# UNSAFE DISPOSAL OF CHILD FECES IN INDONESIA

## *Cara Pembuangan Tinja Balita Yang Tidak Aman di Indonesia*

Sri Irianti[1], Puguh Prasetyoputra[2]
[1]National Institute of Health Research and Development, Indonesian Ministry of Health
[2]Research Center for Population, Indonesian Institute of Sciences
Email: iriantis@gmail.com

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**ABSTRAK**

Studi terdahulu menunjukkan bahwa praktik pembuangan tinja balita yang tidak aman meningkatkan risiko penyakit diare, termasuk di Indonesia. Akibatnya, pemahaman faktor-faktor di balik praktik semacam itu sangat penting dalam menghentikan transmisi diare. Namun faktor-faktor yang terkait dengan praktik pembuangan tinja balita yang tidak aman di Indonesia belum dipahami dengan baik. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang terkait dengan praktik pembuangan tinja balita yang tidak aman di Indonesia. Penelitian ini menganalisis data dari Survei Demografi dan Kesehatan Indonesia (SDKI) 2012. Model regresi probit dibuat berdasarkan data dengan efek marjinal rerata (*Average Marginal Effect*) dan selang kepercayaan (SK) 95% sebagai besaran hubungan. Variabel penjelas dikategorikan menjadi tiga kategori yaitu variabel spasial, variabel lingkungan, dan variabel sosio-demografi. Penghapusan listwise menghasilkan sampel analitik akhir sebesar 16.368 anak balita yang tinggal dalam 13.685 rumah tangga. Hasil analisis menunjukkan bahwa prevalensi pembuangan tinja balita yang tidak aman adalah sebesar 42,63% (SK 95%: 41,87-43,38). Tinggal di daerah perkotaan, tingkat pendidikan ibu yang lebih rendah, tidak memiliki fasilitas mencuci tangan yang tepat, usia anak yang lebih tua, dan tidak memiliki fasilitas sanitasi yang lebih layak merupakan variabel-variabel yang secara signifikan berhubungan dengan kemungkinan praktik pembuangan tinja balita yang tidak aman.

**Kata kunci**: Pembuangan tinja bayi, pendidikan ibu, sanitasi, cuci tangan, Indonesia

***ABSTRACT***

*Previous studies show that unsafe disposal practices of child feces increase the risk of diarrhoeal diseases among children including in Indonesia. Consequently, a comprehension of the factors behind such practices is pivotal in halting the transmission of diarrhea. However, the factors associated with unsafe disposal practices of child stool in Indonesia are not yet well understood. This study investigated the factors associated with unsafe child feces disposal practices in Indonesia. Data from the Indonesia Demographic and Health Survey (IDHS) 2012 were analyzed. Probit regression models were fitted to the data with average marginal effect (AME) and its 95 % confidence interval (CI) as the measure of association. The explanatory variables were categorized into three categories: spatial variables, environmental variables, and socio-demographic variables. Listwise deletion was performed which resulted in a final analytic sample of 16,368 under-5 children residing in 13,685 households. It is observed that the prevalence of unsafe child feces disposal was 42.63% (95% CI: 41.87-43.38). Living in urban areas, lower levels of maternal education, not having a proper handwashing facility, older child age, and not having improved sanitation facility were the variables found to be associated with higher probability of unsafe child feces disposal practices*.

**Keywords:** *Child feces disposal; maternal education; sanitation; handwashing, Indonesia*

## INTRODUCTION

The Sustainable Development Goal (SDG) target 6.2 aims at ending open defecation by improving access to and equity of sanitation and hygiene, with particular reference to the needs of women and girls and those in vulnerable situations (WHO/UNICEF JMP, 2017). However, in 2015, it was estimated that 2.3 billion people globally still lacked basic sanitation service (WHO/UNICEF JMP, 2017). It is known that inadequate water supply and poor sanitation are attributable to morbidity and mortality particularly among children (Ezeh, Agho, Dibley, Hall, & Page, 2014). In 2012, more

than 300,000 under-5 deaths could have been prevented through improvements in water and sanitation in low- and middle-income countries (Prüss-Ustün et al., 2014).

