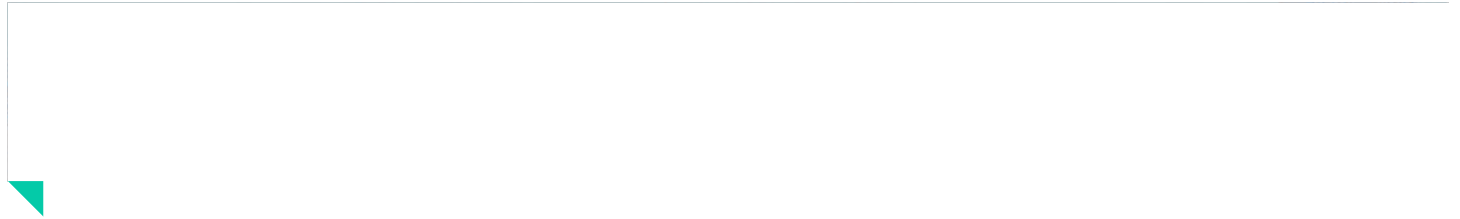


[Skip to main content](#)

Advertisement



Search

- [Explore journals](#)
- [Get published](#)
- [About BMC](#)
- [Login](#)

Menu

- [Explore journals](#)
- [Get published](#)
- [About BMC](#)
- [Login](#)

## [BMC Health Services Research](#)

- [Home](#)
- [About](#)
- [Articles](#)
- [Submission Guidelines](#)
- [Join the Board](#)

Search articles within this journal

[Submit manuscript](#)

### Collections open to submissions



#### [Resilient and responsive health systems in a changing world](#)

Guest Edited by Siri Wiig and Jane K. O'Hara



## [Health services and systems in fragile and conflict-affected regions](#)

Guest Edited by Michel Landry and Clarissa Giebel



## [Innovations for better health and social justice](#)

Guest Edited by Magdalena Szaflarski

## Editor's choice



UK Allied Health Professionals have limited capacity for research, an evaluation has found, with securing research funding a major gap in knowledge.



A new type of spatial analysis, that accounts for being within walkable reach of services and areas with high hardship, reveals where health service funding is really needed.

## Featured news



## [Join the Editorial Board](#)

We are recruiting new, international Editorial Board Members.



## [Meet Harvy Joy Liwanag](#)

Meet our Editorial Board Members working on the Sustainable Development Goals.

### Articles

- [Recent](#)
- [Most accessed](#)
- [Latest collections](#)

#### 1. [Implementation fidelity of a transition program for adolescents with congenital heart disease: the STEPSTONES project](#)

Authors: Markus Saarijärvi, Lars Wallin, Philip Moons, Hanna Gyllensten and Ewa-Lena Bratt

Content type: Research article

5 February 2022

#### 2. [Patient-physician communication in the emergency department in Taiwan: physicians' perspectives](#)

Authors: Yi-Fen Wang, Ya-Hui Lee, Chen-Wei Lee, Chien-Hung Hsieh and Yi-Kung Lee

Content type: Research

5 February 2022

#### 3. ['Grey nomad' travellers' use of remote health services in Australia: a qualitative enquiry of hospital managers' perspectives](#)

Authors: Margaret Yates, Lin Perry, Jenny Onyx and Tracy Levett-Jones

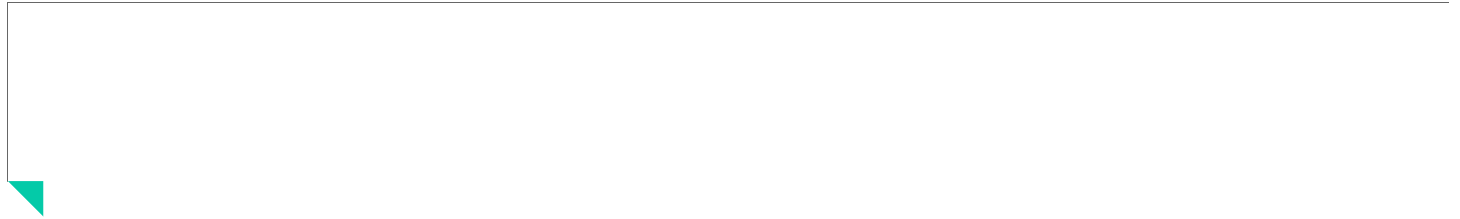
Content type: Research

5 February 2022

#### 4. [Key informant perspectives on sexual health services for travelling young adults: a qualitative study](#)

[Skip to main content](#)

Advertisement



Search

- [Explore journals](#)
- [Get published](#)
- [About BMC](#)
- [Login](#)

Menu

- [Explore journals](#)
- [Get published](#)
- [About BMC](#)
- [Login](#)

[BMC Health Services Research](#)

- [Home](#)
- [About](#)
- [Articles](#)
- [Submission Guidelines](#)
- [Join the Board](#)

## Articles

- [Collections](#)
- [Supplements](#)
- [Reviewer acknowledgements](#)

# Articles

- [Search by keyword](#)
- [Search by citation](#)

Search BMC Health Services  for results from

Show results from

Decomposing health care spending by disease, type of care, age, and sex can lead to a better understanding of the drivers of health care spending. But the lack of diagnostic coding in outpatient care often pre...

Authors: Michael Stucki, Janina Nemitz, Maria Trottmann and Simon Wieser

Citation: *BMC Health Services Research* 2021 21:1264

Content type: Research article

Published on: 22 November 2021

- > [View Full Text](#)
- > [View PDF](#)

8. **[Adolescents' perceived barriers to accessing sexual and reproductive health services in California: a cross-sectional survey](#)**

Adolescents may forego needed sexual and reproductive health (SRH) services due to a variety of concerns and barriers. The purpose of this study is to compare adolescents' perceptions of these barriers by part...

Authors: Martha J. Decker, Tara V. Atyam, Catherine Gilmore Zárate, Angela M. Bayer, Consuelo Bautista and Melissa Saphir

Citation: *BMC Health Services Research* 2021 21:1263

Content type: Research

Published on: 22 November 2021

- > [View Full Text](#)
- > [View PDF](#)

9. **[Evaluation of a flexible and integrative psychiatric care model in a department of child and adolescent psychiatry in Tübingen, Germany: study protocol \(EVA\\_TIBAS\)](#)**

Model projects for flexible and integrated treatment (FIT) in Germany aim at advancing the quality of care for people with mental disorders. A new FIT model project was established in 2017 at the Department of...

Authors: Anne Neumann, Helene Hense, Fabian Baum, Roman Kliemt, Martin Seifert, Lorenz Harst, Denise Kubat, Birgit Maicher, Christopher Schrey, Jochen Schmitt, Andrea Pfennig, Ines Weinhold, Enno Swart and Bettina Soltmann

Citation: *BMC Health Services Research* 2021 21:1262

Content type: Study protocol

Published on: 22 November 2021

- > [View Full Text](#)
- > [View PDF](#)

10. **[The disparities in health insurance ownership of hospital-based birth deliveries in eastern Indonesia](#)**

Development in Eastern Indonesia tends to be left behind compared to other Indonesian regions, including development in the health sector. The study aimed at analyzing the health insurance ownership disparitie...

