

An Evaluative Study on the Quality of Papers on the Effects of the Smoking Prevention Programs in Korea*

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	Abstract

I. Introduction

Cigarette smoking among adolescents has generated much concern in Korea. 2001 was designated as the year of adolescent smoking prevention and smoking prevention demonstration programs were undertaken in schools. As well as smoking prevention demonstration programs, a substantial number of research reports evaluating programs designed to prevent adolescent smoking have been published in the last decade since Korea's

first evaluation study of smoking prevention programs emerged in 1992.(Doo 2002; Han 2001; Hwang 1999; Kim 2002; Kim 2001; Kim 2001; Kim 2003; Kim, Ji, & Oh 1992; Kim, Jun, & Lee 2000; Kwak 2003; Lee 2001; Lee 2002; Moon & Song 2001; Park, Kang, & Ryu 2001; Park, Park, & Lee 2003; Roh 1996; Roh 2001; Seo 2001; Shin 2000).

At present, it seems worthwhile to evaluate the study quality of these evaluation studies.

Smoking prevention programs in Korea have ranged from those that teach factual

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knowledge about smoking to those that teach personal skills to resist smoking. Smoking prevention program studies in Korea have shown inconsistent results regarding how successful the programs are. Despite the potential of smoking prevention programs, debate continues about their effectiveness in influencing the smoking behavior of adolescents. It is necessary for research readers or reviewers to critically assess the methodological and statistical validity of articles before accepting results or conclusions (Ahn & Lee 1991) and before meta-analyzing for synthesis of their results (Bruvold 1993; Hwang 2000; Rooney & Murray 1996). One researcher has suggested that meta-analytic findings should rest on only the most sound research (Bamger-Drowns 1988) and another researcher argued that quality of study should be a factor influencing effect size of smoking prevention programs (Bruvold 1993).

Since recent studies have suggested that smoking prevention programs are not as effective as was once thought (Peterson et al. 2000), quality has become an issue. Several studies that reviewed evaluation studies of smoking prevention programs have pointed out that substandard methodology had been employed by researchers evaluating prevention interventions (Bruvold & Rundall 1988; Hwang 2000). But there is no research that focuses on the quality of studies of smoking prevention programs in Korea.

Several study quality assessment tools exist but those are for clinical randomized control trial studies (Chalmers et al. 1981; Cho & Berro 1994) or for medical research (Ahn & Lee 1991). Several meta-analysts report that they have developed their own study quality assessment tools (Bruvold 1993; Corcoran, Miller, & Bultman 1997; Kim et al. 1999), but they have not presented the tools in detail. Gibbs (1989) developed the Quality of Study Rating Form and revised it in 1996 (Gibbs & Gambrill 1996). Because the QSRF does not have intermediate criteria, it is easy to apply.

This study applied the QSRF evaluation technique to determine the quality of smoking prevention programs. The major objective of this investigation was to summarize a few prominent features of smoking prevention program studies and to evaluate the quality of smoking prevention program studies using the Quality of Study Rating Form (QSRF) developed by Gibbs (Gibbs & Gambrill 1996). This study can contribute to improving study quality in future evaluation studies of smoking prevention programs.

II. Methods

1. Selection criteria of studies

Criteria for including studies in the sample were 1) the study implemented an inter-

vention designed to prevent smoking, 2) the study had a control or comparison group, and 3) the study had some quantitative outcome measures of smoking knowledge, attitude and behavior. Published and unpublished studies conducted up to February 2003 were found by a thorough search of the National Digital Library of Korea and the Research Information Center for Health in Korea. Research lists funded from the Korea Research Foundation, the Korea Science and Engineering Foundation, and the Korea Institute of Health and Social Affairs were also examined, as were bibliographies from articles. Key words for searching were: smoking prevention, smoking education, and adolescents/youth /students smoking.

38 studies were found, of which 10 were excluded because the interventions were intended for smoking cessation among smokers, not for smoking prevention. 3 were set aside because there were no controls. And one article was omitted because it was the same as a thesis study that was already included. 24 studies were included in this evaluation.