In many different cultures, caretakers commonly believe that children feces are not harmful (Almedom, 2007; Rauyajin et al., 1994; WHO/UNICEF JMP, 2006; Zeitlyn & Islam, 1991), and thus they often do not wash their hands after cleaning their children (Jinadu, Esmai, & Adegbenro, 2004). However, this notion need not be accurate as there is evidence that suggests children's feces could pose a higher risk than those of adults as it contains more pathogens that can cause diarrhea (Feachem, Bradley, Garelick, & Mara, 1983). Therefore, unsafe disposal of children feces could emanate higher diarrhoeal risk, which is supported by a study done by Aulia et al. (1994) where they found that Indonesian children whose stools are disposed of in the open were more prone to contracting diarrhea. A more recent study by Cronin, Sebayang, Torlesse, and Nandy (2016) also found that children in Indonesia had elevated the risk of diarrhea when their feces are not disposed of safely. Despite this evidence, according to the 2012 Indonesia Demographic and Health Survey (IDHS), one in three children (35 percent) were reported to have their feces disposed of unsafely (Statistics Indonesia, Indonesia National Population and Family Planning Board, Ministry of Health-Republic of Indonesia, & ICF International, 2013). In fact, this figure has increased from 29 percent in 2007 based on the 2007 IDHS (Statistics Indonesia, Indonesia National Family Planning Coordinating Board, Ministry of Health-Republic of Indonesia, & Macro International, 2008). This increase albeit small should not be overlooked.

The Government of Indonesia (GoI) targets universal coverage of improved sanitation by 2019. The management of feces passed by children need not be safe even in households with access to improved sanitation facility (Majorin et al., 2014). However, the indicators used are usually from household level indicators which often disregards sanitation of children under-five years of age. More evidence is needed to support the GoI in formulating and implementing relevant policies to reduce unsafe disposal practice of children feces. However, the drivers of safe child feces disposal practices in Indonesia are not yet well understood. Therefore, this study is aimed at investigating the factors associated with unsafe disposal of children feces in Indonesia.

## MATERIALS AND METHOD

### Data Source

This study was a further analysis of secondary data of a population-based cross-sectional survey of the 2012 Indonesia Demographic and Health Survey (henceforth the 2012 IDHS). The 2012 IDHS is the seventh IDHS aimed at providing information on fertility, family planning, and maternal and child health (Statistics Indonesia et al., 2013). For this study, two recodes were used, the Household Recode (HR) and the Children's Recode. More detailed information about the sampling method and procedures of IDHS and fieldwork team can be read elsewhere (Statistics Indonesia et al., 2013).

### Dependent Variable

The only dependent variable in this study was unsafe child feces disposal practice. Child feces disposal practice was administered in the 2012 IDHS by asking *"The last time (NAME) passed stools, what was done to dispose of the stools?"* The possible responses comprise: (1) use toilet or latrine, (2) throw in the toilet or latrine, (3) throw outside the dwelling, (4) bury in the yard, (5) rinse away, (6) not disposed of, and (7) other. This variable was then recoded into a dichotomous variable, coded as 0 for "safe" and coded as 1 for "unsafe" based on the definition from the World Health Organisation (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Program (JMP) for water supply and sanitation (see Table 1). The safe practice of child feces disposal includes "use toilet or latrine," "throw in the toilet or latrine," and "bury in the yard" (WHO/UNICEF JMP, 2006).

