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RESEARCH ARTICLE

Correlation of Subject Characteristics, Work Stress Levels, and Smoking Patterns among Educational Personnel at X University, Indonesia

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Abstract

Human resources are among the crucial aspects of an organization, including in higher-education organizations. Educational personnel, a key component of the education system, are prone to work stress, which may trigger smoking behavior. Personal characteristics may also influence smoking behavior. This cross-sectional observational analytic study aimed to analyze the relationship between characteristics, work stress level, and smoking behavior of educational personnel of X University, Indonesia. On 30 April–Mei 2021, subjects were recruited through total sampling based on inclusion and exclusion criteria (n=100, all males). A questionnaire that had been tested for validity and reliability was used to collect data on subject characteristics and behaviors, while DASS-42 was used to measure work stress. Age, education level, length of work, and work stress were the independent variables, while smoking was the dependent variable. Data collected were analyzed univariately and bivariately using the chi-square test, with $p<0.05$ considered significant. Age, education, and length of work were found to be significantly correlated with smoking ($p=0.007$, 0.016, and 0.009, respectively). However, stress levels did not correlate with smoking ($p=0.786$). This suggests that age, education, and length of work significantly influence smoking behavior. It's crucial to interpret these findings with caution, especially considering that all subjects are males, who have been proven less prone to stress than females. This caution is necessary to ensure a comprehensive understanding of the factors influencing smoking behavior among educational personnel.

Keywords: Behavior, characteristics, cigarettes, smoking, stress

Introduction

Human resources, like assets and capital, play a pivotal role within an organization or company. It is essential to address and manage variables such as work motivation, job satisfaction, work performance, discipline, and stress to enhance employee productivity.[1] Work stress can be interpreted as the strain experienced by employees when confronted with the expectations of efficiency and effectiveness in playing their roles. It emerges when employees need help to meet their job demands amidst time constraints to finish the job, unclear responsibilities, lack of necessary supporting facilities, and conflicting tasks. These will collectively contribute to work-related stress.[1]

Work stress is not new but has become the most critical management issue globally. Approximately two of three workers experience work-related stress. Recent estimates indicate that this contributes to employers incurring an annual expenditure of around $200 billion due to absenteeism, delays, burnout, reduced productivity, high turnover rates, workers' compensation, and increased health insurance costs. It is believed that around 80% of diseases and morbidities are triggered and exacerbated by stress.[2]

Work stress is a prevalent issue in United States workplaces, as highlighted by the National Institute of Occupational Health and Safety (NIOSH). According to NIOSH, a survey conducted by Northwestern National Life revealed that roughly 40% of workers face intense work-related stress. Additionally, a Families and Work Institute study found that approximately 26% of individuals experience stress frequently or very frequently. A third survey, conducted by Yale University and reported by NIOSH,

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indicated that 29% of workers feel pretty or very stressed during work hours.[2]

In Indonesia, work-related stress poses a significant concern, leading to a mental and emotional disorder rate of 9.8%. Furthermore, a staggering 35% of work-related stress cases have fatal consequences.[3,4] Work stress does not only occur in the business world. It is also observed in the education sector. It affects members of the educational units, including education personnel.[5] Education staff working in a higher education institution are required to provide good services to students to ensure that they feel comfortable and supported during their college experience, ultimately facilitating the achievement of their educational goals. On the other hand, education personnel are also tasked with assisting the faculties in their teaching activities. Those resulted in a cumulative workload, as both tasks are time-sensitive and require immediate completion. This situation eventually triggers work-related stress among the education personnel.[6]

Work stress is characterized by three types of complaints: physiological, psychological, and behavioral complaints. Physiological complaints encompass a spectrum of bodily symptoms, ranging from headaches or dizziness to digestive disorders, back pain, sexual disorders, asthma or shortness of breath, nervousness, appetite loss, malaise, and lethargy. Within the psychological domain, individuals may experience irritability, anger, feelings of pressure, anxiety, restlessness, and a propensity for becoming easily discouraged. The behavioral complaints observed are lack of concentration, forgetfulness, procrastination, enthusiasm, smoking habits, and alcohol consumption.[7]