2. Description of the quality of study rating form(QSRF)

The Quality of Study Rating Form developed by Gibbs in 1989 (Gibbs 1989) and revised in 1996 (Gibbs & Gambrill, 1996) has eighteen items of quantified criteria con-

cerning study quality. These are added to compute a Total Quality Points index. The eighteen items include; 1) full description of subjects (4 points), 2) full description of intervention (4 points), 3) description of places of interventions (4 points), 4) description of time including intervention period, number of sessions, and interval of each session (4 points), 5) specific theory or literature cited justifying the intervention (4 points), 6) random assignment (10 points), 7) equality at the baseline between treatment group and control group before treatment (5 points), 8) subjects are blind to being in treatment or control group (5 points), 9) random sampling (4 points), 10) presence of a no-treatment control group (4 points), 11) sample size is large enough (more than 21 for each group (5 points), 12) outcome measures have face validity (4 points), 13) a reliability test is used (5 points), 14) there is a desirable reliability coefficient (greater than .70) (5 points), 15) the outcome is rated blind (10 points), 16) the time of measuring outcome is after intervention was completed (4 points), 17) presentation of statistical significance with $p\text{-value} < .05$ (10 points), 18) follow-up is greater than 75% (10 points).

Each item has its own weight as shown in the parenthesis, the form is arranged to allow Total Quality Points ranging from 0 to 100 points. These eighteen items were designed to get all-or-nothing weights

because intermediate criteria would complicate the explanation for criteria and could reduce overall reliability.

3. Application and reliability of the QSRF

Application of the QSRF in the present study was accomplished by translating it into Korean and then discussing the meaning of each item. Each study reviewed was independently coded on the 18 items of QSRF by two investigators. Disagreement occurred for 10 items at 4%-30%. Discrepant codes were resolved by rechecking studies after independent coding. Finally, the disagreement rate was decreased to 9% for only 2 items and 0% for other items.

4. Analysis

Data were analyzed for frequency and percentage with SPSS Win v10.2. For total quality points, mean and standard deviation were calculated.

III. Results

1. Characteristics of studies of smoking prevention programs

Major features of the studies are described in Table 1>. All the studies were published or released between 1992 and 2003, and the median year was 2001. 83.3% of studies have been reported since 2000. 66.7% of them came from dissertations and all others came

Table 1. Characteristics of studies(N=24)

Characteristics	Frequency	%
Year published or released		
- 1999	4	16.7
2000 -	20	83.3
Publication type		
dissertation	16	66.7
article in journal	5	20.8
project report	3	12.5
Grade		
elementary school	8	33.3
middle school	8	33.3
high school	7	29.2
college	1	4.2
No. of schools participated		
1	11	45.8
above 2	13	54.2

Table 2. Distribution of TQP(Total Quality Points) of studies

TQP	Frequency(N=24)	%
Mean(S.D) Range	57.29(8.61), 44-71	
- 50	6	25.0
51-60	9	37.5
61 -	9	37.5

from journals or project reports. 8 of the smoking prevention programs took place in elementary schools, 8 were performed in middle schools, 7 in high schools, and only 1 program took place at the college level. 11 of the interventions selected subjects for the experimental group and control group from one school at the same time.

2. Evaluation results of study quality of smoking prevention programs

Table 2> represents the evaluation results of study quality. TQP (Total Quality Points) was calculated by adding the points for the 18 items. This score ranged from 44 to 71 and the mean was 57.29. 25.0% of the studies scored below 50 TQP, 37.5% were between 51 and 60 TQP, and 37.5% were above 61 TQP.

Table 3> shows the evaluation results of each criterion. 91.7% of the studies described the subjects by presenting their average age and standard deviation and proportion by sex. 83.3% attempted to tell what the intervention involved specifically. 50% stated where the intervention occurred specifically and 100%

gave the time of the intervention by stating how long subjects participated in the intervention in days, weeks, or months, or how many sessions were provided.