Authors: Agung Dwi Laksono, Ratna Dwi Wulandari, Zuardin Zuardin and Nopianto Nopianto

Citation: *BMC Health Services Research* 2021 21:1261

Content type: Research

Published on: 22 November 2021

- > [View Full Text](#)
- > [View PDF](#)

11. [\*\*Correction to: Findings from a novel and scalable community-based HIV testing approach to reduce the time required to complete point-of-care HIV testing in South Africa\*\*](#)

Authors: Tonderai Mabuto, Geoffrey Setswe, Nolundi Mshweshwe-Pakela, Dave Clark, Sarah Day, Lerato Molobetsi and Jacqueline Pienaar

Citation: *BMC Health Services Research* 2021 21:1260

Content type: Correction

Published on: 22 November 2021



The [original article](#) was published in *BMC Health Services Research* 2021 **21**:1176

- > [View Full Text](#)
- > [View PDF](#)

12. [\*\*Evaluating implementation outcomes \(acceptability, adoption, and feasibility\) of two initiatives to improve the medication prior authorization process\*\*](#)

Processes such as prior authorization (PA) for medications, implemented by health insurance companies to ensure that safe, appropriate, cost-effective, and evidence-based care is provided to all members, have ...

Authors: Laney K. Jones, Ilene G. Ladd, Christina Gregor, Michael A. Evans, Jove Graham and Michael R. Gionfriddo

Citation: *BMC Health Services Research* 2021 21:1259

Content type: Research

Published on: 20 November 2021

- > [View Full Text](#)
- > [View PDF](#)

13. [\*\*Implementation and performance of haemovigilance systems in 10 sub-saharan African countries is sub-optimal\*\*](#)

Haemovigilance is an important element of blood regulation. It includes collecting and evaluating the information on adverse events resulting from the use of blood and blood components with the aim to improve ...

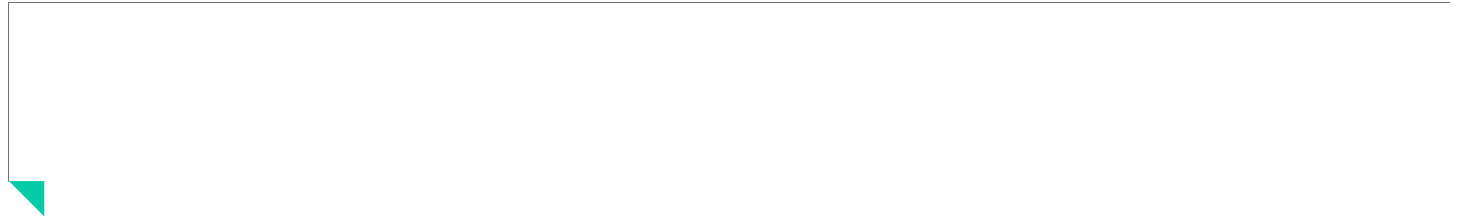
Authors: Washington T. Samukange, Verena Kluempers, Manvi Porwal, Linda Mudyiwenyama, Khamusi Mutoti, Noel Aineplan, Helga Gardarsdottir, Aukje K. Mantel-Teeuwisse and C. Micha Nuebling

Citation: *BMC Health Services Research* 2021 21:1258

[Skip to main content](#)

Advertisement

---



Search

- [Explore journals](#)
- [Get published](#)
- [About BMC](#)
- [Login](#)

Menu

- [Explore journals](#)
- [Get published](#)
- [About BMC](#)
- [Login](#)

[BMC Health Services Research](#)

- [Home](#)
- [About](#)
- [Articles](#)
- [Submission Guidelines](#)
- [Join the Board](#)

[About](#)

- [Contact](#)
- [Editorial Board](#)

## Editorial board

**Tillie Cryer, Senior Editor**



Tillie has a BSc in Bioveterinary Science and a Master of Research in Microbiology, from the *Royal Veterinary College, University of London*. Tillie previously worked in the charity sector supporting a public and patient involvement programme for a mental health research charity. Here, she chaired, facilitated, and consulted on public and patient involvement activities for several large-scale research studies and clinical trials focused on mental health care and service improvement. She is particularly interested in the delivery of digital health interventions in health services. Tillie joined the BMC Series team in 2017 and has worked on several BMC Series medical and veterinary titles. She is a Senior Editor for the BMC Series journals and has been the Editor of *BMC Health Services Research* since 2019.

## Senior Editorial Board Members

### Professor Dina Balabanova



Dina is a Professor of Health Systems and Policy at the London School of Hygiene and Tropical Medicine, UK. Her expertise is in health systems governance, effective delivery models, and health systems strengthening, across a range of low- and middle-income countries. Between 2012-2018, Dina served as an elected Board member of *Health Systems Global*, the journal's affiliated society. Dina joined the Editorial Board of *BMC Health Services Research* in 2011.

### Professor Koustuv Dalal



Koustuv has decades of experience in Health Economics and Systems Research, Prevention and Promotion, Public Health, Global Health, and Implementation Sciences. He has led more than 50 international research projects. He has many national, regional, and international assignments as a senior advisor/committee member. He has developed 30 academic programs in several world-famous universities. He has students and workshops participants from 92 countries and Research collaborations in 51 universities and institutes. He has received many prestigious awards. Koustuv has evaluated more than 500 projects and programs.



## Professor David Hotchkiss



David is Professor and Chair of the Department of International Health & Sustainable Development at Tulane University's School of Public Health and Tropical Medicine. Trained as a health economist, his current research focuses on the evaluation of health systems strengthening strategies in low- and middle-income countries including health care financing mechanisms; health workforce strategies; and routine health information systems. He has also led studies examining socioeconomic inequities in health outcomes and health care utilization; demand for health care; and child marriage and reproductive health.

## Professor Milena Pavlova



Milena is a Professor of Health Economics and Equity at Maastricht University. Her research focuses on the financing of the health care sector, including health insurance, cost-sharing, out-of-pocket payments, willingness to pay, and discrete choice experiments. She is the chair of the ASPHER working group on Economic Evaluation in Healthcare in Europe, and also an active member of the Scientific Board of Red Cross in the Netherlands. Her publication list includes over 100 research papers. In 2016, she received the AXA Award for successful mid-career researcher. Milena joined the editorial board of *BMC Health Services Research* in 2013.

## Dr. Gerald Sendlhofer



Gerald is head of the Quality and Risk Management Department at the University Hospital of Graz, an employee of the Research Unit for Safety in Health, c / o Clinical Department for Plastic, Aesthetic and Reconstructive Surgery, Univ. Clinic for Surgery at the Medical University of Graz. His scientific focus is on patient safety. He is a lecturer in the field of patient safety. He received the “European Quality Leader Award 2015” (European Organization for Quality - EOQ).