Table 1. Classification of safe and unsafe child feces disposal practices

| Sanitary Child Feces Disposal Practices | Unsanitary Child Feces Disposal Practices |
|---|---|
| Child used toilet or latrine | Put/rinsed feces into drain or ditch |
| Put/rinsed feces into the toilet or latrine | Fecesthrown into the garbage |
| Buried the feces | Feces left or buried in the open |
| | Do not know |

Source: WHO/UNICEF JMP (2006)

**Explanatory Variables**

In this study, 14 potential explanatory variables were included in the analysis. These variables were based on previous observational studies on child feces disposal practices in developing countries and other related topics (Azage & Haile, 2015; Bawankule, Singh, Kumar, & Pedgaonkar, 2017; Irianti & Prasetyoputra, 2015; Majorin et al., 2014; Prasetyoputra & Irianti, 2013). These variables were classified as environmental, spatial, and socio-demographic characteristics.

The environmental variables include drinking water source (piped, other improved, unimproved); location of drinking water source (in own dwelling, in own yard/plot, elsewhere); sanitation facility (improved, unimproved, no facility/open defecation); and presence of handwashing facility (no, yes). The classification of improved and unimproved drinking water source and sanitation facility also follows the definition from the WHO/UNICEF JMP for water supply and sanitation (WHO/UNICEF JMP, 2006). Improved drinking water sources include public tap/standpipe, tubewell/borehole, protected dug well, protected spring, and rainwater collection. While, unimproved drinking water sources include: unprotected dug well, unprotected spring, cart with small tank/drum, bottled water, tanker truck, and surface water. Moreover, improved sanitation facilities include flush/pour flush (to a piped sewer system, septic tank, pit latrine), VIP latrine, pit latrine with slab, composting toilet. While, unimproved sanitation facilities include: flush/pour flush to elsewhere, pit latrine without slab/open pit, bucket, and hanging toilet/hanging latrine.

Furthermore, the spatial variables considered in this study include the region of residence (Sumatra, Java, Bali & Nusa Tenggara, Kalimantan, Sulawesi, Maluku & Papua) and place of residence (rural area, urban area). While the socio-demographic variables comprise: age of child (<12 months, 12-23 months, 24-35 months, 36-47 months, 48-59 months); age of mother (15-24 years, 25-34 years, 35+ years); education of mother (no formal education, primary, secondary, higher education); number of under-five children (one, two, three or more); frequently read newspaper (no, yes); frequently listen to the radio (no, yes); frequently watch television (no, yes); and household wealth index (lowest, lower, middle, higher, highest). Frequently here means that the mothers were exposed to the media (i.e., newspaper, radio, and television) for at least once a week.

The 2012 IDHS household module data set already contains a set of wealth index scores which has also been categorized into quintiles. The scores were derived using principal component analysis (PCA) on a set of variables. The details of which can be found elsewhere (Filmer & Pritchett, 2001; Statistics Indonesia et al., 2013). However, two of the independent variables, namely drinking water source and sanitation facilities, are included in the 2012 IDHS wealth index. Therefore, to avoid redundancy in the analysis, a new set of wealth index scores were computed using polychoric PCA (Kolenikov & Angeles, 2009) with the two variables above excluded. The variables for the wealth index included: access to electricity, type of cooking fuel, material of floor, material of wall, material of roof, and ownership of assets (radio, television, refrigerator, bicycle, scooter, car, handphone, bank account, cart, motorboat, agriculture land, cattle/poultry, and canoe). The first three components of the polychoric PCA explained 58.04 percent of the variance.

### Sample Size

The sample for this study was the 18,021 children born during the five years preceding the survey (aged 0-59 months), which was obtained from the Children Recode data set. This dataset was cleaned for missing values which resulted in an analytical sample of 16,368 children in 13,685 households (90.83 percent of the initial sample).

### Ethics Statement

This study is a further analysis of a publicly accessible secondary data. The 2012 IDHS data were downloaded and analyzed after objective of the study was communicated and approved by the DHS Program. The DHS Program and Statistics Indonesia have removed any information that can be used to identify the respondents in the 2012 IDHS to preserve anonymity. Thus, no additional ethical review was sought.