50% of the studies either discussed a specific theory that justified the use of one or more intervention methods, or they cited literature said to support the chosen intervention method.

Only one study assigned subjects randomly to experimental groups or control groups and 50.0% of the studies showed baseline equality. There was no study wherein subjects were blind to being in the treatment or control group or where subjects were selected randomly by random sampling procedure. 79.2% of the studies had non-treated control groups and 20.8% of the studies had comparison groups with other treatments in the form of either other delivery methods or other contents. Sample sizes were larger than 21 in the experimental group for all studies (the number of subjects in the experimental group must be 21 or more to compare with the control group).

Table 3. Frequency and percentage of studies which met each criteria

Criteria for evaluation of study quality	Frequency (N=24)	%
1. Full description of subjects(4pts)	22	91.7
2. Full description of intervention(4pts)	20	83.3
3. Description of intervention place(4pts)	12	50.0
4. Description of intervention time, interval, and period(4pts)	24	100.0
5. Presentation of specific theory or literature related to their intervention (4pts)	12	50.0
6. Subjects randomly assigned to treatment or control(10pts)	1	4.2
7. Analysis shows equal treatment and control groups before treatment(5pts)	12	50.0
8. Subjects blind to being in treatment or control group(5pts)	0	0.0
9. Subjects randomly selected for inclusion in study(4pts)	0	0.0
10. Control group(non-treated) used(4pts)	19	79.2
11. Sample size larger than 21 for each group(4pts)	24	100.0
12. Outcome measure has face validity(4pts)	18	75.0
13. Outcome measure was checked for reliability(5pts)	14	58.3
14. Reliability measure has value greater than .70(5pts)	11	45.8
15. Those rating outcome rated it blind(10pts)	0	0.0
16. Outcome was measured after intervention completed.(4pts)	24	100.0
17. Test of statistical significance was made and $p < .05$ (10pts)	24	100.0
18. Follow-up was great than 75%(10pts)	24	100.0

75% of the studies stated face validity of outcome measure or cited from previous literature. 58.3% of the studies tested reliability and 45.8% reported the reliability measure was a figure of .70 or greater. There was no study where those rating outcomes were rated blind, because researchers generally collected data by themselves. Outcome measures were taken only after the intervention was completed and tests of statistical significance were generally referred to statistical method and p value $< .05$. in all studies. All studies met the criteria that follow-up was greater than 75%.

IV. Discussion

In this study, 24 school-based smoking prevention programs were subjected to an evaluation of study quality using QSRF. In spite of almost a decade of research on smoking prevention programs, individual evaluations have not conclusively answered fundamental questions about the effectiveness of smoking prevention program in decreasing smoking behavior. An evaluation of study quality needs to come first before exploring general conclusions.

1. Characteristics of Studies

Interventions for smoking prevention were applied to elementary, middle, and high school students evenly. The CDC recommended that instruction for smoking prevention should be especially intensive in middle school and should be reinforced in high school (CDC 1994). In light of this recommendation, it may be necessary to facilitate smoking prevention programs for middle school students.

In 11 studies, the subjects were selected from only one school. This could be a threat to internal validity, because where subjects are selected from one school, there can be a diffusion effect of treatment to control group. So it is difficult to make an inference that the intervention is truly influencing the outcome variables (Polit & Hungler 1999) and it is possible for the effect of the intervention to be underestimated.

2. Quality of Studies

Common methodological problems prevalent in the smoking prevention literature in Korea were: no use of random sampling no use of blind methods; lack of random assignment and insufficient reliability. Random assignment is relatively easier than random sampling.

Randomization in true experimental studies refers to assigning subjects to experimental conditions so that each person has an

equal chance of being selected for the treatment or control group (Gibbs 1989; Polit & Hungler 1999). The purposes of randomization are to control extraneous variables of subject characteristics and to detect true difference between groups (Nieswiadomy 1993). However, most of the evaluation studies of smoking prevention did not employ random assignment.