Smoking behavior, the act of burning cigarettes or other tobacco products, inhaling the smoke, and exhaling it, is a significant global health concern. It not only harms the smoker's health but also poses substantial risks for passive smokers. Smoking remains a major health concern globally, contributing to fatal conditions that claim the lives of approximately 6 million people annually. The risk for smoking-related mortality is higher among active smokers compared to passive smokers.[8]

Indonesia is one of the developing countries with the highest cigarette consumption. It ranks third as the country with the highest number of smokers globally after China and India. The increased cigarette consumption significantly contributes to the substantial smoking-related disease burden and mortality rate. In this country, more than 230,000 deaths annually are attributed to cigarette consumption as smoking continues to dominate societal habits. The average cigarette consumption in Indonesia has also been higher among workers compared to non-working individuals, with 11.1% cigarette consumption among workers as opposed to 7.9% among non-working individuals.[8] This study examined the relationship between subject characteristics, work stress level, and smoking behavior among educational staff at X University.

Methods

This research constitutes an observational analytical study conducted using a cross-sectional approach. The population selected was male educational personnel working at X University on 30 April–Mei 2021. Sampling was performed using the total sampling technique, which included all male education personnel working at X University. Male participants were selected based on the finding of the Indonesia Basic Health Research 2018 that the majority of smokers aged >15 years are males (62.9%) and that the global prevalence of male smokers is still higher than their female counterparts.9 The inclusion criterion for this study was male education personnel still actively working at X University. Those who were on leave or sick during data collection were excluded. Based on the inclusion above and exclusion criteria, the final sample size was 100. Data were collected using a validated and reliable questionnaire for subject characteristics and smoking behaviors, while the Depression Anxiety Stress Scale (DASS)-42 was used to measure work stress. Considerations of ethical issues are included with number: 002/KEPK-Unisba/III/2021.

The independent variable in this study was subject characteristics of age, education level, work tenure, and work stress. Meanwhile, smoking behavior was assigned as the dependent variable. The primary data obtained were then processed and analyzed univariately and bivariately. The univariate analyses applied were frequency distribution, percentage, mean value, minimum and maximum range, and

standard deviation, which was then followed by a bivariate analysis using the chi-square test ($\chi 2$) to determine the relationship between the subject characteristics—age, education, and work tenure—and smoking behavior. In addition, the relationship between stress levels and smoking behavior was also analyzed. A confidence interval of 95% and a 5% margin of error were applied, with a p-value of less than 0.05 deemed to demonstrate statistical significance. All analyses used the Statistical Product and Service Solution (SPSS) program version 25.0.

Results

Table 1 describes the characteristics of the study subjects. Of 100 male respondents, the majority were 31–40 years old (48%), graduated from diploma IV or had a bachelor's degree (45%), and had worked at X University for more than 15 years (38%).

Table 2 lists the stress levels experienced by the subjects and their smoking behavior. Work stress is categorized into five levels: normal, mild, moderate, severe, and very severe. Most subjects experienced an average stress level (n=53, 53%) and were non-smokers (n=62, 62%). Only 38 subjects were active smokers (38%).

The results of the analysis to determine the relationship between subject characteristics and smoking behavior are displayed in Table 3. Two variables are said to have a significant relationship if the probability or the p-value is smaller than 0.05. In the context of this study, age, education level, and work tenure showed substantial relationships with smoking behavior, as their p-values were below 0.05 ($p<0.05$).

Based on Table 4, the work stress level was examined for its significant relationship with smoking behavior by looking at the probability value (p-value). The results of the analysis using the chi-square test ($\chi 2$) revealed a p-value of 0.786, which was more significant than 0.05 ($p>0.05$). Consequently, work stress levels do not exhibit a substantial relationship with smoking behavior.

