**Effect of Social Capital on Smoking and Alcohol**

**Consumption Behavior in Adults**

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**ABSTRACT**

**Background:** Clinical epidemiological studies show that smoking and alcohol are often used together as social activities. Smoking and alcohol consumption are related to the risk of developing non-communicable diseases. According to data from the Indonesian Health Survey (SKI), (2023) the percentage of smokers in Surakarta City is 23.6% and the percentage of alcohol consumption is 1.4%. This study aims to analyze the influence of social capital on smoking behavior and alcohol consumption in adults.

**Subjects and Method:** The research design used is a cross-sectional study. The population in this study is adults aged 19-59 years in the city of Surakarta. Sampling in the study was carried out by the snowball sampling method, then as many as 200 adults domiciled in the city of Surakarta were obtained. The method used in collecting data for this study is a questionnaire. The analysis used in this study is the Structural Equation Model (SEM) to analyze the influence of social capital elements on smoking behavior and alcohol consumption in adults. The dependent variables are smoking habits and alcohol consumption. The independent variable is social capital including 3 elements, namely structural elements, cognitive elements and relational elements.

**Results:** Social capital had a negative effect on smoking behavior (b= -0.80; 95% CI= -0.88 to -0.71; p= 0.001), and social capital has a negative effect on alcohol consumption (b= -0.71; 95% CI= -0.80 to -0.63; p= 0.001).

**Conclusion:** The results of this study show that social capital constructs include structural elements, cognitive elements and relational elements that are high have a lower likelihood of smoking behavior and alcohol consumption in adults

**Keywords:** Social capital, smoking, alcohol consumption, adults

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| **BACKGROUND** |

Clinical epidemiological studies have shown that smoking and alcohol are often used together as a social activity (Slagter et al., 2014). Smoking and alcohol consumption are often associated with the risk of deve­loping non-communicable diseases such as cardiovascular disease, stroke, hyper­ten­sion, various types of cancer, mental he­alth conditions, depression, and anxiety (Moore et al., 2014; Seid et al., 2016; Kim et al., 2020). The level of risk depends on several factors including the amount of cigarettes and alcohol consumed, frequency of use, individual health status, age and gender. Based on WHO data in 2019, an estimated 474,000 deaths from car­diovascular disease were caused by alcohol consumpt­ion. Meanwhile, according to W­HO, (2023) cigarette smoke causes car­diovascular and respiratory diseases, in­cluding heart disease and lung cancer which kill around 1.3 million people each year. Based on data from the World Health Organization (WHO) in 2020, around 80% of smokers live in low- and middle-income countries. More than 7 million deaths are caused by active smokers and 1.3 million by passive smokers (Institute of Health Me­trics, 2021). Meanwhile, the death toll from alcohol con­sumption worldwide reaches 2.6 million. An estimated 7% of the world's po­pulation aged 15 years and over live with alcohol use disorders. Of that number, 3.7% of the adult population lives with alcohol depen­dence (WHO, 2024). According to the 2023 Indonesian Health Survey (SKI), the number of active smokers in Indonesia reached 70 million people with the largest population aged 40-44 years at 29.8%. Meanwhile, the highest alcohol con­sump­tion is at the age of 20-24 years, namely 4.0%. SKI 2023 data by region states that the number of smokers in Cen­tral Java is at 23.6% and alcohol con­sumption is 1.4%. The 2018 Central Java Basic Health Research (Riskesdas) Report shows that the percentage of active smokers every day in Surakarta City reaches 19.16%.