Blind method is one criterion that it is very difficult for a researcher to meet it in a smoking prevention program, because most researchers perform interventions directly.

Reliability of instrument concerns consistency and stability (Lee, Lim, & Park 1998). Correlation coefficients computed to test the reliability of an instrument are expected to be positive correlations. Generally, a correlation coefficient above .70 is considered satisfactory (Nieswiadomy 1993). This evaluation study found that 10 out of 24 studies did not test reliability and 3 out of 14 studies showed lack of reliability with below .70 of Cronbach alpha.

Another methodological problem is related to face validity. 25% of the studies did not report the validity of the instrument used. The face validity of an instrument can be examined through the use of experts in the content area or through the use of people who have characteristics similar to those of the potential subjects. In this study, when the researcher used an instrument that came from

previous research, it was considered to meet face validity. But this investigator did not check whether the instrument was tested for face validity in previous research or not, therefore face validity might be overestimated. In spite of this loose condition, 25% of the studies did not meet face validity.

QSRF may be useful to researchers who want to review a large number of intervention studies. This evaluation can contribute to the improvement of future evaluation studies. But there were several limitations in this QSRF.

First, intervention features were not considered because those features are beyond the extent of the present study. Second, this study did not consider whether appropriate statistical analyses were used in the studies reviewed. But intervention features might be investigated in the future because they proved to be important in previous analysis of smoking prevention programs (Bangert-Drowns 1988; Hwang 2000; Rooney & Murray 1996) and statistical analyses might be reviewed because statistical appropriateness is important to study quality.

V. Conclusion

This investigation was performed to summarize a few prominent features of smoking prevention program studies and to evaluate the quality of smoking prevention

program studies using the Quality of Study Rating Form (QSRF). QSRF focuses on methodological features, presentation of research method, and results.

28 evaluation studies designed to prevent smoking were found through a thorough search, 24 of them were evaluated in this study.

Study quality was 57.29 points out of 100 points on average, so it cannot be said that study quality was good. To improve study quality in the field of smoking prevention programs, university faculties might make an effort to teach research methodology to students at first, because 2/3 of the studies were dissertations.

This evaluative study found that common methodological problems in the studies reviewed were non-random assignment and outcome measurement through an instrument with insufficient reliability. Additional problems discussed were lack of description of intervention place and lack of presentation of specific theory or literature related to the intervention; and lack of equality at baseline.

In the future, researchers in this field should make an effort to reduce methodological errors, considering the above-mentioned methodological aspects.

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References

- Ahn, Y., and Lee, H. 1991. Development of a checklist for assessing the methodological and statistical validity of medical articles. *Journal of Korean Medical Education* 3(1):19-35.
- Bangert-Drowns, R.L. 1988. The effect of school-based substance abuse education-a meta analysis. *Journal of Drug Education* 18(3):243-264.
- Bruvold, W.H. 1993. A meta-analysis of adolescent smoking prevention programs. *American Journal of Public Health* 83(6):872-880.
- CDC. 1994. Guidelines for school health programs to prevent tobacco use and addiction. *Journal of School Health* 64(9):353-360.
- Chalmers, T.C., Smith, H., Blackburn, B., Silverman, B., Reitman, D., and Ambroz, A. 1981. A method for assessing the quality of a randomized control trial. *Controlled Clinical Trials* 2:31-49.
- Cho, M.K., and Bero, L.A. 1994. Instruments for assessing the quality of drug studies published in the medical literature. *JAMA* 272:101-104.
- Corcoran, J., Miller, P.O., and Bultman, L. 1997. Effective of prevention programs for adolescent pregnancy: A meta-analysis. *Journal of Marriage and the Family* 59:551-567.
- Doo, Y.T. 2002. *Development of education program for smoking prevention and giving up smoking in middle school students and the education effect evaluation*. Ph.D dissertation, Department of Physical Activity, Myongji University, Seoul.
- Gibbs, L.E. 1989. Quality of study rating form: An instrument for synthesizing evaluation studies. *Journal of Social Work Education*, 25(1):55-67.
- Gibbs, L.E., and Gambrill, E. 1996. *Critical thinking for social workers: exercises for the helping professions*. Thousand Oaks, CA:Pine Forge Press.
- Han, S.H. 2001. Effects of smoking prevention education on knowledge and attitude toward smoking and the satisfaction of education among middle school students. *Journal of Korean Community Nursing* 13(2):230-238.
- Hwang, M.S. 2000. *Meta analysis of adolescent psychosocial smoking prevention programs evaluated from 1978-1997 in the United States*. Ph.D. dissertation, Department of Education, Ohio State University, OH.
- Hwang, R.I. 1999. *The effects of the smoking prevention education on middle school student*. Master dissertation, Department of Nursing, Korea University, Seoul.
- Kim, J.H. 2002. *A study on comparison with*