Table 1 Subject Characteristics

Characteristics	n=100 (%)
Age (years)	
≤30	11 (11)
31–40	48 (48)
41–50	20 (20)
>50	21 (21)
Education	
Elementary to junior high school/equivalent	1 (1)
Senior high school/equivalent	35 (35)
Diploma I/II	3 (3)
Diploma III	9 (9)
Diploma IV/bachelor	45 (45)
Postgraduate	7 (7)
Work tenure (years)	
≤5	37 (37)
6–10	22 (22)
11–15	2 (2)
>15	39 (39)

Table 2 Work Stress Levels and Smoking Behavior

Variables	n=100 (%)
Work stress level	
Normal	53 (53)
Mild	12 (12)
Moderate	15 (15)
Severe	10 (10)
Very severe	10 (10)
Smoking behavior	
Active smoker	38 (38)
Non-smoker	62 (62)

Discussion

This study showed that of a sample of 100 male subjects, the majority (48%) fell within the age range of 31–40 years, and almost half of the subjects (45%) held a diploma IV or bachelor's degree. Additionally, 39 subjects (39%) reported that they had been working in the university for more than 15 years.

According to the previous study, men have a higher tendency to smoke than females. He believed that this is due to the norms of society that associate smoking with masculinity for men while stigmatizing female smokers. These assumptions create a conducive environment for initiating smoking among men. It contributes to the ease of men to adopt smoking habits.[9]

Meanwhile, another previous study on factors causing work stress among employees

Table 3 Relationship between Subject Characteristics and Smoking Behavior

Variables	Smoking Behavior			p*
	Active Smoker n=38 (%)	Non-smoker n=62 (%)	Total n=100 (%)	
Age (years)				
≤30	2 (18)	9 (82)	11 (100)	0.007
31–40	13 (27)	35 (73)	48 (100)	
41–50	9 (45)	11 (55)	20 (100)	
>50	14 (67)	7 (33)	21 (100)	
Education				
Elementary to junior high school/ equivalent	1 (100)	0 (0)	1 (100)	0.016
Senior high school/equivalent	20 (57)	15 (43)	35 (100)	
Diploma I/II	2 (67)	1 (33)	3 (100)	
Diploma III	2 (22)	7 (78)	9 (100)	
Diploma IV/bachelor	10 (22)	35 (78)	45 (100)	
Postgraduate	3 (43)	4 (57)	7 (100)	
Work tenure (years)				
≤5	7 (19)	30 (81)	37 (100)	0.009
6–10	8 (36)	14 (64)	22 (100)	
11–15	1 (50)	1 (50)	2 (100)	
>15	22 (56)	17 (44)	39 (100)	

Note: *chi-square test (χ2), 95% confidence interval

demonstrated that individuals in the older age category, over 40 years old, are more prone to severe anxiety. This vulnerability is attributed to declining physical conditions and challenges in effectively balancing workloads with age-related factors.[10] A previous study examining factors related to work stress in workers working with chemical hazards in a confined space at PT Z also found that age was linked to work stress. In contrast, a previous study found no effects of age on work stress when studying workers in factory workers in Makassar, Indonesia.[11]

Nevertheless, age indeed significantly influences smoking behavior, often demonstrated through a sharp increase in smoking during productive years due to misconceptions of

Table 4 Relationship between Stress Level and Smoking Behavior

Stress Level		Smoking Status			p*
		Active Smoker n=38	Non-smoker n=62	Total n=100	
Normal	n	18	35	53	
	%	34%	66%	100%	0.786
Mild	n	4	8	12	
	%	33%	66%	100%	
Moderate	n	6	9	15	
	%	40%	60%	100%	
Severe	n	5	5	10	
	%	50%	50%	100%	
Very severe	n	5	5	10	
	%	50%	50%	100%	

Note: *chi-square test (χ2), 95% confidence interval

the effect of tobacco on working ability, which usually takes root during adolescence. In older age, smoking habits markedly decline as health conditions start to deteriorate, making smoking cessation necessary.[9]