## Dr. Hannah Tappis



Hannah is a Senior Technical Advisor at Jhpiego - an affiliate of Johns Hopkins University, and associate faculty at the Johns Hopkins Center for Humanitarian Health where her work focuses on generating and using evidence to improve the quality of reproductive, maternal and child health services in conflict-affected settings. Hannah has a DrPH in International Public Health from Johns Hopkins Bloomberg School of Public Health and a BA in History from Princeton University. She has been a Senior Editorial Board Member for *BMC Health Services Research* and an Editorial Board Member for *BMC Pregnancy and Childbirth* since 2020.

## Dr. Brad Wright



Brad is Associate Professor and Director of Health Services and Outcomes Research in Family Medicine at UNC-Chapel Hill, where he co-directs the Health Care Economics and Finance program at the Sheps Center for Health Services Research. He holds a PhD in health policy and management from UNC-Chapel Hill, completed a postdoctoral fellowship at Brown University, and previously served as faculty at the University of Iowa. His research focuses on disparities in health care delivery, primary care, emergency medicine, and health politics and policy. In 2016, Dr. Wright received AUPHA's John D. Thompson Prize for Young Investigators.

### Senior Editor

Tillie Cryer, *BMC, UK*

### Senior Assistant Editor

James Edwards, *BMC, UK*

### Assistant Editor

Anisa Lowe, *BMC, UK*

### Senior Editorial Board Members

Dietmar Ausserhofer, *State University of Applied Sciences for Health Professions Claudiana, Italy*

Dina Balabanova, *London School of Hygiene and Tropical Medicine, UK*

Michael Donnelly, *Queen's University Belfast, UK*

Koustuv Dalal, *Mid Sweden University, Sweden*

Martin N. Dichter, *Uniklinik Köln, Germany*

Donna Goodridge, *University of Saskatchewan, Canada*

David Hotchkiss, *Tulane University, USA*

David Mohr, *VA Boston Healthcare System, USA*

Milena Pavlova, *Maastricht University, Netherlands*

Gerald Sendlhofer, *LKH Universitaetsklinikum Graz, Austria*

Hannah Tappis, *JHPIEGO, USA*

Brad Wright, *University of North Carolina at Chapel Hill, USA*

## Editorial Board Members

### Designing and implementing health system reform

Carl Antonio, *University of the Philippines Manila, Philippines*

Hannah Arem, *Medstar Health Research Institute, United States*

Stephanie Best, *Macquarie University, Australia*

Helen Brooks, *University of Manchester, United Kingdom*

Donaldson Conserve, *University of South Carolina, United States*

Saba Hinrichs-Krapels, *Delft University of Technology, Netherlands*

Anton Isaacs, *Monash University, Australia*

Saravana Kumar, *University of South Australia, Australia*

Desmond Kuupiel, *University of KwaZulu-Natal, South Africa*

Wenhui Mao, *Duke Global Health Institute, USA*

Morwenna Rogers, *University of Exeter, United Kingdom*

Binaya Sapkota, *Nobel College Faculty of Health Sciences, Nepal*

Rahul Shidhaye, *Centre for Mental Health Law & Policy, India*

Ivo Vlaev, *University of Warwick, UK*

### eHealth, mHealth and informatics

Ganisher Davlyatov, *University of Oklahoma Health Sciences Center, USA*

Bassey Ebenso, *University Of Leeds, Institute Of Health Sciences, United Kingdom*

Mariann Fossum, *University of Agder, Norway*

Ilana Graetz, *Emory University, United States*

Md Shahidul Islam, *University of New England, Australia*

Johannes Knitza, *Friedrich-Alexander-University Erlangen-Nuremberg, Germany*

Bridianne O'Dea, *Black Dog Institute, University of New South Wales, Australia*

Megan O'Grady, *University of Connecticut School of Medicine, USA*

Roxana Ologeanu-Taddei, *University of Montpellier, France*

Mei-Sing Ong, *Harvard Medical School, United States*

Yannis Pappas, *University of Bedfordshire, United Kingdom*

Kalyan Pasupathy, *University of Illinois, USA*

Francesco Schiavone, *University of Naples Parthenope, Italy*

Nathan Shlobin, *Northwestern University, USA*

Shahadat Uddin, *The University of Sydney, Australia*

Hao Xue, *Stanford University, USA*

### Health policy, politics and power

Salla Atkins, *Tampere University and Karolinska Institutet, Finland*

Sunday Azagba, *University of Utah, United States*

Julie Balen, *University of Sheffield, United Kingdom*

Francesco Barbabella, *National Institute of Health and Science on Ageing (INRCA), Italy*

Heather Barry, *Queen's University Belfast, Ireland*

Masoud Behzadifar, *Lorestan University of Medical Sciences, Iran*

Eva Blozik, *Helsana Health Insurance, Switzerland*

Fabrizio Carinci, *Universita degli Studi di Bologna, Italy*

Enrique Castro-Sanchez, *City, University of London, UK*

Jack Chen, *University of New South Wales, Australia*

Lisa Cosgrove, *University of Massachusetts, USA*

Saskia den Boon, *Organisation mondiale de la Sante, Switzerland*

Khalifa Elmusharaf, *University of Limerick, Ireland*

Daniel Erku, *Griffith University, Australia*

Ama Fenny, *University of Ghana, Ghana*

Ines Fronteira, *Universidade Nova de Lisboa, Portugal*

Andrew Gray, *University of KwaZulu-Natal, South Africa*

Jagnoor Jagnoor, *The George Institute for Global Health, Australia*

RESEARCH

Open Access



# The disparities in health insurance ownership of hospital-based birth deliveries in eastern Indonesia

Agung Dwi Laksono<sup>1,2\*</sup>, Ratna Dwi Wulandari<sup>3</sup>, Zuardin Zuardin<sup>2,4</sup> and Nopianto Nopianto<sup>2,5</sup>

## Abstract

**Background:** Development in Eastern Indonesia tends to be left behind compared to other Indonesian regions, including development in the health sector. The study aimed at analyzing the health insurance ownership disparities in hospital delivery in Eastern Indonesia.

**Methods:** The study draws on secondary data from the 2017 Indonesia Demographic and Health Survey. The study population was women aged 15–49 years who had given birth in the last five years in Eastern Indonesia. The study analyzes a weighted sample size of 2299 respondents. The study employed hospital-based birth delivery as a dependent variable. Apart from health insurance ownership, other variables analyzed as independent variables are province, residence type, age group, marital status, education level, employment status, parity, and wealth status. The final stage analysis used binary logistic regression.

**Results:** The results showed that insured women were 1.426 times more likely than uninsured women to undergo hospital delivery (AOR 1.426; 95% CI 1.426–1.427). This analysis indicates that having health insurance is a protective factor for women in Eastern Indonesia for hospital delivery. There is still a disparity between insured and uninsured women in hospital-based birth deliveries in eastern Indonesia. Insured women are nearly one and a half times more likely than uninsured women to give birth in a hospital.

**Conclusion:** The study concludes that there are health insurance ownership disparities for hospital delivery in eastern Indonesia. Insured women have a better chance than uninsured women for hospital delivery.

