%)	Low (%)	
Smoking	217 (43·8)	279 (56·3)	18
Diabetes Mellitus	322 (64·5)	173 (35·5)	1
Hypertension	218 (44·6)	278 (55·4)	-
URTI	184 (36)	312 (64)	-
Pneumonia	151 (30·4)	345 (69·6)	-
Lung TBC	196 (45·3)	298 (54·7)	-
Asthma	222 (39·5)	274 (60·5)	2
Mental emotional disorder	203 (41·2)	293 (58·8)	-

A meta-analysis research shows that smoke free area regulation as implementation of WHO's recommended tobacco control policies (MPOWER) was associated with substantial benefits to health especially on perinatal and children health, especially who got in tobacco smoke exposure [13, 14]. The WHO MPOWER recommendation were able to reduce the adult daily smoking prevalence significantly the countries with higher initial tobacco control preparedness and higher smoking burden [15]. Children were among the most exposed to cigarette smoke or become passive smokers compared to other age groups. Other research show that smoking regulation associated with reduction in severe asthma exacerbations requiring hospital admission [16]. The Smoke Free Area regulation was expected to have an effect on reducing the number of smokers. This is in accordance with Rahajeng's research in 2015 which stated that the application of SFA regulations and legislation can reduce the proportion of smokers every day. One of the areas, for example the Special Region of Yogyakarta, the number of smokers every day from 2007 to 2013 decreased by 2·6% [17]. Even though the regulation of Smoke Free Area had been implemented since 2009, the number of smokers

Table 2 Analysis between percentage of smokers and prevalence of smoking attributable morbidity in Indonesia based on Districts/Cities as unit of analysis

Variable	Number of Districts/Cities with High Percentage of Smokers		Missing data	p	PR	95% CI
	Yes	No				
Prevalence of Diabetes						
High	161	161	18	·000	1·342	1·135–1·587
Low	56	117				
Prevalence of Hypertension						
High	115	103	1	·000	1·631	1·252–2·124
Low	102	176				
Prevalence of URTI						
High	79	105	-	·779	·981	·856–1·123
Low	138	174				
Prevalence of Pneumonia						
High	76	75	-	·051	1·125	·997–1·270
Low	141	204				
Prevalence of Lung TBC						
High	100	96	-	·008	1·219	1·049–1·417
Low	116	100				
Prevalence of Asthma						
High	103	119	2	·285	1·092	·928- 1·284
Low	114	160				
Prevalence of Mental Emotional Disorder						
High	99	104	-	·061	1·153	·991–1·343
Low	118	175				

in Indonesia was still high. It showed that there was low compliance on the regulation due to poor enforcement, as the study result of Ravara et al. (2013) [18]. This was also related to Smoking-Attributable Morbidity which was also still a large disease burden for the country.

The results showed that districts/cities with high smoking category had a high prevalence of diabetes mellitus, hypertension, and lung tuberculosis. The strong association between smoking and the diabetes is consistent with studies and the development of micro and macrovascular complications. Smoking causes changes in insulin secretion by pancreatic cells and can also cause insulin resistance associated with impaired glucose metabolism. In addition, smoking-induced endothelial dysfunction has a key role in the development of vascular complications in this condition [19]. Smokers had a 2·30 (95%CI 1·47 to 3·60) risk of developing diabetes mellitus than non-smokers [20]. In this study, districts/cities with high smoking category had a risk of 1·631 times (95%CI 1·252 to 2·124) to become districts/cities with high prevalence of diabetes mellitus.

The results showed that districts/cities with a high percentage of smokers had a high prevalence of hypertension as well (95%CI 1·252 to 2·124). Smoking was significantly correlated with higher blood pressure, especially among former smokers and new smokers [21]. Hypertension had been common and is still considered as one of the main risk factors for coronary heart disease. Endothelial dysfunction, increased arterial stiffness, and changes in platelet function caused by smoking exposure contribute to increased blood pressure, which is strongly associated with hypertension. The results of another study [22] also showed that cigarette smoke is a factor that can cause functional damage, especially to the endothelium due to the effects of nicotine and carbon monoxide.