### Econometric Analysis

Binary and Multivariable probit regression models were fitted to the data to assess the factors correlated with the unsafe practice of child feces disposal. A probit regression model was used in place of a logistic regression model as the latter may cause overestimation of the effect of the independent variables on the likelihood of the dependent variable (measured in odds ratios) due to the high proportion of the outcome (Sainani, 2011). Statistical significance was evaluated at the 5 percent level. Average marginal effect (AME) was chosen as the measure of association with a 95 percent confidence interval (Long & Freese, 2014). While goodness of fit was assessed using Tjur's coefficient of determination (Tjur, 2009) and the area under the receiver operating characteristics (ROC) curve (AUC) (Fawcett, 2006).

Moreover, sampling design and sampling weights were not incorporated in the econometric analysis as it is unnecessary for this study [for a good explanation on the use of sampling weights see Solon, Haider, and Wooldridge (2015)]. All of the econometric analyses were performed using Intercooled STATA version 13.1 (StataCorp, 2013).

## RESULTS

### Sample Characteristics

Table 2 presents the characteristics of the analytic sample comprising 16,368 children. The prevalence of unsafe disposal practice of child feces was found to be 42.63% (95% CI: 41.87-43.38). More than half of the children are living in households with unimproved sources, and also more than half are living in households with no closely located drinking water source. Almost 60% of the children reside in households with improved sanitation facility. More than 73% of them are living have access to handwashing facility at home. More than half of the children were from rural areas.

Table 2. Characteristics of the analytic sample (N = 16,368)

| Variables | Categories | % | VIF |
|---|---|---|---|
| Unsafe disposal practice of child feces | No (Ref.) | 57.37 | - |
| (dependent variable) | Yes | 42.63 | - |
| Drinking water source | Piped (Ref.) | 10.78 | - |
| | Other improved | 33.35 | 4.89 |
| | Unimproved | 55.87 | 10.60 |
| Location of drinking water source | In own dwelling (Ref) | 20.59 | - |
| | In own yard/plot | 22.42 | 2.66 |
| | Elsewhere | 56.99 | 7.61 |
| Sanitation facility | Improved (Ref.) | 57.51 | - |
| | Unimproved | 22.82 | 1.79 |
| | No facility/open defecation | 19.67 | 2.06 |

(con'd)

| Variables | Categories | % | VIF |
|---|---|---|---|
| Presence of handwashing facility | No | 26.48 | - |
| | Yes | 73.52 | 4.45 |
| Region | Sumatra (Ref.) | 29.87 | - |
| | Java | 22.62 | 1.88 |
| | Bali & Nusa Tenggara | 8.80 | 1.34 |
| | Kalimantan | 10.53 | 1.37 |
| | Sulawesi | 17.09 | 1.62 |
| | Maluku & Papua | 11.08 | 1.46 |
| Place of residence | Rural area (Ref.) | 54.38 | - |
| | Urban area | 45.62 | 2.50 |
| Age of child | <12 months (Ref.) | 20.91 | - |
| | 12-23 months | 20.27 | 1.95 |
| | 24-35 months | 19.65 | 1.94 |
| | 36-47 months | 19.35 | 1.95 |
| | 48-59 months | 19.82 | 2.01 |
| Age of mother | 15-24 years (Ref.) | 21.77 | - |
| | 25-34 years | 52.82 | 3.48 |
| | 35+ years | 25.41 | 2.24 |
| Education of mother | No formal education (Ref.) | 3.09 | - |
| | Primary | 30.63 | 7.93 |
| | Secondary | 52.87 | 13.05 |
| | Higher education | 13.41 | 4.33 |
| Number of under-5 children | One | 63.65 | 9.38 |
| | Two | 29.43 | 4.73 |
| | Three or more (Ref.) | 6.92 | - |
| Frequently read newspaper | No (Ref.) | 87.56 | - |
| | Yes | 12.44 | 1.41 |
| Frequently listen to the radio | No (Ref.) | 85.12 | - |
| | Yes | 14.88 | 1.23 |
| Frequently watch television | No (Ref.) | 18.05 | - |
| | Yes | 81.95 | 6.97 |
| Household wealth index | Lowest quintile | 21.33 | 4.02 |
| | Lower quintile | 19.85 | 2.82 |
| | Middle quintile | 19.55 | 2.33 |
| | Higher quintile | 19.48 | 2.04 |
| | Highest quintile (Ref.) | 19.78 | - |

