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Parental Knowledge Influenced the Effectiveness of Role Play on Food Safety Behavior in School-Age Children

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Abstract

Introduction: Health problems due to unsafe food in Indonesia often occur, especially amongst school-aged children. School-aged children need to be given health education related to food safety to prevent food poisoning. Parents have an essential role in health among school-aged children. **Objectives:** This study aimed to determine the most influential factors of role-play on food safety behavior among school-aged children (6–12 years). **Method:** The study design was quasi-experimental with pre-and post-test designs. It involved 101 school-age children equally divided into intervention and control groups. Multistage random sampling was used to determine the research area and school where the research was conducted, while the research subject was selected using a simple random sample. The intervention group was treated in the form of a group process with the implementation of a role play for four weeks, which was carried out four times a month and lasted for 40 minutes per session. The analysis of data was performed using the ANOVA test. **Results:** The results showed that parental knowledge had a significant effect on the influence of therapeutic role-play on students' learning ($p = 0.004$), attitudes ($p = 0.007$), and prevention skills ($p = 0.009$). Parental knowledge is the most influential factor in effective therapeutic role-play on food safety behaviors among school-aged children (6–12 years). **Conclusion:** The role-play method can improve the food safety behavior of school-aged children. The role-play method should be an effective and interactive health education intervention for elementary school-aged children. Role-play can involve the food safety behavior of parents and teachers in further study.

Keywords: food safety, role play, parental knowledge, school-age children

INTRODUCTION

School-aged children (SAC) are 6 to 12 years old (1). The motor development of children at this age is speedy but not yet balanced with their intellectual development, where SAC begins to develop logical thinking even though it is still tied to perceptual facts (2). Therefore, SAC cannot predict the level of danger, including the lavatory hazard of unsafe food. This makes SAC often experience various health threats related to food safety, such as foodborne disease, food ingredients that contain dangerous substances, and nutritional intake that is less than necessary (3).

School-age children need to understand the criteria for safe food. Safe food is defined as balanced food that meets the needs of energy, protein, fat, minerals, vitamins, and other nutritional components and does not cause illness. Not causing disease is defined as food safe from contamination by disease-causing microorganisms and free from harmful chemicals. There are still many health cases that occur due to low food safety. The results of an Asian food safety conference held in Malaysia in 2014 informed that the incidence of foodborne diseases such as diarrhea is still a top priority. Food contamination e, especially by microorganisms, is the leading cause (4). As a result, the contamination of food by E. coli bacteria caused more than 3950 morbidity and 53 deaths in European countries in 2011 (5).

Food poisoning cases also occurred in India, which caused 23 elementary school children to die (6). Health cases due to food safety in children in Indonesia are still relatively high. Based on research results Handoyo, in Indonesia, health problems due to food are experienced by 21.4% of children, whereas the school-age group shares 75.5% of them, with the most frequent cause being food poisoning (7). Ayuningtyasalso stated that snacks contaminated with E. coli in schools are closely related to diarrhea among school children in Sukatani Depok. The results are supported by research Sofiana which said that 34% of street food was contaminated with E. coli bacteria based on the results of the analysis of the variable test of food sold by food traders in the Tapos District Elementary School consisting of 50 samples of snack foods. This will increase the risk of getting diarrhea at school age which can harm the growth and development of school-age children (8); Growth and development of children that are not optimal will reduce the quality of children, which will affect the future of school-aged children.

Diarrhea is also one of the potential disease outbreaks due to food poisoning, often accompanied by death, especially in areas where the risk factor control is still low in Banyumas the Regency. Diarrhea cases in Banyumas Regency from year to year are still high compared to other disease cases. Based on data from the Banyumas District Health Office, the diarrhea morbidity rate in Banyumas Regency in 2014 increased to 214/1000 population, while in 2013, it was 21.55 / 1000 population. The causes of diarrhea problems in Banyumas Regency include behavioral and environmental factors. Behavioral factors are the dominant factors causing health problems (11). The preliminary survey on 41 school-age children in the Purwokerto area obtained data that 22 children (53.7%) had a history of diarrhea in the lastthree3 months. Only 14 children (34.1%) made a habit of washing their hands before handling food, and only 11 children (26.8%) completed the habit of washing their hands after defecating using soap. In comparison, 30 children (73.2%) Washed their hands with running water only. In addition, as many as 28 children (68.3%) bought unhealthy snacks such as uncovered food and foods containing coloring and preservatives at school, while 13 children (31.7%) used to bring food from home (9).