The educational level also influences smoking behavior as individuals with higher educational backgrounds are more aware of the impact of smoking behavior, which may motivate them to reduce their smoking habit gradually.[9]

In terms of work stress levels, which are divided into 5 (five) categories: standard, mild, moderate, severe, and very severe, this study found that most subjects (53%) had an average stress level. The fact that all subjects of this study were males should be considered in the interpretation of this study, as females are more likely to experience stress than their male counterparts.[12] This can be seen in a previous study on education personnel at the Faculty of Nursing, Universitas Padjadjaran Indonesia, where 72% of the subjects were females. Their study demonstrated that 25 subjects (41.7%) experienced low-stress levels, while the remaining 24 (40%) and 11 (18.3%) subjects experienced severe and moderate stress levels, respectively.[12]

Among this study population 38%were active smokers, as depicted in Table 2. It seems to be a common situation as Lianzi and Pitaloka,[9] in their study in 2014 on the relationship between knowledge about cigarettes and smoking behavior in the administrative staff of Universitas Esa Unggul, also stated that 51.2% of the administrative staff of the said university is active smokers, which is dominated by those in the age group of 31–40 years. Likewise, a previous study in 2014 on knowledge, attitudes, and psychological factors related to smoking behavior in employees of the Jakarta III Ministry of Health Polytechnics revealed that 45.5% of the employees smoked because they believed that smoking could relieve stress and provide psychological comfort.[13]

With the notion that two variables are considered to have a significant relationship if the p-value is less than 0.05, it is apparent that this study found that age, education, and work tenure have a substantial relationship with smoking behavior. It is supported by a previous study by Fernando et al.[14] examining the relationship between education, occupation, age, and smoking behavior in Pontianak city that there is a relationship between age and smoking behavior. Their finding stated that smoking behavior has started since childhood (10–13 years), and the age group (22–40 years) is the group with the highest prevalence of smoking, which is in line with the finding in this study that the prevalence of smoking at the age of <15 years is lower than the age ≥15 years.

However, this finding is not supported by the conclusions of a study by Nurfadhilah et al.[15] on the determinants of smoking behavior in workers of public facilities and infrastructure management in Kampung Rambutan, Jakarta, Indonesia, where respondents aged <30 years are more likely to smoke. However, her study presented insignificant relationships. 'Inayati[16] proposes an interesting idea based on her research that despite the lack of relationship between age and cigarette consumption, each additional year of a person's age tends to decrease cigarette consumption because smoking-related harm is heightened as an individual grows older.

In this study, education has a relationship with smoking behavior, which is supported by the findings of Nurfadhilah et al.[15] stating that there is a significant relationship between education level and smoking behavior among employees of public facilities and infrastructure management in Kampung Rambutan. Employees with lower have a 5.333 higher chance of adopting smoking habits than their more educated colleagues. A study by Fernando et al.[14] on the relationship between education level, occupation, age, and smoking behavior in Pontianak even suggested education as the most influential factor of smoking in Pontianak. The inclination to smoke tends to diminish with higher levels of education. These findings align closely with Lawrence Green's theory, which posits that education is a pivotal characteristic influencing individual behavior. Education significantly impacts the depth and quality of one's knowledge. Knowledge, in turn, acts as a predisposition for behavior. Well-informed individuals are less likely to adopt smoking habits.[14]

In this study, work tenure was identified as linked to smoking. It supports the finding of Lianzi and Pitaloka,[9] stating that the longer people work in a company, the more stressed they are and the higher the likelihood of developing smoking habits. Work tenure is defined as the period that an employee has been working in a firm, which can include work during the day and night, while

the working period is when the employee works in a specific place. As an individual spends more time at work, their exposure to work-related hazards, including behaviors like smoking, tends to increase.[9]

Stress is closely related to an individual health condition and can be influenced by changes or deviations in behavior, including the adoption of smoking habits. In this study, of 53 with an average stress level, 18 (34%) were active smokers, while of 12 with a mild stress level, four (33%) were active smokers. Furthermore, of 15 subjects with moderate stress levels and 10 subjects with a severe stress level, 6 (40%) and five people (50%) were active smokers, respectively. When data on this aspect was analyzed using the chi-square test ($\chi 2$), it was observed that the stress level does not correlate with smoking behavior ($p=0.786$, $p>0.05$).