Identifying factors that influence drink­ing and smoking in adult age groups is es­sential to inform prevention and treat­ment efforts. Previous research conducted by Yang et al., (2020) found that social capital such as relationships between indi­vi­duals with family members, friends, coworkers and social participation are related to

smoking and alcohol consumption. Then research by Rodgers et al., (2019); Kuerbis, (2020) concluded that trust, social partici­pation, reciprocity, satisfaction with the environment, social networks and collective efficacy can control smoking status and excessive alcohol consumption. The results of the study have shown that social capital indicators have been shown to have an influential relationship with vari­ous aspects of health (Seid et al., 2016; Zahedi et al., 2021). This study is also supported by research conducted by Ma­gson et al., (2016) that high levels of family relation­ships will be lower for alcohol consumption, drunkenness and smoking levels. Social capital is a multidimensional and multilevel concept as an individual and community level construct for social deter­minants in the field of health (Hasan, 2020). Seeing the results of previous stu­dies indicates that social capital plays an important role in controlling health beha­vior and it appears that smoking behavior and alcohol con­sump­tion are influenced by social inter­actions with other people and society so that researchers are interested in conduct­ing research entitled "The Influence of Social Capital on Smoking Behavior and Alcohol Consumption in Adults".

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| **SUBJECTS AND METHOD** |

1. **Study Design**

The research design used in this study is observational analysis with a cross-sectio­nal approach. The research was conducted in the city of Surakarta from September to November 2024.

1. **Population and Sample**

The study population is adults aged 19-59 years and the research sample is 200 adults aged 19-59 years selected using snowball sampling.

1. **Study Variables**

The dependent variables in this study are smoking habits and alcohol consumption while the independent variables are social capital constructs, namely structural ele­ments, cognitive elements and relational elements.

1. **Operational Definition of Vari­ables**

**Smoking** behavior is the act of consuming cigarettes per day.

**Alcohol Consumption** is the act of consuming alcohol on a regular basis.

**Structural elements** are dimensions of social capital related to the properties of social systems and networks of relati­on­ships as a whole, such as: individual inter­action with community organizations including local community participation, proactivity in social contexts, family rela­tion­ships, and friends and family (Claridge, 2018).

**The Cognitive Element** is a dimension of social capital that connects resources as shared values or paradigms. Values and be­liefs that affect participation in society include tolerance and the value of life (Claridge, 2018).

**The Relational element** is a dimension of social capital related to personal cha­racteristics and relationships such as beli­efs, identities and social norms (Claridge, 2018).

1. **Study Instruments**

The research instrument used for data collection is a questionnaire. A ques­tion­naire on smoking, alcohol consum­ption, and social capital behavior that includes structural elements, cognitive

elements, and relational elements.

1. **Data analysis**

Univariate analysis on continuous data was carried out to obtain mean data, standard deviation, and minimum to maximum values. Bivariate analysis to analyze the influence of independent variables on depen­dent variables used a linear regres­sion test with a significant level of p<0.05, and multivariate analysis using the Struc­tural Equation Model (SEM).

1. **Research Ethics**

Research ethics issues, including informed consent, anonymity, and confidentiality, are carefully addressed throughout the research process. The approval letter for the research ethics permit was obtained from the Research Ethics Committee at Dr. Moewardi Hospital, Surakarta, Indonesia, No. 2454/X/HREC/2024, on October 15, 2024.

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| **RESULTS** |

1. **Sample Characteristics**

Univariate analysis aims to be able to see an overview of the distribution and frequency of the characteristics of the respondents and all the variables studied, the results of the studies that have been carried out are the results of the distribution of respon­dents based on variables.

**Table 1. Characteristics of the categorical data sample**

| **Variable** | **Category** | **Frequency (n)** | **Percentage (%)** |
| --- | --- | --- | --- |
| Gender | Male  Female | 132  68 | 66  34 |
| Age | < 27 years  ≥ 27 years | 93  107 | 46.50  53.50 |
| Income | < Rp. 2,500,000  ≥ Rp. 2,500,000 | 28  172 | 14  86 |
| Education | < Higher Education  ≥ Higher Education | 99  101 | 49.50  50.50 |

Table 1 shows the characteristics of the 200 samples. In this study, the characteristics of the sample were taken based on gender, age, monthly income and education. The characteristics of the sample showed that as many as 132 research subjects were males while 68 were female. Furthermore, 93 research subjects were < 27 years old and as many as 107 research subjects were ≥ 27 years old. A total of 28 research subjects earned < Rp. 2,500,000 and 172 research subjects earned ≥ Rp. 2,500,000. Based on education, as many as 99 research subjects were educated in elementary, junior high, and high school which in this study were categorized as < of higher education, and as many as 101 adults were educated ≥ higher education.