This condition encourages efforts to fulfill nutritional needs and food safety as much as possible. One of WHO's efforts is

the Global Strategy for Food Safety, with the primary strategy being health promotion. Unfortunately, health promotion programs are still running separately in Indonesia, so they are not yet running optimally. So an integrated health program is needed, namely the School Health Unit Program (10). The Ministry of Health has introduced a comprehensive and integrative approach through the Advocacy, Community Development, and Community Empowerment Model Movement (CEMM). However, CEMM has not succeeded in improving the health status of students. Therefore, researchers developed a school health nursing care intervention method that enhances the role of nurses in collaborating with the roles of teachers, students, and families to trigger changes in food safety practices. The intervention implemented is a role play that emphasizes the food safety program builds a culture of choosing, managing, and consuming healthy and safe food through collaboration between teachers, students, and families (11).

Thibodeau, Gilpin, Brown, and Meyer carried out research related to role-playing in 110 children aged 3 to 5 years (12). The results showed a cognitive increase in the intervention group who played fantasy roles. Meanwhile, the control and non-imagined playgroups did not experience cognitive improvement. Meacham, Vukelich, Han, and Buell also state that playing role-play is an essential language development method in children (13). Sunish conducted research using the role-play method with peers. Role-play provides opportunities for acting and interacting with peers (14). The results showed that role play significantly improved communication skills in children with moderate mental retardation. These studies are supported by Lillard, Lerner, Hopkins, Dore, Smith, and Palmquist, which state that role-playing improves children's creativity, intelligence, conservation, and thinking skills (15). Role-playing methods that use folklore positively affect students' speaking skills. Based on the phenomena described, it is necessary to conduct further research on the impact of role-playing on improving food safety attitudes and skills in elementary school-aged children. Therefore, it is essential to identify the effect of role-playing on changes in the prevention of food safety in school-age children after being controlled for education, income, parental knowledge, and availability of handwashing facilities, hygienic latrines, and clean water sources. This study aimed to determine the most influential factors of role-play on food safety behavior among school-aged children (6–12 years).

METHOD

Design

This study incorporated a quasi-experimental design with pre-and post-tests, using the control group method. The design of this study was to measure the most influential factors of therapeutic role-play on food safety behavior and preventive behavior among school-age children (6–12 years).

Population and Study Setting

The sample size was 101 children; 51 were assigned to the intervention group and 50 to the control group. Multistage random sampling was used to determine the area and school where the research was to be conducted, while the subject of the study was determined using a simple random sample. North Purwokerto was selected as the intervention group, while Kedungbanteng elementary school was chosen as the control group.

The Instrument for Data Collection

The data collection tool used in this study was a questionnaire based on the guidelines of previous research and guidance from the Directorate General of Disease Control and Environmental Health of Indonesia and the Health Ministry of Indonesia (16). The component of the instrument consists of 10 questions of knowledge variables (Guttman scale), four questions of attitude variables (Likert

scale), and nine questions of skill variables (Guttman scale). The validity and reliability test result showed that the instrument is valid and reliable to measure food safety behavioral prevention behavior of knowledge variables (r > 0.361; Cronbach's alpha = 0.813), attitude variables (r > 0.361; Cronbach's alpha = 0.821), and skill variables (r > 0.361; Cronbach's alpha = 0.835). In addition, an observation sheet was used to identify the availability of handwashing facilities, healthy restrooms, and clean water sources.

Data Collection Process

The data were collected in March-May 2020 in North Purwokerto as an intervention group and Kedungbanteng as a control group. Research assistants involve in this study. The research assistant helps the research coordinator to collect the data, for example, assisting the children in filling out the questionnaire.

Intervention

The role play was conducted in groups of 9 to 10 children. The researcher intervened six times within three weeks for 40 minutes per session. Each session consisted of 20 minutes of role-playing and a focus group discussion (FGD). The role play consists of how to choose food safety and hand washing. Researchers involved various peers of children who were actors in the role play. Final behavioral measurements were taken after a 2-week internalization phase. The researchers also provided health education about food safety to the control group on one occasion. The researchers also provided health education about diarrheal prevention to the control group using the conventional method (presentation model).