**Keywords:** Health insurance, Maternity care, Maternal health, Woman health, Eastern Indonesia

## Introduction

World Health Organization (WHO) notes that, in the case of births and delivery or within 42 days of pregnancy termination, mother mortality (MMR) is the annual number of female deaths due to all factors related to or caused by or for the period and site of the

pregnancy. Except for causes of accident or event [1]. One of the Sustainable Development Goals (SDGs) goals is to reduce the MMR globally to less than 70 per 100,000 live births by 2030 [2].

Referring to the Ministry of Health of the Republic of Indonesia's annual report in 2019, maternal deaths were 4221 cases. This number has decreased slightly compared to 2018, which amounted to 4226 cases. It consists of maternal mortality caused by bleeding in 1280 instances, hypertension in pregnancy in 1066 cases, infection in 207 patients, circulatory system disorders in 200

\* Correspondence: [ratna-d-w@fkm.unair.ac.id](mailto:ratna-d-w@fkm.unair.ac.id)

<sup>1</sup>National Institute of Health Research and Development, the Ministry of Health of the Republic of Indonesia, Jakarta, Indonesia

<sup>2</sup>Persakmi Institute, Surabaya, Indonesia

Full list of author information is available at the end of the article



© The Author(s). 2021 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

cases, metabolic disorders in 157 points, and other causes 1311 cases [3].

Every day 38 mothers in Indonesia die from diseases/complications related to pregnancy and complications [4]. We could have been preventing most of these deaths. It means that we could avoid and saved if the MMR was high. Indonesia's MMR trend has decreased from 2000 to 2017 (272 per live birth to 177 per 100,000 live births) but has not yet reached the SDGs target globally [4]. Compared with the MMR trend from 2000 to 2017 in the Southeast Asia region, Indonesia has the highest Maternal Mortality Rate. The lowest is in Singapore (8 per 100,000 live births). Moreover, at the global level, there are at least 830 maternal deaths in the world every day [4].

Previous studies found that 14.3% of maternal mortality was due to abortion bleeding and uterine rupture, followed by eclampsia in 12.5% [5, 6]. On the other hand, other causes of maternal death were infection (sepsis) by 10.7%, then abortion and embolism by 7.9%. The rest are of unknown reasons [7]. We handled incorrect and on-time maternal deaths caused by obstetric complications. About 15% of pregnancies/deliveries have difficulties; they have required quality service readiness at all times. Quick access to quality emergency services is needed, as some complications require emergency care within hours, especially in hospitals, to get complete delivery services [5, 6]. Delay in assisting can cause maternal death. A previous study found at least three delays to cause maternal death: late in making decisions, late arrival at the referral place, and late getting help at the referral place [8].

Several lessons inform caused delays in delivery assistance in eastern Indonesia by access to health facilities and costs incurred during childbirth [9, 10]. Moreover, in the territory of Indonesia, the distribution of hospitals in each region is imbalanced. The disparity in hospital availability also affects the accessibility to delivery at the hospital [11, 12]. Besides, the cost is quite expensive to influence mothers to take advantage of hospital services, especially in Eastern Indonesia [10, 13].

One of the Indonesian government's policies is to achieve universal health coverage to overcome these conditions. The government does it through the National Health Insurance (NHI). NHI is a form of financial guarantee when the mother wants to give birth in the hospital. The NHI contributes by making it easier for them to access finance, reducing their labor burden [14–16]. Several studies have reported that the NHI can increase women's access to childbirth in the hospital [15, 17, 18]. This situation is the basis for knowing the importance of differences in health insurance ownership among women who give birth in eastern Indonesia hospitals. This study's results are significant for

policymakers to encourage policies that focus on increasing deliveries to hospitals. This study aimed to analyze health insurance ownership disparities in hospital delivery in Eastern Indonesia based on the background description.

## Materials and methods

### Data source

The author conduct study using secondary data from Indonesian Demographic and Health Survey (IDHS) in 2017. The IDHS was part of the international Demographic and Health Survey (DHS) program conducted by the Inner City Fund (ICF). The IDHS was a cross-sectional survey. The study population was women aged 15–49 years old who had given birth in the last five years in Eastern Indonesia. The study covered all provinces in Eastern Indonesia, namely East Nusa Tenggara, Maluku, North Maluku, West Papua, and Papua [19]. The study takes samples through stratification and multistage random sampling methods. By the procedure, the study employs a weighted sample size of 2299 respondents.

### Outcome variable

The study defines hospital-based birth delivery as a delivery carried out in hospitals, government, and private hospitals. Hospital-based birth consists of two categories: no and yes.

### Exposure variables

Health insurance ownership was the respondent's recognition of owned insurance, whether run by the government or the private sector. Health insurance ownership consists of two categories, namely uninsured and insured.

### Control variables

Apart from health insurance ownership, other variables analyzed as control variables were province, residence type, age group, marital status, education level, employment status, parity, and wealth status. The study selected control variables based on previous studies on the same theme [20–22].

The provinces consist of East Nusa Tenggara, Maluku, North Maluku, West Papua, and Papua. Meanwhile, the residence type consists of two categories, namely urban and rural. This categorization refers to Statistics Indonesia. The age group consists of seven classes in 5 years, namely 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, and 45–49. Marital status consists of three categories: never in a union, married/living with a partner, and widowed/divorced. Education level was the respondent's recognition of the last diploma they have. Meanwhile, education level consists of four categories: no education, primary, secondary, and higher. Parity was the number

of living children that have been born. Parity consists of three types, namely primiparous ( $\leq 1$ ), multiparous [2–4], and grand multiparous ( $> 4$ ) [23].

The IDHS calculated wealth status based on the wealth quintile owned by a household. Households were scored based on the numbers and types of items they had, from televisions to bicycles or cars, and housing characteristics, such as drinking water sources, toilet facilities, and primary building materials for the house's floor. The IDHS calculated the score using principal component analysis. National wealth quintiles were arranged based on household scores for each person in the household and divided by the distribution into the same five categories, accounting for 20% of the population. Wealth status consists of five classes: the poorest, poorer, middle, richer, and the richest [24].

### Statistical analysis

The initial stage analysis used chi-square to analyze the disparity characteristics of health insurance ownership and other variables. In the final stage, because of the dependent variable's nature, binary logistic regression was used to determine health insurance ownership disparities and determine the adjusted odds ratio (AOR) with a 95% confidence interval (CI). The binary logistic regression used "hospital delivery = no" as references. The authors carry out all stages of statistical analysis using SPSS 21.

### Ethical approval

The 2017 IDHS has obtained ethical clearance from the National Ethics Committee in Indonesia. The authors deleted all the respondents' identities from the dataset. Respondents have provided written approval for their involvement in the study. The researcher has obtained permission to use the 2017 IDHS data through the website: <https://dhsprogram.com> for this study.

### Results

The analysis results found that, on average, women in Eastern Indonesia in 2017 made hospital deliveries of 28.5%. Meanwhile, the average health insurance ownership in Eastern Indonesia in 2017 was 61.5%.

### Descriptive analysis

Table 1 displays descriptive statistics of health insurance ownership of respondents in Eastern Indonesia. Based on a hospital delivery, it shows that uninsured women rule both categories of hospital delivery. Based on the province, uninsured women occupy all regions. Meanwhile, based on the type of place of residence, uninsured women also dominate in both areas, with a more significant proportion of uninsured in rural areas.