1. **Univariate Analysis**

Univariate analysis in Table 2 of the continuous data of 200 study subjects found that the average adult who smoked was 5.28 with a minimum value of 0 and a maximum value of 16. Meanwhile, in al­cohol consumption, the average score is 2.45 with a minimum value of 0 and a maximum value of 13. In the variable of the structural element of social capital, the average value is 6.49 with the smallest value of 0 and the largest value of 8. Fur­thermore, the variable of the cognitive element of social capital with an average value of 3.49 with the smallest value being 0 and the largest value being 4. In the relational element variable with an average value of 7.67, the smallest value is 0 and the largest value is 12.

**Table 2. Results of univariate analysis of continuous data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **SD** | **Minimum** | **Maximum** |
| Smoking Behavior | 5.28 | 5.26 | 0 | 16 |
| Alcohol consumption | 2.45 | 3.51 | 0 | 13 |
| Structural Elements | 6.49 | 1.97 | 0 | 8 |
| Cognitive elements | 3.49 | 0.95 | 0 | 4 |
| Relational elements | 7.67 | 2.85 | 0 | 12 |

1. **Bivariate Analysis**

Bivariate analysis was carried out to analyze the influence of construct variables from social capital, namely structural ele­ments, cognitive elements, and relational elements on smoking behavior. This analysis was carried out by linear reg­ression test.

Table 3 shows that structural ele­ments have a negative influence on smo­king behavior (b= -0.98; Cl 95%= -1.33 to -6.31; p= 0.001). These results showed that the structural element of social capital de­creased the smoking behavior of adults in the community by -0.97 units higher with a low structural element, this relationship was statistically significant.

Furthermore, in the cognitive element of smoking behavior, a value (b= -1.95; Cl 95%= -2.68 to -1.22; p= 0.001). These results showed that the cognitive element of social capital lowered the smoking behavior of adults in the community by -1.95 units higher with a low cognitive element, this relationship was statistically significant.

Then the analysis of relational elements on smoking behavior obtained a value (b= -1.17; Cl 95%= -1.38 to -0.98; p= 0.001). These results showed that the relational element of social capital lowered the smoking behavior of adults in the community by -1.17 units higher with a low relational element, this relationship was statistically significant.

Meanwhile, the bivariate analysis between income and smoking behavior obtained a value (b= 0.55; Cl 95%= -0.92 to 2.03; p= 0.458). These results showed that income increased adult smoking behavior in the community by 0.55 units higher with low income, this association was not statistically significant.

**Table 3 Results of bivariate analysis of variables that affect smoking behavior**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Path coefficient (b)** | **95% Cl** | | **p** |
| **Lower Limit** | **Upper Limit** |
| Structural Elements | -0.98 | -1.33 | -6.30 | 0.001 |
| Cognitive elements | -1.95 | -2.68 | -1.22 | 0.001 |
| Relational elements | -1.17 | -1.38 | -0.98 | 0.001 |
| Income | 0.55 | -0.92 | 2.03 | 0.458 |

Table 4 explains the structural elements of alcohol consumption with a value (b= -0.29; Cl 95%= -0.53 to -0.04; p= 0.022). These results show that the structural element of social capital lowers adult alcohol consumption in the community by -0.29 units higher with a low structural element, this relationship is statistically significant.

In the cognitive element of alcohol consumption, a value (b= -1.32; Cl 95%= -1.80 to -0.83; p= 0.001). These results showed that the cognitive component of social capital lowered adult alcohol con­sumption in the community by -1.32 units higher with a low cognitive element, this association was statistically significant.

Then the analysis of the relational element on alcohol consumption obtained a value (b= -0.70; Cl 95%= -0.85 to -0.57; p= 0.001). These results showed that the cognitive element of social capital lowered adult alcohol consumption in the commu­nity by -0.70 units higher with a low rela­tional element, this association was statis­tically significant.