Notes: Ref. = Reference category
Source: Authors' calculation of the 2012 IDHS

**Multivariable Regression Analysis**

The final multivariable probit regression model was significant (P<0.001) with Tjur's coefficient of determination of 26.8% and area under ROC curve of 80.58% (see Figure 1).

Table 3 presents the results of the regression analysis. AME and its 95 percent CI represents the measure of association. It is observed that 10 out of 14 independent variables were found to be statistically significant, namely sanitation facility, presence of handwashing facility, region of residence, place of residence, age of child, age of mother, education of mother, number of under-five children, frequently listen to the radio, and frequently watch television

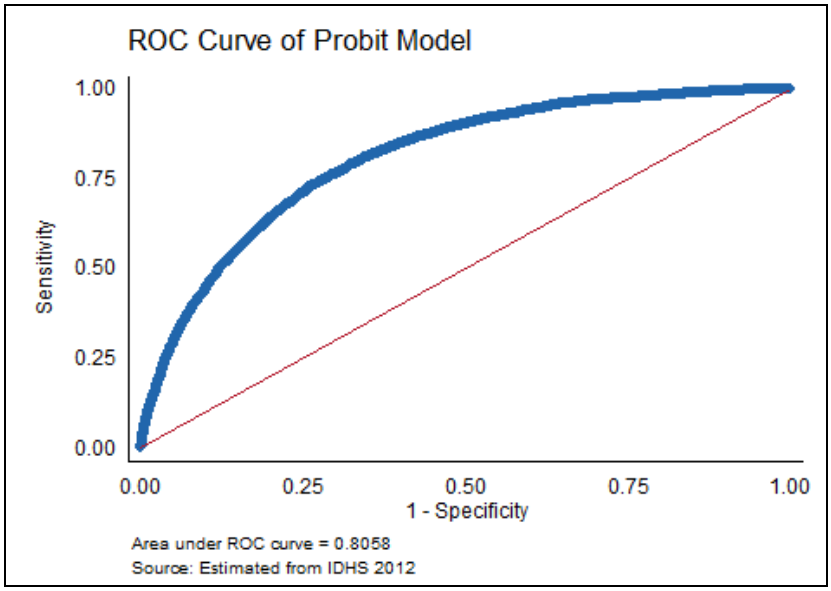


Figure 1. Receiver operating characteristics (ROC) curve of the final multivariable probit model

Table 3. Regression analysis of the correlates of unsafe disposal practice of child feces (N = 16,368)

