ORIGINAL ARTICLE

Factors Influencing Acute Respiratory Infections in Traditional Brick Makers

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ABSTRACT

Background: **The brick industry is a business that is a material for making walls at home. The manufacturing process uses various materials including clay and water. the next process is burned and produces ash, from the process there are some health risks. Respiratory tract infection (ARI) is a disease that has the potential to occur.**

Objective: **To determine the factors associated with the incidence of ARI in brick-home industry workers.**

Methods: **The research used a case control approach. The population in this study amounted to 120 brick-home industry workers. Data collection using a questionnaire. The analysis used Chi-square test.**

Results: **The results showed that there was a relationship between the incidence of ARI in brick home industry workers, namely respiratory protective equipment (p < 0.001), working period (p0.002), and working time (p < 0.001).**

Conclusion: **Respiratory protective equipment, work period, and work time have a relationship with the incidence of ARI in brick-home industry workers.**

KEY WORDS

respiratory tract infections, respiratory protective equipment, working time, working time

INTRODUCTION

Acute Respiratory Infection (ARI) is an upper respiratory tract disease or lower respiratory tract disease[1)]. Acute respiratory disease can be caused by infectious agents that spread from person to person. Sufferers usually experience symptoms such as fever, cough, frequent sore throat, shortness of breath, and difficulty breathing[2)]. ARI incidence can be influenced by 2 factors, namely intrinsic factors and extrinsic factors. Intrinsic factors include age, nutritional status, and body weight. Extrinsic factors include knowledge, educational factors, occupancy density, physical condition of the house, house ventilation, cigarette smoke, social economy, and work[3)]. The prevalence of ARI in Indonesia has reached 25% with an incidence range of around 17.5% - 41.4%. There are 16 provinces which have a prevalence above the national rate. A survey conducted by the Sub Directorate of ARI is one of the biggest causes of disease in Indonesia[4)].

ARI increase exposure to hazards in industrial workers. The production process in the informal sector is usually carried out traditionally. One of the informal sector industries that many Indonesians are engaged in is brick-making[5)]. The brick industry is a business that is produced as a basic material for making buildings that are most often used. The manufacture of bricks goes through several stages according to the location of each brick-making area. There are several diseases caused by the brick-making process itself, including hookworm infections, respiratory infections, conjunctivitis, and cataracts[6)]. Meanwhile, accidents caused by the process of making bricks include being hit by a heavy object, being stabbed by a sharp object, being exposed to hot liquids, or exposure to fire[7)]. Brick makers can face danger every day in every job, workers can be exposed to smoke/ash during the brick burning process which can cause respiratory problems for workers, because during the brick burning process, there are still many workers who do not use personal protective equipment (PPE) protective equipment self to protect

Tabel 1: Characteristics of Respondents (N = 96)

	Variables	Count	
		f	(%)
Gender	Men	54	56.3
	Women	42	43.7
Age	21-30 Years old	6	6.3
	31-40 Years old	13	13.5
	> 40 Years old	77	80.2
Level of Education	Elementary School	28	29.2
	Junior High School	31	32.3
	Senior High School	37	38.5
Working Periode	< 6 Year	3	3.1
	6-10 Year	14	14.6
	> 10 Year	79	82.3
Working time	≤ 8 Hour per day	61	63.5
	> 8 Hour per day	35	36.5
Using PPE	Yes	40	41.7
	No	56	58.3
Accute Respitratory Infection	ARI	48	50.0
	Non ARI	48	50.0

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Table 2: Relation between Independence and dependence Variables (N = 96)

Variables		ARI		Non ARI		Total		*p*
		f	%	f	%	F	%	
Working Periode	< 6 Year	1	2,1	2	4,2	3	3,1	0.002
	6-10 Year	1	2,1	13	27,1	14	14,6	
	> 10 Year	46	95,8	33	68,8	79	82,3	
Working time	≤ 8 Hour per day	48	100	13	27,1	61	63,5	< 0.001
	> 8 Hour per day	0	0	35	72,9	35	36,5	
Using PPE	Yes	33	68,8	7	14,6	40	41,7	< 0.001
	No	15	31,2	41	85,4	56	58,3	

the respiratory tract of workers[8,9]. Occupational health and safety knowledge can influence the proper and correct use of PPE for workers. Knowledge itself can be increased by conducting counseling to workers or putting up posters about the proper and correct use of PPE[10].

Others risk factors of ARI for brickmakers are length of work and working time. Brick workers can be exposed to environmental contaminants from the first time they work, in which case there is a hazard factor for exposure to high levels of dust contaminants while working. Working time per day determines how much exposure to dust contamination is experienced by workers. The longer the working time, the more dust contamination received by the brick workers. For the record, the brick kiln has an excess Threshold limit value[11,12]. Based on this problem, the research aim to study factors influencing ARI in traditional brick makers in East Java, Indonesia.