Meanwhile, the high percentage of smokers in districts/cities also showed a significant relationship with a high prevalence of lung tuberculosis (95%CI 1·049 to 1·417). Previous studies have stated that excessive tobacco consumption in men (⩾20 cigarettes per day) was a risk factor for tuberculosis (OR: 4·509; CI: (1·971–10·859) [23]. However, Ghambir et.al's study explains that the association between smoking and tuberculosis can be influenced by confounding factors such as socioeconomic conditions, population density at home, previous contact with tuberculosis patients, previous TB infection, malnutrition, use of intravenous drugs, alcohol consumption, and high-risk occupations [24].

The high blood glucose associated with diabetes can damage the blood vessels and nerves that control the heart. Over time, this damage can lead to heart disease. Heart disease is associated with various complications of other diseases, from stroke to kidney failure [25, 26]. Complications of diseases such as these are more likely to cause disability and loss of productivity, especially if they occur in people of productive age. Meanwhile, the total health care expenditure due to Smoking-Attributable diseases is 5·7% of global health expenditure or reaches US$422 billion if calculated according to Purchasing Power Parity (PPP) in 2012 [27].

There were 706 million DALYs (Disability Adjusted Life Year) worldwide attributable to non-communicable diseases in 2017 and diabetes is one of the top five causes of DALYs by association with major risk [28]. The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017 showed that stroke was the third leading cause of death and disability combined (measured by disability-adjusted years of life [DALYs]). Meanwhile in Indonesia, the main causes of DALYs in 2016 were ischemic heart disease, cerebrovascular disease, diabetes, and lung tuberculosis which took the fourth position. Diabetes recorded an average rate from 2006 to 2016 of 54·9%, after previously in 1990–2006 it was 81·6% [29].

Many areas with SFA regulations are not followed by a good public health status as well. This can be seen from the high percentage of smokers and the high prevalence of smoking-related diseases. So, it's time not only to add regions that have SFA regulations but also to apply the regulations correctly, which will be effective in reducing smokers and the diseases they cause. Although in this study asthma was not associated significantly with smokers, as we know there were many studies showed that there are association between cigarette smoke exposure and asthma, as the result showed that smoking from younger age is a dominant factor in the incidence of Chronic Obstructive Pulmonary Disease, such as asthma [30, 31].

The data in this research is secondary data which based on 2018 Basic Health Research, the smoking variable was defined as anyone smoking every day in the last month which was asked to respondents above 10 years old, however, the disease's variable was asked to respondents aged > 15 years, this is the limitation of the study. In addition, the number of smokers aged 10–15 is 0.7%. The prevalence data of smoking-related morbidity/diseases consist of diseases which age manifestations mostly on people aged > 30 years, therefore, we may consider this will not give much differences affect the analysis.

Conclusion

This study showed that around 72% of districts/cities in Indonesia already have local regulations of Smoke Free Area. There was a significant association between the high percentage of smokers with high prevalence of smoking attributable morbidity, such as diabetes mellitus, hypertension, and lung tuberculosis in the District/City in Indonesia. Certainly, Smoke Free Area should be evaluated in the implementation. It will have an impact on the health status of the people in the area at this time and in the future considering that the disease is a chronic disease and requires very high treatment costs.

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Authors' contributions
SM designed the study and wrote the protocol. SM, KDA, AH, SW did the study. SM supervised all the steps in the review process.SM, KDA and AH did the data analysis and created the figures. All authors interpreted the findings. SM, KDA, and AH drafted the manuscript. SM supervised the writing. KDA, AH, SW, AA, YSP provided feedback. The author(s) read and approved the final manuscript.

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Availability of data and materials
All data set generated and analysis are available in the article. The raw data is available in the website https://www.litbang.kemkes.go.id/laporan-riset-kesehatan-dasar-riskesdas//.

Declarations

Ethics approval and consent to participate
This study does not involve human participants or animal subjects.

Consent for publication
Not required.

Competing interests
We declare no competing interests.

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