According to the age group, uninsured women led in all age groups categories. Based on marital status, uninsured women ruled all types. Moreover, uninsured women occupied all classes based on education level, except for the higher education group, which insured women dominated.

Table 1 shows that the uninsured women prevalence in all employment status categories. Meanwhile, based on parity, uninsured women rule in all parity types. Finally, based on wealth status, the uninsured women ruled in the poorest and poorer categories; on the other hand, the insured women led in the middle, richer, and the richest categories.

### Multivariable analysis

Table 2 shows that insured women are 1.426 times more likely than uninsured women to have hospital delivery (AOR 1.426; 95% CI 1.426–1.427). This analysis indicates that having health insurance will be more likely to have birth delivery in the hospital in eastern Indonesia for hospital delivery. There is still a disparity between insured and uninsured women in hospital-based birth deliveries in the east of Indonesia. Insured women are nearly one and a half times more likely than uninsured women to give birth in a hospital.

The adjusted odds ratios for the health insurance ownership variable are smaller than the unadjusted odds ratios. The value of unadjusted odds ratios is 2.013 (OR 2.013; 95% CI 1.652–2.453).

Apart from health insurance ownership, all other independent variables analyzed were significant determinants of hospital delivery in Eastern Indonesia. According to the province, women in Maluku and North Maluku are less likely than women in East Nusa Tenggara to carry out hospital delivery. Meanwhile, West Papua and Papua women have a higher probability than women in East Nusa Tenggara for hospital delivery.

Based on the age group, women in 20–24, 25–29, and 30–34 age groups were less likely than women in the 15–19 age group to have hospital delivery. Meanwhile, women in the 35–39, 40–44, and 45–49 age groups had a higher chance than women in the 15–19 age group to have hospital delivery.

Married/living with partner women were 1.342 times more likely than never in union women to undertake hospital delivery (AOR 1.342; 95% CI 1.340–1.344). Moreover, widowed/divorced women were 0.690 times less likely than never in union women to do hospital delivery (AOR 0.690; 95% CI 0.688–0.691).

Women with primary education are 3.379 times more likely than no educated women to have hospital delivery (AOR 3.379; 95% CI 3.375–3.383). Women with secondary education have a 5.175 times chance of education for hospital delivery (AOR 5.175; 95% CI 5.169–5.182).

**Table 1** Descriptive statistics of health insurance ownership of respondents in Eastern Indonesia in 2017 ( $n = 2299$ )

Variables	Health Insurance Ownership				p-value
	Uninsured		Insured		
	n	%	n	%	
Hospital delivery					< 0.001
No	707	79.8%	179	20.2%	
Yes	936	66.2%	477	33.8%	
Province					< 0.001
East Nusa Tenggara	601	71.6%	238	28.4%	
Maluku	480	72.9%	178	27.1%	
North Maluku	292	79.1%	77	20.9%	
West Papua	111	57.5%	82	42.5%	
Papua	159	66.3%	81	33.8%	
Type of place of residence					< 0.001
Urban	332	51.6%	312	48.4%	
Rural	1311	79.2%	344	20.8%	
Age group					< 0.001
15–19	62	71.3%	25	28.7%	
20–24	285	77.9%	81	22.1%	
25–29	409	74.2%	142	25.8%	
30–34	418	71.3%	168	28.7%	
35–39	296	67.1%	145	32.9%	
40–44	128	62.4%	77	37.6%	
45–49	45	71.4%	18	28.6%	
Marital status					< 0.001
Never in union	20	74.1%	7	25.9%	
Married/Living with partner	1553	71.2%	629	28.8%	
Widowed/Divorced	70	77.8%	20	22.2%	
Education Level					< 0.001
No education	72	87.8%	10	12.2%	
Primary	526	82.4%	112	17.6%	
Secondary	836	72.3%	320	27.7%	
Higher	209	49.4%	214	50.6%	
Employment status					< 0.001
Unemployed	816	73.0%	302	27.0%	
Employed	827	70.0%	354	30.0%	
Parity					< 0.001
Primiparous	391	64.1%	219	35.9%	
Multiparous	943	73.3%	343	26.7%	
Grandmultiparous	309	76.7%	94	23.3%	
Wealth status					< 0.001
Poorest	1204	81.9%	266	18.1%	
Poorer	237	62.7%	141	37.3%	
Middle	95	47.0%	107	53.0%	
Richer	80	48.8%	84	51.2%	
Richest	27	31.8%	58	68.2%	

**Table 2** The results of binary logistic regression of hospital delivery in Eastern Indonesia in 2017 ( $n = 2299$ )

Variables	Hospital Delivery			
	p-value	AOR	95% CI Lower Bound	Upper Bound
Health insurance: No	–	–	–	–
Health insurance: Yes	< 0.001	1.426	1.426	1.427
Province: East Nusa Tenggara	–	–	–	–
Province: Maluku	< 0.001	0.477	0.476	0.477
Province: North Maluku	< 0.001	0.443	0.443	0.443
Province: West Papua	< 0.001	1.068	1.067	1.068
Province: Papua	< 0.001	1.208	1.207	1.208
Type of place: Urban	–	–	–	–
Type of place: Rural	< 0.001	0.376	0.375	0.376
Age group: 15–19	–	–	–	–
Age group: 20–24	< 0.001	0.581	0.580	0.581
Age group: 25–29	< 0.001	0.640	0.640	0.641
Age group: 30–34	< 0.001	0.934	0.933	0.935
Age group: 35–39	< 0.001	1.404	1.403	1.406
Age group: 40–44	< 0.001	2.555	2.552	2.558
Age group: 45–49	< 0.001	2.356	2.352	2.359
Marital: Never in union	–	–	–	–
Marital: Married/Living with partner	< 0.001	1.342	1.340	1.344
Marital: Widowed/Divorced	< 0.001	0.690	0.688	0.691
Education: No education	–	–	–	–
Education: Primary	< 0.001	3.379	3.375	3.383
Education: Secondary	< 0.001	5.175	5.169	5.182
Education: Higher	< 0.001	10.225	10.212	10.238
Employment: Unemployed	–	–	–	–
Employment: Employed	< 0.001	0.954	0.954	0.955
Parity: Primiparous	–	–	–	–
Parity: Multiparous	< 0.001	0.610	0.610	0.610
Parity: Grandmultiparous	< 0.001	0.462	0.462	0.462
Wealth: Poorest	–	–	–	–
Wealth: Poorer	< 0.001	1.642	1.641	1.642
Wealth: Middle	< 0.001	2.208	2.207	2.210
Wealth: Richer	< 0.001	1.944	1.942	1.945
Wealth: Richest	< 0.001	1.626	1.624	1.627

Note: 95% CI; AOR adjusted odds ratio

Finally, women with higher education are 10.225 times more likely than no education women to undertake hospital delivery (AOR 10.225; 95% CI 10.212–10.238). This analysis shows that the better the education level, the more likely it is for women in Eastern Indonesia to make hospital delivery.