Data Analysis

After controlling the variables above, the multivariate analysis determined the most influential role play factors. There are three dependent variables: knowledge, attitudes, and skills; these variables have a numerical scale. There are seven covariate variables: education level, income, parental ability, history of food safety behavior for the previous three months in children, availability of handwashing facility, rest roominess, and clean water sources. Therefore, the multivariate test used was a general linear regression test: the multivariate analysis of covariance (MANCOVA).

Ethical Aspects

This study applied ethics in research to each respondent and respected human dignity, nonmaleficence, and justice. The faculty has approved it of Nursing Ethics Committee No. 159 / EC / KEPK / VIII / 2020.

RESULTS

The characteristics of the respondents were as follows: The education levels of the parents were primarily low (60.3%); the incomes of the parents were in a common category (67.5%); most children had experienced a food safety behavioral disease in the previous three months (54.3%); and handwashing facilities, clean water sources, and healthy latrines were readily available (67.5%).

Table 1. The initial model of the effect of role-playing on food safety behavior in school-age children in the Purwokerto in 2020 (n = 101)

No	Dependent variables	*F Value*	*Partial Eta (R) Squared*	p-*value*
1	Knowledge	3188.037	0.289	0,002
2	Attitude	9340.471	0.367	0.002
3	Skills	8975.949	0.412	0.003
Pillai's Trace		4246,564a	0.976	0.001

Table 1 shows that the *p-value* for Pillai's trace (F = 4246,564a, p = 0.001) showed that role play affects school children's knowledge, attitudes, and skills. R squared offers a value of 0.994, meaning that the dependent variable is influenced by role play by 97.6%, while other factors influence the rest. The research continued with the interaction test to determine interactions between variables.

Table 2. Results of the interaction test between dependent variables of food safety behavior in school-age children in Purwokerto Subdistrict in 2020 (n = 101)

Dependent variables		Knowledge	Attitudes	Skills
Knowledge	r	1	0.348	0.412
	p		0.001	0.001
Attitude	r	0.348	1	0.763
	p	0.001		0.001
Skills	r	0.412	0.763	1
	p	0.001	0.001	

The results of the interaction test show that all variables had a value of p < 0.05. Therefore, it can be assumed that interactions occur between all dependent variables. The strength of the correlation can be seen in the value of R. Based on the test results, the force between variables is medium-strong (0.348–0.763) with a positive direction, meaning that the higher the knowledge, the higher the attitude and skills. After the interaction test results, the confounding test followed suit.

Table 3 Results of confounding testing of food safety behavior in school-age children in Purwokerto Subdistrict in 2020 (n = 101)

No	Research Variables	*F value*	*Partial Eta (R) Squared*	p-*value*
1	Parental knowledge	6.285 a	0.356	0.002
2	Education level	0.544	0.089	0.451
3	Family incomes	1.242 a	0.055	0.356
4	Handwashing facilities	1.783a	0.069	0.257
5	Availability of healthy latrines	0.542a	0.022	0.468
6	Availability of healthy water sources	0.805a	0.045	0.356
7	History of diarrhea in children for the past three months	0.381a	0.016	0.665

The results of the confounding test showed that the six variables are not confounding because they have a *p-value* of > 0.05. Therefore, some of these variables must be removed from the model. Some insignificant variables are issued gradually, starting with the highest p values-values education levels. After removing the model, the change in the *R-value* is not more than 10%, so that variable is still issued. The same is done for the following variables (i.e., family incomes, availability of handwashing facilities, availability of healthy latrines, availability of clean water sources, and history of food safety behavior during the previous three months) until there are no variables with p < 0.05. Only the variable of parents' knowledge was confirmed as confounding.

Table 4 The initial model of the effect of role-playing on food safety behavior in school-age children after being controlled by parental knowledge in the District of Purwokerto in 2020 (n = 101)

No	Dependent variables	Before being controlled by parental knowledge		
		F value	*Partial Eta (R) Squared*	p-value
1	Knowledge	2876.125	0.324	0,003
2	Attitude	7834.221	0.412	0.006
3	Skills	8695.342	0.360	0.005
Total (*Pillai's Trace*)		4135.578a	0.982	0.004

Table 4 showed that the *p-value* for Pillai's trace (F = 4135.578a, p = 0.004) means that role play affects school children's knowledge, attitudes, and skills before being controlled by confounding. R squared shows a value of 0.982, which means that the role play influences the dependent variable by 99.40%, and other factors influence the rest. This means that role play influences knowledge, attitudes, and skills of school-age children before being controlled by the confounding factor (parental knowledge).