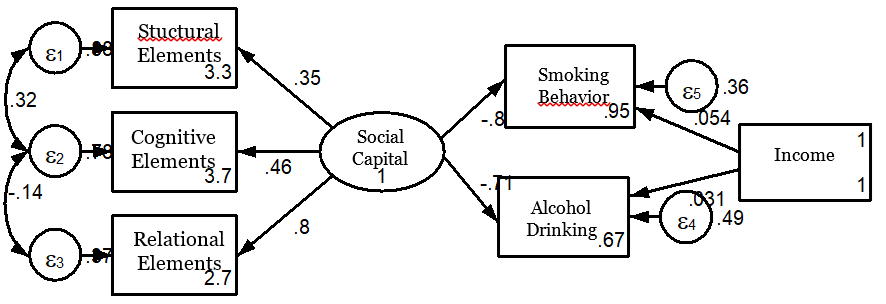
Meanwhile, the bivariate analysis between income and alcohol consumption obtained a value (b= 0.21; Cl 95%= -0.77 to 1.19; p= 0.672). These results showed that adult income in the community increased alcohol consumption by 0.21 units higher with low income, this relationship was not statistically significant.

**Table 4. Results of analysis of variable bivariate that affects alcohol consumption**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Path coefficient (b)** | **95% Cl** | | **p** |
| **Lower Limit** | **Upper Limit** |
| Structural Elements | -0.29 | -0.53 | -0.04 | 0.022 |
| Cognitive elements | -1.32 | -1.80 | -0.83 | 0.001 |
| Relational elements | -0.70 | -0.85 | -0.57 | 0.001 |
| Income | 0.21 | -0.77 | 1.19 | 0.672 |

**4. Multivariate Analysis**

Model identification is carried out to identify the number of variables measured, the number of exogenous variables, endogenous variables, and parameters to be

estimated. The results of model identifica­tion in this research path analysis obtained a value of df= 8 or over identified, so that path analysis can be carried out.

**Figure 1. Measurement and Structural components**

**of The Influence of Social Capital on Smoking Behavior**

**and alcohol consumption**

Figure 1 of the analysis model presents the analysis of the structural equa­tion model (SEM) path which includes measurement and structural components about the influence of social capital on smoking behavior and akohol consumption. The measurement component in path ana­lysis shows that structural, cognitive, and relational elements provide positive factor loading to the latent variables of social capital. The structural component in the pathway analysis showed a negative effect of social capital on smoking behavior and alcohol consumption. This means that adults living in communities with high social capital have lower smoking behavior scores than those living in communities with low social capital. Likewise, adults living in societies with high social capital had lower alcohol consumption scores than those living in societies with low social capital. In other words, social capital has a preventive effect on smoking behavior and alcohol consumption.

Table 5 shows that the structural component in the pathway analysis has a negative effect of social capital on smoking behavior and the influence is statistically significant. That is, adults living in commu­nities with high social capital have lower smoking behavior scores than those living in communities with low social capital (b= -0.80; Cl 95%= -0.88 to -0.71; p= 0.001).

Likewise, in the structural component in the pathway analysis, there is a negative effect of social capital on alcohol consump­tion. That is, adults living in communities with high social capital have lower alcohol consumption scores than those living in communities with low social capital (b= -0.71; Cl 95%= -0.80 to -0.63; p= 0.001).

In the component of measuring struc­tural elements, it provides a positive factor charge for the social capital variable (b= 0.35; Cl 95%= 0.21 to 0.49; p= 0.001), then the cognitive element provides a positive factor charge to the social capital variable (b= 0.46; Cl 95%= 0.33 to 0.60; p= 0.001), and the relational element provides a posi­tive factor charge to the social capital variable (b= 0.80; Cl 95%= 0.71 to 0.88; p= 0.001).