Employed women were 0.954 times less likely than unemployed women for hospital delivery (AOR 0.954; 95% CI 0.954–0.955). This information shows that

unemployment is a protective factor for women in Eastern Indonesia to do hospital delivery.

According to parity, multiparous women are 0.610 times more likely than women who do not have children or have one child to undertake hospital delivery (AOR 0.610; 95% CI 0.610–0.610). Meanwhile, grand multiparous women were 0.462 times less likely than women who do not have children or have one child to undertake hospital delivery (AOR 0.462; 95% CI 0.462–0.462).



These multivariate test results inform that the more children who have been born, the less likely it is for women in Eastern Indonesia to have hospital delivery.

Table 2 informs that according to wealth status, women in a more deficient category were 1.642 times more likely than the poorest women to do hospital delivery (AOR 1.642; 95% CI 1.641–1.642). Women in the middle category were 2.208 times more likely than the poorest women for hospital delivery (AOR 2.208; 95% CI 2.207–2.210). The richer category women were 1.944 times more likely than the poorest women to do hospital delivery (AOR 1.944; 95% CI 1.942–1.945). Finally, women in the wealthiest category are 1.626 times more likely than the poorest women to do hospital delivery (AOR 1.626; 95% CI 1.624–1.627). This information shows that all wealth status categories have a higher probability of making hospital delivery than the poorest.

## Discussion

The analysis found that having health insurance will be more likely to have birth delivery in the hospital in Eastern Indonesia to carry out hospital delivery. This analysis results in line with the objectives of Indonesia's health financing policies that seek to realize National Health Insurance (NHI) with total coverage to minimize the barrier to health financing in Indonesia [15, 25]. This study's results align with several previous studies on health insurance in various countries [26–28].

The results of this study provide a clear policy direction. The Indonesian government can push for policies that focus on increasing public participation in National Health Insurance to increase childbirth in eastern Indonesia. The Indonesian government can also optimize local governments' role, for example, by conducting cost-sharing assistance for National Health Insurance contributions for poor people [25].

For eastern Indonesia, having health insurance is not enough because it will only cover service costs. Meanwhile, east Indonesia has extreme geographical characteristics, including archipelagic topography, making transportation costs expensive [10, 11, 29]. These characteristics often make health development in this region lag behind other Indonesian areas [30, 31]. Other policy interventions are still needed to complement the National Health Insurance policy.

In addition to health insurance ownership as exposure, this study also finds control variables as factors that also affect hospital delivery in eastern Indonesia. The study results inform that there are still disparities in hospital utilization between regions (provinces) for delivery. The information on this study's results is consistent with previous studies that inform that this disparity starts from an unbalanced input of health resources [32, 33]. On the other hand, the Papua Health Insurance, initiated by the

local governments in West Papua and Papua, has proven to encourage hospital delivery [10]. West Papua and Papua Provinces have better utilization of hospital delivery services than other provinces in Eastern Indonesia.

The research analysis found that the age group is one of the determinants of women in Eastern Indonesia for hospital delivery. The older a woman is, the higher the chances of having her delivered to the hospital. Perhaps this is related to self-confidence because of previous experience or because pregnant women are increasingly aware of pregnancy and childbirth as they age [34]. Other authors also found age as a factor related to hospital delivery. The authors conduct the study in 34 countries in sub-Saharan Africa [35].

The multivariate analysis results found that having a partner (married/living with a partner) will be more likely for women in Eastern Indonesia to undertake hospital delivery. Psychologically, having a partner makes a woman have a place to share the burden, including the burden of financing related to childbirth costs [36]. Moreover, several previous studies have also found husbands' involvement has increased health services utilization [37, 38]. In the Indonesian context, this condition follows local values and local culture, which views a pregnant woman without a partner as a disgrace [39, 40], so pregnant women without a partner tend to hide their pregnancy and childbirth.

The study found education will be more likely to give birth for women in Eastern Indonesia to undertake hospital delivery. The better the level of education, the higher the possibility of women in Eastern Indonesia launching hospital delivery. The higher the woman's education, the more independent she is in determining what is best [41]. This finding is in line with the results of previous studies in Bangladesh and Ethiopia [42, 43]. Generally, several lessons that inform better education levels are a strong determinant of better health output [19, 44, 45]. Otherwise, poor education is known as a barrier to achieving better health output [16, 46].

The study found unemployed will be more likely to have a birth for women in Eastern Indonesia to conduct hospital delivery. It is possible that this situation can occur because unemployed women have a better time to prepare for delivery, including better choices of places for delivery. This study's results align with previous studies in Indonesia that analyzed IDHS data in 2013 [47].

According to parity, the results found that the more children who have been born, the less likely women in Eastern Indonesia are to have hospital delivery. Women in Eastern Indonesia with higher parity are likely to be more confident about delivering at a facility other than a hospital. Previous birth experiences also influence the choice of place of delivery [35]. An earlier study in Southern Ethiopia also confirmed similar findings [43].

According to wealth status, the study found that all wealth status categories have a higher probability than the poorest to make hospital delivery. In other words, poverty is a barrier for women in Eastern Indonesia to undertake hospital delivery. This situation is what the government wants to overcome, removing the public's financing barrier to access health services by releasing the NHI policy [25]. Several previous studies confirmed wealth status as a strong predictor of better health performance [24, 48–50].

### Study limitation

This study carries out limitations as a consequence of the use of secondary data received. Studies analyze superficial data. The study does not consider cultural factors and beliefs known in previous studies to influence women's choice to deliver in the hospital or not [51–53]. On the other hand, the 2017 IDHS is a cross-sectional survey, and hence the findings drawn are not causal.

### Conclusions

The authors concluded that health insurance ownership disparities for hospital deliveries in Eastern Indonesia were based on the study results. Insured women have a better chance than uninsured women for hospital delivery.

The implication of this study's results is related to the health financing policy carried out by the Indonesian government through a social insurance mechanism called National Health Insurance. If the government wants to encourage deliveries to hospitals, the government must formulate policies to increase Eastern Indonesia's community participation in National Health Insurance.

### Acknowledgments

The author would like to thank ICF International for agreeing to allow this paper to review the 2017 IDHS data.

### Authors' contributions

ADL developed the proposal, analyzed and interpreted the patient data. RDW was a significant contributor in conducting the study, interpreting the data, and writing the manuscript. ZZ and NN were substantial contributors to research, analyzing the data, and writing the manuscript. All authors read and approved the final manuscript.

### Funding

Not applicable.

### Availability of data and materials

The authors cannot share data because a third party and authors who own the data do not have permission to share it. The 2017 IDHS data set name requested from the ICF ('data set of childbearing age women') are available from the ICF contact via <https://www.dhsprogram.com> for researchers who meet the criteria for access to confidential data.

### Declarations

#### Ethics approval and consent to participate

The 2017 IDHS has passed ethical clearance from the National Ethics Committee. The research deletes respondents' identities from the dataset. Respondents have provided written approval for their involvement in the study. The author has obtained permission for the use of data for this study through the website: <https://dhsprogram.com>.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare that they have no competing interests.