Table 5 The final model of the effect of role-playing on food safety behavior in school-age children after being controlled by parental knowledge in the District of Purwokerto in 2020 (n = 101)

No	Dependent variables	After being controlled by parental knowledge		
		Nilai F	*Partial Eta (R) Squared*	p-value
1	Knowledge	1427.051	0.250	0.004
2	Attitude	3214.217	0.212	0.007
3	Skills	3346.020	0.221	0.009
Total (*Pillai's Trace*)		1556.223a	0.976	0.005

A subsequent analysis shows the *p-value* for Pillai's trace (F = 1556.223a, p = 0.005). The R squared value is 0.976, meaning that the value of the dependent variable decreases after being influenced by role-playing and controlling for parental knowledge by 97.6%. Thus, the analysis results conclude that role play affects school-age children's knowledge, attitudes, and skills in food safety.

DISCUSSION

The results of the multivariate analysis show that role play affects the knowledge, attitudes, and prevention of food safety behavior in school-age children. School-age children's knowledge attitudes and skills increased to 98.20% when they were already influenced by parental knowledge. After controlling for parental knowledge, the effect of role-playing on the inside, attitudes, and food

safety behavior-prevention skills of school-age children decreased to 97.60%. This means that low levels of parental

knowledge reduce the effect of role-playing by 2.4%. The results of this study indicate that role play is more effective when it is coupled with high levels of parental knowledge. Therefore, parents' education levels also need to be addressed to study the effect of role-playing in further research.

Parental knowledge is one of the most influential factors affecting behavior modification; unsafe food is prevented when parents model techniques such as handwashing. The availability of clean water and hygienic latrines does not affect the incidence of food safety. Handwashing

is a critical practice that prevents food safety behavior. Most parents (94.9%) play a role in teaching their children how to wash their hands. Based on the results of this study, the percentage of parents who order their children to wash their hands is 91.5%. The percentage of children who obtained information from parents is 47.5%; 16.9% accepted input from the television; 6.8% received notification from the school; 6.8% got news from magazines, and 22% got feedback from others. Children obtain the majority of their information from their parents. Parental knowledge affects food safety behavior prevention behavior in school-age children. Parents' health education is also required to improve food safety behavioral prevention behavior in school-age children.

School-aged a group at risk of experiencing health problems. Broader interaction with the environment will increase the risk factors that can cause health problems (17). Stanhope and Lancaster explained that the risk group has a higher risk of experiencing health problems than others (20). School-age children begin to interact more broadly with the surrounding environment, so the risk factor for developing food poisoning problems is higher (18). the role chess applied the school method according to cognitive development and the developmental stage of school-age children, namely learning while playing. School-age children begin to enter the concrete operational location of Piaget's cognitive theory, where the child is serious about his behavior and begins to think logically (19). Sare and Ogilvie also state that increasing awareness through education with dramatic relief methods is an alternative to advancing knowledge. The relief dramatization method can explore feelings and emotions that could result in individuals, which can be done by playing role play (20). Hsieh Explained that role-playing could improve children's fine motor skills and imagination (21). The dramatic relief method played by school-age children in the role-play play gives a deep impression to school-age children so that it is more sedentary.

The change in attitude after the intervention positively impacts increased knowledge. Respondents who previously did not know about food safety then changed their attitude patterns. Respondents' attitudes raise children's afterschool-age children to realize the importance of healthy behavior. Based on the HPM theory, commitment to the action plan is influenced by interpersonal factors through peer support (22). The concept of role-playing uses peer models as characters in role plays. In addition, researchers also use the principle of reward and punishment during the intervention process for school-age children. Nurses focus on reward and punishment by packaging all activities into a form of competition during the intervention process. For example, a group that obeys the rules of the researcher and can perform the role play well will be rewarded. On the other hand, groups that do not follow the laws of the researcher, for example, quarreling, disturbing friends, and being busy when performing role-plays, will be penalized by singing the national song in front of their friends. This principle is quite effective in encouraging school-age children to change bad behavior.

