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Detection of Nicotine in Urine of Passive Smokers Exposed to Cigarette Smoke From Smoking and Non-Smoking Families

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ABSTRACT

Passive smokers are vulnerable to nicotine exposure, which can increase the risk of health problems. Nicotine is a chemical compound in tobacco that causes dependence and can be detected in urine as metabolites like cotinine. This study aimed to detect nicotine in the urine of passive smokers exposed to cigarette smoke from smoking and non-smoking families in Genggelang Village. An analytical observational method with a cross-sectional design was used. The sample consisted of 24 respondents selected by purposive sampling, divided into two groups. Urine samples were tested using a nicotine test strip and analysed descriptively. The results showed that among 12 passive smokers from smoking families, one respondent tested positive for nicotine. Meanwhile, all 12 respondents from non-smoking families tested negative. These findings indicate that passive smokers living with smoking families are still at risk of nicotine exposure through second hand smoke in the household environment.

INTRODUCTION

Exposure to cigarette smoke is a massive public health concern, affecting not only active smokers but also passive smokers. These individuals are known as individuals that smoke indirectly. As passive smokers, these individuals face significant health risks due to toxic compounds in cigarrete, including nicotine. Nicotine is as addictive substance that contributes to various health problems such as cardiovascular diseases, respiratory disorders, and cancer. In household environment, passive smokers' exposure may occur when one or more family members smoke indoors.

Cigarrete smoke exposure within the home is especially concerning due its long-term and frequent occurrence. According to Riskesdas 2018, 33.8% of Indonesians over the age of 15 are smokers, the majority of whom are male (Sudiyono et al., 2021). This indicates as substantial risk of second-hand smoke exposure to other household members, particularly children and women (Mayangsari & Mahmood, 2021). A study by Lathifah et al. (2020) revealed that passive smokers at home can have detectable nicotine levels in their urine.

Previous studied have confirmed that nicotine absorbed into the body is metabolized into cotinine, which is excreted in urine. Therefore, urine testing is considered a practical and effective method for detecting nicotine exposure. Immunochromatographic nicotine test strips are commonly used due to their simplicity (Sholikah et al., 2022).

However, research on nicotine detection in the urine of passive smokers at the household levels remains limited. This highlights the need for further investigation into nicotine presence among passive smokers living with or without smokers in the family.

A study by (Mayangsari & Mahmood, 2021) reported that urinary levels in passive smokers could reach up to 1.936 mg/mL, emphasizing the significant impact of second-hold smoke in residential settings. Nevertheless, no prior research has specifically addressed this

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issue in Genggelang Village, North Lombok Regency, West Nusa Tenggara, which has high smoking prevalence of 35.97% (Badan Pusat Statistika, 2024). Thus, this study aims to provide an initial overview of nicotine exposure in this region.

The novelty of this research lies in its focus on both smoking and non-smoking families within Genggelang Village. The absence of prior comparative studies between these two groups makes this research valuable in assessing the influence of family behavior on urinary nicotine detection in passive smokers.

The hypothesis proposed in this study is that there is a difference in urinary nicotine detection between passive smokers living with smokers and those from non-smoking house hold. Passive smokers living in smoking families are expected to have a higher likelihood of testing positive for nicotine.

METHOD

This study employed an analytical observational method with a cross-sectional research design (Jiwantoro YA et al., 2023). The research was conducted in Genggelang Village, North Lombok Regency, West Nusa Tenggara, from January to April 2025. The study samples were selected using purposive sampling and divided into two groups; passive smokers from smoking familied and those from non-smoking families.

Urine samples were collected from each respondent and analyzed using immunochromatographic nicotine test strips. Results were interpreted as positive or negative based on the test strips appearance. Descriptive analysis was performed to determine the proportion of nicotine detection in each group.

RESULTS AND DISCUSSION

The nicotine urine result explained by Table 1.

Table 1. Urine Test Results of Passive Smokers by Smokers and Non-Smoking Families

No	Results	Smoking Families		Non-Smoking Families	
		Total	Percentage	Total	Percentage
1	Positive	1	8.33%	0	0.00%
2	Negative	11	91.67%	12	100.00%

The results on table 1. showed that ne out of twelve passive smokers from smoking families (8.33%) tested positive for urinary nicotine. In contrast, all twelve respondents from non-smoking families tested negative.

These findings confirm that household environments with smokers can contribute to nicotine accumulation in non-smoking family members. This result aligns with Sutaryono (2021), who stated that passive smokers cohabiting with active smokers are more likely to experience nicotine exposure.

The positive detection in one respondent may be influenced by several factors, such as the frequency of smoking by household members, inadequate home ventilation, and the duration of exposure. The individual who tested positive was a 26-year-old male living with family members who smoked indoors in a poorly ventilated house.

Conversely, the absence of nicotine detection among respondents from non-smoking families underscores the protective effect of smoke-free home environments. These results support efforts to promote smoke-free households to protect the health of all family

members. This is consistent with Syahraeni et al. (2022), who found that household smoking bans significantly reduce second-hand smoke exposure.

CONCLUSIONS

The study concludes that passive smokers living with smoking family members are at risk of nicotine exposure, evidenced by the presence of nicotine in their urine, whereas nicotine was not detected in the urine of passive smokers from non-smoking families. The detection of urinary nicotine is significantly influenced by household smoking habitsand home ventilation conditions.

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