| Variables | Categories | AME | | 95% CI | |
|---|---|---|---|---|---|
| Drinking water source | Piped (Ref.) | - | | - | - |
| | Other improved | -0.0019 | | -0.0273 | 0.0235 |
| | Unimproved | 0.0037 | | -0.0253 | 0.0327 |
| Location of drinking water source | In own dwelling (Ref) | - | | - | - |
| | In own yard/plot | -0.0006 | | -0.0229 | 0.0218 |
| | Elsewhere | 0.0199 | | -0.0040 | 0.0437 |
| Sanitation facility | Improved (Ref.) | - | | - | - |
| | Unimproved | 0.1041 | *** | 0.0851 | 0.1230 |
| | No facility/open defecation | 0.4182 | *** | 0.3969 | 0.4394 |
| Presence of handwashing facility | No (Ref.) | - | | - | - |
| | Yes | -0.0198 | ** | -0.0362 | -0.0034 |
| Region | Sumatra (Ref.) | - | | - | - |
| | Java | -0.0790 | *** | -0.0977 | -0.0604 |
| | Bali & Nusa Tenggara | 0.0308 | ** | 0.0046 | 0.0570 |
| | Kalimantan | 0.0579 | *** | 0.0344 | 0.0815 |
| | Sulawesi | 0.0724 | *** | 0.0516 | 0.0931 |
| | Maluku & Papua | 0.1048 | *** | 0.0792 | 0.1303 |
| Place of residence | Rural area (Ref.) | - | | - | - |
| | Urban area | 0.0293 | *** | 0.0143 | 0.0444 |
| Age of child | <12 months (Ref.) | - | | - | - |
| | 12-23 months | -0.1608 | *** | -0.1827 | -0.1390 |
| | 24-35 months | -0.2983 | *** | -0.3195 | -0.2771 |
| | 36-47 months | -0.3566 | *** | -0.3773 | -0.3358 |
| | 48-59 months | -0.3734 | *** | -0.3940 | -0.3529 |
| Age of mother | 15-24 years (Ref.) | - | | - | - |
| | 25-34 years | -0.0209 | ** | -0.0382 | -0.0037 |
| | 35+ years | -0.0450 | *** | -0.0649 | -0.0251 |
| Education of mother | No formal education (Ref.) | - | | - | - |
| | Primary | -0.0245 | | -0.0686 | 0.0195 |
| | Secondary | -0.0437 | * | -0.0883 | 0.0008 |
| | Higher education | 0.0522 | ** | 0.0038 | 0.1006 |

(con'd)

| Variables | Categories | AME | | 95% CI | |
|---|---|---|---|---|---|
| Number of under-5 children | One | -0.1657 | *** | -0.1951 | -0.1363 |
| | Two | -0.0591 | *** | -0.0898 | -0.0284 |
| | Three or more (Ref.) | - | | - | - |
| Frequently read newspaper | No (Ref.) | - | | - | - |
| | Yes | -0.0147 | | -0.0358 | 0.0065 |
| Frequently listen to the radio | No (Ref.) | - | | - | - |
| | Yes | -0.0288 | *** | -0.0472 | -0.0104 |
| Frequently watch television | No (Ref.) | - | | - | - |
| | Yes | -0.0212 | ** | -0.0408 | -0.0016 |
| Household wealth index | Lowest quintile | 0.0206 | | -0.0095 | 0.0508 |
| | Lower quintile | -0.0008 | | -0.0261 | 0.0246 |
| | Middle quintile | -0.0030 | | -0.0260 | 0.0200 |
| | Higher quintile | -0.0163 | | -0.0376 | 0.0049 |
| | Highest quintile (Ref.) | - | | - | - |

Notes: AME = average marginal effect; CI = confidence interval; Ref. = Reference category;
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculation of the 2012 IDHS

## DISCUSSION

### Environmental Variables

A previous study suggests that location of water source is associated with unsafe child feces disposal practice in West Bengal India (Preeti, Sahoo, Biswas, & Dasgupta, 2016). However, this study did not find it statistically significant. Only two out of four environmental variables were statistically significant in the final multivariable model namely sanitation facility and presence of handwashing facility. Having poor sanitation facility or none at all were more associated with higher probability of unsafe child feces disposal practice. Similar studies have suggested the same association in Ethiopia (Azage & Haile, 2015) and Orissa State, Eastern India (Majorin et al., 2014). Also, the presence of handwashing facility was found to be associated with lower probability of unsafe child feces disposal practice. Greenland and colleagues (2015) have shown that hygiene practices go hand-in-hand with defecation practice. The individuals who openly defecate are more likely to be the ones not washing their hands. Also, having a handwashing facility enables one to do the safer practice of child feces disposal.

### Spatial Variables

Concerning to spatial variables, both region and place of residence were found to be associated with child feces disposal practice. This study observed variation in unsafe child feces disposal practice across six regions in Indonesia. Moreover, living in the urban area is corresponds to higher odds of unsafe child feces disposal practice. However, studies were done by Azage and Haile (2015), and Bawankule and colleagues (2017) found the opposite in Ethiopian and India, respectively. This difference may be explained by differences between Ethiopia, India, and Indonesia not accounted for in this study.