This result is contradictory to the finding of Aisyah et al.[17] on factors that influence smoking behavior among Indonesian army soldiers in Jakarta, stating a relationship between respondents' stress levels and smoking behavior. It coincides with the findings of a study performed by Oktriansyah et al.[18] in 2023 on the relationship between stress, social environment, and smoking behaviors among health care workers of RYZ hospital in X city that demonstrated significant correlations between the three variables, with stress and social environment have a 52% of effective contribution to smoking behavior. The remaining 48% might be attributed to other variables not studied in their study.

The link between work stress and smoking behavior is also stated by Siagian et al.[8] in a study on factors influencing smoking behavior among electricity company workers in South Sorong regency. The impact of work stress on smoking behavior is evident. As work stress levels increase, so does the prevalence of smoking behavior. Excessive stress can significantly hinder an individual's capacity to cope with their environment and work demands. The findings from a 2017 study conducted by Stubbs et al.,[19] which investigated the correlation between stress and smoking behavior across 41 countries in Europe, Africa, Asia, and America continents, have also revealed a significant association between stress and smoking behavior.

In 2021, a study in Denmark discovered that the relationship between smoking and stress is very complex and that stress in childhood or adolescence is a risk factor for someone to start smoking. Furthermore, the desire to smoke will increase after exposure to stress. Perceived stress is also a barrier for people to quit smoking. People who experience a high level of stress will have a lower chance of quitting smoking.[20]

The relationship between work stress and smoking behavior can be explained as follows. According to a prior study by Asih et al.,[21] work stress refers to tension arising from human interaction with their job. This condition can lead to physical and psychological imbalances, impacting an employee's emotions, cognitive processes, and overall well-being. Stress is not always bad, even though it is often discussed in a negative context, because stress can also positively influence it. Stress becomes positive; for example, it offers potential outcomes when it becomes an opportunity. For example, many professionals view pressure as a heavy workload and tight deadlines as positive challenges that improve the quality of their work.[21] According to researchers, challenge stress—arising from work-related challenges—is distinct from obstacle stress, which impedes goal achievement. Occasionally, companies intentionally introduce challenges to enhance employee motivation and prompt swift task completion by imposing tight deadlines.[21]

The symptoms of stress are categorized into physical, psychological, and behavioral symptoms. The physical manifestations of stress encompass alterations in metabolism, heightened heart rate and respiration, elevated blood pressure, headaches, and the potential risk of heart attacks. Psychologically, stress gives rise to job dissatisfaction, feelings of pressure, anxiety, irritability, boredom, and a tendency toward procrastination. Meanwhile, the behavioral symptoms encompass shifts in productivity, absenteeism, alterations in dietary patterns, heightened alcohol or cigarette consumption, rapid speech, restlessness, and disruptions in sleep.[21]

As previously mentioned, work stress is associated with smoking behavior. Stress not only influences individuals to initiate cigarette consumption but also impacts those who are already smokers, as they tend to smoke more during stress.[22] This notion is also proposed by Nurfadhilah et al.,[15] stating that respondents with

severe stress smoked more.

Contrary to the previous studies, this study indicates that stress does not exhibit a significant association with smoking behavior. Notably, the majority of respondents (53%) reported normal stress levels, implying that other unexplored factors contribute to smoking behavior within this study cohort. Various factors may affect smoking behaviors, including social, psychological, lifestyle, and family-related factors.[23] Other research shows that a person's knowledge and experience in terms of smoking can affect smoking habits.[24]

Conclusions

The findings from this study stated that age, education level, and work tenure exhibited a significant relationship with smoking behavior. However, work stress levels do not show a significant relationship with smoking behavior.

Conflict of Interest

The authors declare that they have no conflict of interest to disclose.

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