#### Author details

<sup>1</sup>National Institute of Health Research and Development, the Ministry of Health of the Republic of Indonesia, Jakarta, Indonesia. <sup>2</sup>Persakmi Institute, Surabaya, Indonesia. <sup>3</sup>Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia. <sup>4</sup>Faculty of Psychology and Health, UIN Sunan Ampel, Surabaya, Indonesia. <sup>5</sup>STIKes Tengku Maharatu Tengku Maharatu, Pekanbaru, Indonesia.

Received: 1 February 2021 Accepted: 28 October 2021

Published online: 22 November 2021

### References

- World Health Organization. Maternal mortality : level and trends 2000 to 2017. *Sex Reprod Health*. 2019;12.
- Barredo L, Agyepong I, Liu G, Reddy S. Ensure healthy lives and promote well-being for all at all ages. *UN Chron*. 2015;51(4):9–10. <https://doi.org/10.8356/3bfe3cfa-en>.
- Ministry of Health of The Republic of Indonesia. Indonesia Health Data and Information: The Indonesia Health Profile. 8, Profil Kesehatan Indonesia. Jakarta; 2020. Available from <https://www.kemkes.go.id/downloads/resources/download/pusdatin/profil-kesehatanindonesia/Profil-Kesehatan-Indonesia-Tahun-2020.pdf>
- WHO, UNICEF, UNFPA WBG and, Division the UNP. Trends in Maternal Mortality 2000–2017. World Health Organization Geneva; 2019. Available from: [www.who.int/reproductivehealth/publications/maternal-mortality-2017/en/](http://www.who.int/reproductivehealth/publications/maternal-mortality-2017/en/)
- Mbachu II, Ezeama C, Osuagwu K, Umeononihu OS, Obiannika C, Ezeama N. A cross sectional study of maternal near miss and mortality at a rural tertiary centre in southern nigeria. *BMC Pregnancy Childbirth*. 2017;17(1):251.
- Afifah T, Tejayanti T, Saptarini I, Rizkianti A, Usman Y, Senewe FP, et al. Maternal death in Indonesia: follow-up study of the 2010 Indonesia population census. *Indones J Reprod Heal*. 2016;7(1):1–13. <https://doi.org/10.22435/kespro.v7i1.51021-13>.
- Say L, Chou D, Gemmill A, Tunçalp Ö, Moller ABA-BB, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health*. 2015;2(6):e323–33. [https://doi.org/10.1016/S2214-109X\(14\)70227-X](https://doi.org/10.1016/S2214-109X(14)70227-X).
- Masturoh M, Pamuji SE, Siswati S. Path analysis: three late causes of maternal death in Brebes district (path analysis: tiga keterlambatan penyebab kematian maternal di kabupaten brebes). *Pena Med*. 2018;8(1):1–8.
- Pardosi J, Parr N, Muhidin S. Local Government and Community Leaders' perspectives on Child Health and Mortality and Inequity Issues in Rural Eastern Indonesia. *J Biosoc Sci*. 2017;49(1):123.
- Laksono AD, Wulandari RD. Predictors of hospital utilization among Papuans in Indonesia. *Indian J Forensic Med Toxicol*. 2020;14(2):2319–24.
- Laksono AD, Wulandari RD, Soedirham O. Regional Disparities of Health Center Utilization in Rural Indonesia. *Malaysian J Public Health Med*. 2019;19(1):158–66.
- Mubasyiroh R, Nurhotimah E, Laksono AD. Health Service Accessibility Index in Indonesia (Indeks Aksesibilitas Pelayanan Kesehatan di Indonesia). In: Supriyanto S, Chalidyanto D, Wulandari RD, editors. *Accessibility of health Services in Indonesia (Aksesibilitas Pelayanan Kesehatan di Indonesia)*. Jogjakarta: PT Kanisius; 2016. p. 21–58.
- Mawarti Y, Utarini A, Hakimi M. Maternal care quality in near miss and maternal mortality in an academic public tertiary hospital in Yogyakarta,