The principle of reward and punishment is by the stage of moral development in school-age children. The honest story of school-age children begins to change from an initially egocentric mindset to a logical one. Children learn to obey the rules and recognize the rewards and sanctions received according to their actions (23). School-age children begin to learn rules of conduct and will feel worried about breaking those rules of behavior. Therefore, rewards and sanctions are essential components in the moral development of school-age children. Rewards can be applied if the child can better carry out the rules given according to the agreement. However, sanctions are also used if the child violates the agreed laws of

behavior. Therefore, these principles can improve one's attitude to change health behavior.

Although there was an increase in student attitudes as a whole. The results of filling out the questionnaire on student attitudes also showed results that needed to be considered for strengthening student education regarding routine monitoring of height and weight every six months because the attitudes of students who agreed were still low. Researchers argue that students do not understand that the fulfillment of good nutrition influences monitoring height and weight. Watching average body weight according to BMI is one of the four pillars of the 2014 PGS and indicators of PHBS in schools (26). School-aged children may not understand how this monitoring should be done, even though it can be seen in the nutrition status chart. Therefore, parents, teachers, or school nurses must always guide School-aged children to monitor students height/weight status regularly.

The increase influences skills improvement in knowledge and attitudes of school-age children. Wahid et al. describe someone who has a good mood and has good skills (24). Notoadmodjo health skills are a person's activity to maintain and improve health (24).

Research result Apriany shows an increase in healthy behavior after health education (26). Furthermore, Apriany explained that health education is an effort to improve one's ability and make the right decisions regarding health care based on the experience gained. The HPM theory influenced the previous healthy behavior outcome by biopsychosocial processes and individual experiences (27,28).

Individual experiences of school-age children can also influence healthy behavior. Based on the HPM theory, personal experiences can be a strategy to change health behavior through behavior action methods. Role-play in this implementation uses peers as characters who play role plays. Wahyuni also uses peers to provide an example of handwashing behavior in preventing diarrhea (16). How to teach skills during the intervention process involving peers to provide an example of food safety. Individual experiences can be reflected through the role of role-playing figures. Children act as characters who play diarrhea prevention behaviors such as using healthy latrines, healthy water sources, washing hands with soap in running water, consuming vegetables and fruits, and physical activity. Therefore, role play can help influence children's behavior toward healthy behavior.

The habit of washing hands with soap in running water affects the incidence of diarrhea in children. Research result Awyono showed that diarrhea tends to occur in lousy handwashing behavior (64.3%) compared to good handwashing behavior (14.8%). Nicholson et al. (2014) explained that the behavior of washing hands regularly in children could prevent morbidity in the family and reduce school absences. Contzen, Meili, and Mosler also stated that handwashing could prevent infectious diseases such as diarrhea in children (34). In addition, washing hands before preparing food is also a factor associated with diarrhea. Therefore, washing hands using soap in running water must become a child's culture to improve food safety.

Students' skills towards food safety in this study were measured by a questionnaire in the form of pictures. Researchers realize that these measurements may be less effective and not optimal. The height might be better if it is done by direct observation of students' skills in applying the principles of daily food safety. Based on the transtheoretical model, changes' skills will remain if they have passed the maintenance stage, which takes approximately six months (29).

Meanwhile, role play is held for four weeks so that changes in students' skills or

abilities in general towards food safety need to be internalized to support skill changes which then become habits.

CONCLUSION

Role-play improves the food safety behavior of school-age children. Role-play affects the knowledge, attitudes, and prevention skills of food safety behavior in school-age children. After parental knowledge was controlled for, the effect of role-playing on the inside, attitudes, and food safety behavioral prevention skills of school-age children decreased to 98.30%. This means that low levels of parental knowledge reduce the effect of role-playing by 1.1%. The results of this study Indicate that role play will be more effective when coupled with high levels of parental knowledge. Socio-dramatic space is a game of interest among school-age children. It can also be integrated into the curriculum through various school subjects (e.g., art, physical education) by the School Health Unit (UKS) to promote preventive behavior. Role-play can also be applied to other health issues, such as preventing acute respiratory infection and various skin diseases in school-age children. Further research should be conducted to identify health education methods that involve parents and teachers in socio-dramatic play.

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