**Table 5. Results of pathway analysis on social capital elements that influence smoking behavior and alcohol consumption.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variables** | **Independent variables** | **Path coefficient (b)** | **95% Cl** | | **p** |
| **Lower limit** | **Upper limit** |
| **Structural** |  |  |  |  |  |
| Smoking Behavior | 🡨Income  🡨Social Capital | 0.05  -0.80 | -0.05  -0.88 | 0.15  -0.71 | 0.311  0.001 |
| Alcohol consumption | 🡨Income  🡨Social Capital | 0.03  -0.71 | 0.08  -0.80 | 0.14  -0.63 | 0.586  0.001 |
| **Measurement** |  |  |  |  |  |
| Structural | 🡨 Social Capital | 0.35 | 0.21 | 0.49 | 0.001 |
| Cognitif | 🡨 Social Capital | 0.46 | 0.33 | 0.60 | 0.001 |
| Relational | 🡨 Social Capital | 0.80 | 0.71 | 0.88 | 0.001 |
| **RMSEA= 0.08** |  |  |  |  |  |
| **CFI= 0.97** |  |  |  |  |  |
| **TLI= 0.92** |  |  |  |  |  |
| **SRMR= 0.03** |  |  |  |  |  |
| **p= 0.020** |  |  |  |  |  |

Table 5 shows that social capital is negati­vely and significantly associated with smoking behavior. Individuals living in communities with higher social capital tend to have lower smoking behavior scores (b= -0.80; 95% CI = -0.88 to -0.71; p = 0.001). This indicates the protective role of social networks and community engagement.

Social capital is also negatively asso­ciated with alcohol consumption. Commu­nities with stronger social ties and support systems show lower levels of risky alcohol use (b = -0.71; 95% CI = -0.80 to -0.63; p = 0.001). This suggests that social capital may contribute to healthier behavioral norms.

The structural equation model (Table 5) demonstrates a good fit to the data with the following indices: p = 0.020, RMSEA= 0.087, CFI= 0.97, TLI = 0.92, and SRMR= 0.03. These results confirm that the proposed model aligns well with the observed data and does not require further modification.

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| **DISCUSSION** |

1. **The influence of social capital on smoking behavior.**

This study found that there was a negative influence of social capital on smoking behavior. This research is in line with the statement of Sun & lu., (2024) which states that social capital significantly controls the health behavior of adults who smoke. High social capital in adults has a low association with smoking habits. The results of this study explain that adults who have high social capital tend to increase relatively high social trust in the government and public health policies so that it will encourage cooperative actions of the com­munity to follow health-related regulations and the social benefits of healthy behaviors such as not smoking.

The findings of the study from Xue et al., (2017) support that high social trust is significantly associated with a lower likeli­hood of smoking. The results of the study by Xu et al., (2020) explained that social capital related to special beliefs is signi­ficantly related to smoking. Compared to samples with low general confidence, samples with high levels of specific confi­dence were less likely to smoke.

1. **The influence of social capital on alcohol consumption.**

Adnum et al. (2024) stated that higher levels of relational and cognitive elements of social capital in adults are associated with a lower risk of alcohol consumption. High social capital has a significant effect in helping to understand the risks of alcohol consumption and in protecting adults from the harmful effects of excessive alcohol intake. The study results indicate that individuals can benefit from being engaged in social networks within the community.

Another study conducted by Wang et al., (2024) concluded that the variables used were structural social capital (involved in social activities and social participation), cognitive social capital (trust) and five indi­vidual health behaviors to prevent disease and maintain health, namely: no smoking, no alcohol consumption, exercise and physical examination. The results of the study of structural social capital variables (social participation) were significantly corre­lated with alcohol consumption beha­vior. This is also supported by research conducted by Villalonga et al., (2020) showing that positive social capital has a relationship as a protective factor against the consumption of alcoholic beverages in adult women and men, while negative social capital is a risk factor for the consumption of alcoholic beverages in adult women and men.

**AUTHOR CONTRIBUTIONS**

Maoli Zartika is the main researcher in this study as determining the topic, conducting research, collecting data, analyzing data, and writing a manuscript. Bhisma Murti helps develop conceptual framework topics, guide data analysis, and interpret the results of data analysis. Argyo Demartoto provided input on the research topic.

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**CONFLICTS OF INTEREST**

There was no conflict of interest in this study.

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