- Indonesia: A retrospective cohort study. *BMC Pregnancy Childbirth*. 2017; 17(1):149.
14. Aizawa T. The impact of health insurance on out-of-pocket expenditure on delivery in Indonesia. *Health Care Women Int*. 2019;40(12):1374–95. <https://doi.org/10.1080/07399332.2019.1578778>.
  15. Wulandari RD, Laksono AD, Matahari R. The effects of health insurance on maternity Care in Health Services in Indonesia. *Int J Innov Creat Chang*. 2020;14(2):478–97.
  16. Laksono AD, Wulandari RD. The Barrier to Maternity Care in Rural Indonesia. *J Public Heal From Theory to Pract*. 2020; Online First. <https://doi.org/10.1007/s10389-020-01274-3>
  17. Sari B, Idris H. Determinant of independent national health insurance ownership in Indonesia. *Malays J Public Heal Med*. 2019;19(2):109–15. <https://doi.org/10.37268/mjphm.vol.19.no.2.art.177>.
  18. Nasution SK, Mahendradhata Y, Trisnantoro L. Can a National Health Insurance Policy Increase Equity in the utilization of skilled birth attendants in Indonesia? A secondary analysis of the 2012 to 2016 National Socio-Economic Survey of Indonesia. *Asia Pac J Public Health*. 2020;32(1):19–26. <https://doi.org/10.1177/1010539519892394>.
  19. Ipa M, Widawati M, Laksono AD, Kusriani I, Dhewantara PW. Variation of preventive practices and its association with malaria infection in eastern Indonesia: findings from community-based survey. *PLoS One*. 2020;15(5):e0232909. <https://doi.org/10.1371/journal.pone.0232909>.
  20. Laksono AD, Wulandari RD, Rukmini R. The determinant of healthcare childbirth among young people in Indonesia. *J Public Health Res*. 2021; 10(1):28–34. <https://doi.org/10.4081/jphr.2021.1890>.
  21. Efendi F, Aidah FN, Has EMM, Lindayani L, Reisenhofer S, Ni'Mah AR, et al. Determinants of facility-based childbirth in Indonesia. *Sci World J*. 2019; 9694602.
  22. Adde KS, Dickson KS, Amu H. Prevalence and determinants of the place of delivery among reproductive age women in sub-Saharan Africa. *PLoS One*. 2020;15(12 December):1–14.
  23. Wulandari RD, Laksono AD. Is parity a predictor of neonatal death in Indonesia? Analysis of the 2017 Indonesia demographic and health survey. *Indian J Forensic Med Toxicol*. 2020;14(3):2161–6.
  24. Wulandari RD, Qomarrudin MB, Supriyanto S, Laksono AD. Socioeconomic disparities in hospital utilization among elderly people in Indonesia. *Indian J Public Health Res Dev*. 2019;10(11):1800–4.
  25. Anindya K, Lee JT, McPake B, Wilopo SA, Millett C, Carvalho N. Impact of Indonesia's national health insurance scheme on inequality in access to maternal health services: a propensity score matched analysis. *J Glob Health*. 2020;10(1):1–12. <https://doi.org/10.7189/jogh.10.010429>.
  26. Zhang F, Shi X, Zhou Y. The impact of health insurance on healthcare utilization by migrant workers in China. *Int J Environ Res Public Health*. 2020;17(6):1852.
  27. Sisira Kumara A, Samaratunge R. Health insurance ownership and its impact on healthcare utilization: evidence from an emerging market economy with a free healthcare policy. *Int J Soc Econ*. 2019;47(2):244–67. <https://doi.org/10.1108/IJSE-05-2019-0333>.
  28. Miraldo M, Propper C, Williams RL. The impact of publicly subsidised health insurance on access, behavioural risk factors and disease management. *Soc Sci Med*. 2018;217:135–51. <https://doi.org/10.1016/j.socscimed.2018.09.028>.
  29. Laksono AD, Rukmini R, Wulandari RD. Regional disparities in antenatal care utilization in Indonesia. *PLoS One*. 2020;15(2):e0224006. <https://doi.org/10.1371/journal.pone.0224006>.
  30. Ipa M, Laksono ADAD, Astuti EPEP, Prasetyowati H, Hakim L. Predictors of malaria incidence in rural eastern Indonesia. *Indian J Forensic Med Toxicol*. 2020;14(4):2994–3000.
  31. Suparmi, Kusumawardani N, Nambiar D, Trihono, Hosseinpoor AR. Subnational regional inequality in the public health development index in Indonesia. *Glob Health Action*. 2018;11(1):41–53.
  32. Pratiwi NL, Suprpto A, Laksono AD, Rooshermiati B, Rukmini PG, et al. Policy review on the distribution of health operational assistance funds in support of achieving maternal and child health (MDG's 4,5) in three districts, cities in East Java Province. *Bul Penelit Sist Kesehat*. 2014;17(4): 395–405.
  33. Laksono AD, Ridlo IA. Ernawaty. Distribution Analysis of Doctors in Indonesia. 2019;2019 Available from: <https://doi.org/10.31227/osfio/df6ns>.
  34. Wulandari RD, Laksono AD. Determinants of knowledge of pregnancy danger signs in Indonesia. *PLoS One*. 2020;15(5):e0232550. <https://doi.org/10.1371/journal.pone.0232550>
  35. Dunlop CL, Benova L, Campbell O. Effect of maternal age on facility-based delivery: Analysis of first-order births in 34 countries of sub-Saharan Africa using demographic and health survey data. *BMJ Open*. 2018;8(4):e020231.
  36. Wai KM, Shibanuma A, Oo NN, Fillman TJ, Saw YM, Jimba M. Are husbands involving in their spouses' utilization of maternal care services?: A cross-sectional study in Yangon, Myanmar. *PLoS One*. 2015;10(12):e0144135.
  37. Maken ZHH, Nasir Idrees I, Zahid A, Zulfiqar A, Munib A, Hassan F, et al. Factors influencing father's antenatal and perinatal involvement in maternal health care. *J Matern Neonatal Med*. 2018;31(19):2569–75. <https://doi.org/10.1080/14767058.2017.1347920>.
  38. Sakuma S, Yasuoka J, Phongluxa K, Jimba M. Determinants of continuum of care for maternal, newborn, and child health services in rural Khammouane, Lao PDR. *PLoS One*. 2019;14(4):e0215635.
  39. Himawan KK. Singleness, sex, and spirituality: how religion affects the experience of being single in Indonesia. *Ment Health Relig Cult*. 2020;23(2): 1–12. <https://doi.org/10.1080/13674676.2020.1767555>.
  40. Himawan KK, Bambling M, Edirippulige S. What Does It Mean to Be Single in Indonesia? Religiosity, Social Stigma, and Marital Status Among Never-Married Indonesian Adults. *SAGE Open*. 2018;8(3).
  41. Himawan KK, Bambling M, Edirippulige S. Modernization and singlehood in Indonesia: Psychological and social impacts. In: *Kasetsart Journal of Social Sciences*. Kasetsart University Research and Development Institute, vol. 40; 2019. p. 499–506.
  42. Shahabuddin ASM, Delvaux T, Utz B, Bardaji A, De Brouwere V. Determinants and trends in health facility-based deliveries and caesarean sections among married adolescent girls in Bangladesh. *BMJ Open*. 2016; 6(9):e012424.
  43. Asseffa NA, Bukola F, Ayodele A. Determinants of use of health facility for childbirth in rural Hadiya zone, Southern Ethiopia. *BMC Pregnancy Childbirth*. 2016;16(1):355.
  44. Wulandari RD, Laksono AD. Education as predictor of the knowledge of pregnancy danger signs in rural Indonesia. *Int J Innov Creat Chang*. 2020; 13(1):1037–51.
  45. Megatsari H, Laksono AD, Ibad M, Herwanto YT, Sarweni KP, Geno RAP, et al. The community psychosocial burden during the COVID-19 pandemic in Indonesia. *Heliyon*. 2020;6(10):e05136.
  46. Rohmah N, Yusuf A, Hargono R, Laksono AD, Ibrahim I, et al. Determinants of teenage pregnancy in Indonesia. *Indian J Forensic Med Toxicol*. 2020; 14(3):2080–5.
  47. Efendi F, Ni'Mah AR, Hadisyatmana S, Kuswanto H, Lindayani L, Berliana SM. Determinants of facility-based childbirth in Indonesia. *Sci World J*. 2019;1–7. <https://doi.org/10.1155/2019/9694602>.
  48. Ogundele OJ, Pavlova M, Groot W. Socioeconomic inequalities in reproductive health care services across Sub-Saharan Africa. A systematic review and meta-analysis. *Sex Reprod Healthc*. 2020;25(2020):100536.
  49. Yaya S, Da F, Wang R, Tang S, Ghose B. Maternal healthcare insurance ownership and service utilisation in Ghana: analysis of Ghana demographic and health survey. *PLoS One*. 2019;14(4):1–13. <https://doi.org/10.1371/journal.pone.0214841>.
  50. Yuan Y, Louis C, Cabral H, Schneider JC, Ryan CM, Kazis LE. Socioeconomic and Geographic Disparities in Accessing Nursing Homes With High Star Ratings. *J Am Med Dir Assoc*. 2018;19(10):852–9. <https://doi.org/10.1016/j.jamda.2018.05.017>
  51. Mulondo SA. Factors associated with underutilisation of antenatal care services in Limpopo. *South Africa Br J Midwifery*. 2020;28(11):788–95. <https://doi.org/10.12968/bjom.2020.28.11.788>.
  52. Pratiwi NL, Fitrianti Y, Nuraini S, Rachmawati T, Laksono AD, Afreni M, et al. Concealed pregnant women or Kemel of Gayo ethnic in Blang Pegayon District, Gayo Lues District. *Aceh Bull Heal Syst Res*. 2019;22(2):81–90. <https://doi.org/10.22435/hsr.v22i2.1693>.
  53. Laksono AD, Soerachman R, Angkasawati TJ. Case Study of Muyu Ethnic's Maternal Health in Mindiptara District-Boven Digoel (Studi Kasus Kesehatan Maternal Suku Muyu di Distrik Mindiptana, Kabupaten Boven Digoel). *J Reprod Health*. 2016;07/03:145–55.

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.