METHODS

Study Design

The research used a survey method conducted on a population of brick-making workers with a case control approach. Data collection for this research was carried out in June 2022 which will take place in the Bendo District, Kinandang Village, Magetan Regency, East Java, Indonesia.

Samples

The population in this research is brick home industry business actors with a total of 120 people. Based on calculations, the sample size is 46 respondents. To prevent dropout, the sample was increased by 5% from the total calculation of 46 + (5% x 46) = 46 + 2.3 = 48.3 or rounded up to 48 respondents. With a case-control ratio of 1: 1

Instruments

This research instrument used a questionnaire to measure the characteristics of the use of respiratory protective equipment, work period, working time, and the incidence of ARI.

Data Collection

The research data is primary data and secondary data, primary data is in the form of information data from questionnaires answered by respondents, and secondary data is data from the health center. The independent variables in this study were the use of respiratory protective equipment, length of service, and working time, while the dependent variable was the incidence of ARI which was obtained from medical records of examinations at the Community Health Center.

Data Analysis and Ethical Consideration

In this study, researchers analyzed univariately using numerical data to produce data on the frequency distribution and percentage of each variable. Bivariate analysis was carried out used Chi-square test, if the results do not meet the requirements then the guideline value can be seen in the Fisher's exact test results. Regarding ethics, the researcher prepares several things, including asking permission from the manager of the place where the research will be carried out, placing the person who will be researched as a subject which means the same position as the researcher, respecting, obeying the rules adopted by the community where the research is carried out, keeping things confidential. relating to the information conveyed by the informant, maintaining the confidentiality of the informant's privacy, and providing a sense of comfort so that participants can convey the problems they are experiencing freely.

RESULTS

Characteristics of Respondents

Table 1 shows most of the participants are men (56.3%), > 40 years old (80.2%), graduated from senior high school (39.5%), working period > 10 years (82.3%), working time < 8 hours/day (63.5%), and did not use respiratory protective equipment (58.3%).

Relation between Independence and dependence Variables

Table 2 shows that all factors have relationship with incidence of ARI. Significant value each factors are working period (p0.002), working time ($p < 0.001$), and using personal protective equipment ($p < 0.001$).

DISCUSSION

Respiratory protective equipment is a tool to protect the breath from danger or disease caused by contact with chemical, biological, or physical hazards[13]. Respiratory protective equipment can protect the respiratory organs from exposure or contamination in the work environment[14]. Based on the findings, it is known that brick workers do not use respiratory protective equipment, because they feel uncomfortable and feel that respiratory protective equipment hinders their work. this is supported by Pujiani & Siwiendrayanti[15] who state that there is a relationship between the use of masks and the incidence of ARI with ($p = 0.018$).

Furthermore, a working period of more than 10 years carries a higher risk of experiencing ARI symptoms in brick workers. Brick workers can be exposed to environmental contaminants from the first time they work, where in this case there is a chemical contamination hazard factor, namely in the form of smoke and dust, In other words, the working period is closely related to the length of contact and the entry of contaminants into the workers' organs or the system. worker’s breathing. The impact of this contamination, especially dust particles that settle on the worker's respiratory organs, can accumulate depending on the length of time they work and the amount of contamination inhaled by the worker each day, as well as depending on the worker's efforts to neutralize incoming dust particles[16,17]. In line with previous studies stated in a dusty and smoky environment, more dust particles and smoke are inhaled, so this can cause workers to contract ARI[18,19]. Our findings are consistent with growing evidence regarding the health impacts of exposure to air pollution in highly polluted environments and research on workplace exposures[20].

Extending working hours beyond this capability is usually not accompanied by high efficiency, and usually shows a decrease in productivity and a tendency for fatigue, illness, and accidents to occur. In a week, someone usually works well for 40-50 hours, more than that, it is likely that negative things will arise for the personnel concerned and the

work itself. Other research has also been carried out, stating that there is a relationship between working time and the incidence of ISPA in line with previous studied[21,22]. This research found obstacles because it is an informal sector so understanding of occupational safety and health is very low so respondents did not show enthusiasm for this research and tended to feel disturbed.

CONCLUSION

The results of the study showed that there was a relationship between working period, working time, and the use of respiratory protective equipment and the incidence of ARI in brick home industry workers. The results provide a basis for carrying out further programs, especially increasing knowledge about the importance of using Personal Protective Equipment as an effort to prevent ARI.

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

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