### Socio-Demographic Characteristics

Regarding to socio-demographic characteristics, age of child, age of mother, education of mother, number of U-5 children, frequently listen to the radio, and frequently watch television were found to be significantly associated with unsafe child feces disposal. However, the ‘frequently read newspaper’ and ‘household wealth index’ variables were not significantly associated with the dependent variable. Although previous studies in Ethiopia (Azage & Haile, 2015) and India (Preeti et al., 2016) found that household affluence corresponds to lower odds of unsafe child feces disposal practice. Child’s age is a significant factor. The older the child is, the lower the probability of their mother in practicing unsafe child feces disposal. Feces of older children can be more easily managed due to their ambulatory status. This relationship was also found in existing studies (Azage &

Haile, 2015; Miller-Petrie, Voigt, McLennan, Cairncross, & Jenkins, 2016). Mother's age is also found to significantly associated with the outcome variable. The older the mother is, the less likely the unsafe child feces disposal practice to occur. Studies in Ethiopia (Azage & Haile, 2015) and in Cambodia (Miller-Petrie et al., 2016) also found a similar relationship. Moreover, more educated mothers were observed to be less likely to practice unsafe disposal of child feces. Previous findings confirm this association (Azage & Haile, 2015; Preeti et al., 2016). Having more education can improve one's ability in accessing and obtaining information of many types, including information on hygienic practices.

Furthermore, more under-five children in the household correspond to a higher probability of unsafe child feces disposal practice. The study in Ethiopia also found this kind of association (Azage & Haile, 2015). Lastly, mothers who were more exposed to information from radio and television were found to have a lower probability of disposing of their children's feces in an unsafe manner.

A safe defecation practice is one of twelve indicators of Healthy Family Approach which is an effort to reduce the risk of feces-related diseases including diarrhoeal diseases, which in turn become a foundation of a healthy behavior of all family members. Moreover, Healthy Family Approach is such a strategy to improve public health efforts leading to a healthy community. This healthy community will then reduce health expenditure through strengthening the role of Community Health Center as stated in Health Ministerial Decree No. 57/2014. However, unsafe practices of children feces disposal have never been considered significant concerning clean and healthy behavior by environmental health program. In fact, children feces is more infectious than adult feces.

### Study Limitations

This study is not without limitations. First, the data used in this study were collected in a cross-section manner hindering the establishment of causality. Second, as the data is a secondary source, then the choice of the independent variables is restricted to the variables collected in the IDHS. Third, several factors have been shown to be associated with child feces disposal practice. One example is the knowledge of caregiver (Aluko et al., 2017). These drawbacks need to be kept in mind when interpreting the results of this study.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The practice of unsafe child feces disposal in Indonesia has risen in the recent years. This paper explored the drivers behind such practice. It is observed that disparities exist in the prevalence of unsafe child feces disposal. Being an urban resident, not having access to handwashing facility with running water, and not having access to improved sanitation facility were factors associated with higher probability of unsafe child feces disposal. Moreover, higher maternal education corresponds to lower probability unsafe child feces disposal. Knowing more about the characteristics of households that practice unsafe disposal of child feces will assist the GoI in policy-making process to alleviate unhealthy behavior and thus reduce its associated morbidity and mortality among Indonesian children.

### Recommendations

Firstly, the study recommends that provision of basic sanitation and handwashing facilities will be a necessity as to improve safe disposal of child feces since the children's mothers or caretakers can have access to such facilities. Local governments can initiate the provision of such facilities can be initiated by local governments in collaboration with urban communities. Secondly, health promotion should be regularly conducted in areas where unsafe practices of child feces disposal occurred targeting uneducated mothers using strategic methods of community total led sanitation. Lastly, the coverage of safe practices of child feces disposal should be considered as an indicator of a healthy family, as to prevent

overestimation of the current indicator of defecation practice of family members in healthy family approach.

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