- lecture and online discussion for smoking prevention education for adolescents.* Master dissertation, Department of Health Education, Ehwa Womans University, Seoul.
- Kim, S.J. 2001. *The effects of anti-smoking education program among primary school children on the smoking behavior, attitude and knowledge of smoking among middle school students.* M.P.H. dissertation, Graduate School of Public Health, Yonsei University, Seoul.
- Kim, S.K. 2001. *The influence of smoking cessation education program on university students' recognition of second-hand smoking exposure.* Master dissertation, Department of Christian Education, Sahn Yook University, Seoul.
- Kim, S.Y. 2003. *The effects of smoking prevention education on knowledge and attitude of smoking among high school students.* Master dissertation, Department of Nursing, Jeonbuk National University, Jeonju.
- Kim, S.W., Jun, H.J., and Lee, Y.O. 2000. *Development of the school- and community-based smoking prevention program for youth.* Seoul: Inje University/Ministry of Health and Social Affairs.
- Kim, T.M., Ji, S.H., and Oh, H.M. 1992. Effect of anti-smoking education on male high school students. *Korean Journal of Epidemiology*, 14(2):175-183.
- Kwak, H.J. 2003. *A comprehensive study on the attitude and knowledge of smoking between students in general school and student in smoking prevention education research school(Focusing on 5th and 6th grade students).* Master dissertation, Department of Education, Kangwon National University, Chunchon.
- Lee, E.H. 2001. *Development and effectiveness of a smoking preventive program for elementary students.* Master dissertation, Department of Nursing, Sahn-yook University, Seoul.
- Lee, E.O., Lim, N.Y., and Park, H.Y. 1998. *Nursing · medical research and statistical analysis.* 3rd Ed. Seoul: Soomunsa.
- Lee, M.K. 2002. *The effects on knowledge and attitudes of smoking by preventive education for the fifth grade student in elementary school.* Master dissertation, Department of Nursing, Kyunghee University, Seoul.
- Moon, J.S., and Song, K.A. 2001. *Status and evaluation of smoking prevention education in elementary schools.* Seoul: Catholic University/Ministry of Health and Social Affairs.
- Nieswiadomy, R.M. 1993. *Foundations of nursing research.* Norwalk: Appleton & Lange.
- Park, I.H., Kang, H.Y., and Ryu, H.S. 2001. Effects of a smoking prevention program

- an smoking related knowledge, attitudes, self-esteem, and stress in the first year of middle school. *Journal of Korean Society of School Health* 14(1):95-106.
- Park, S.W., Park, J.H., and Lee, J.Y. 2003. *Development and evaluation of smoking prevention program for high school students*. Daegu: Daegu Catholic University/Ministry of Health and Social Affairs.
- Peterson, A., Kealey, K., Mann, S., Marek, P., and Sarason, I. 2000. Hutchinson smoking prevention project: long-term randomized trial in school-based tobacco use prevention - results on smoking. *J Natl Cancer Inst* 92:1979-1991.
- Polit, D., and Hungler, B.P. 1999. *Nursing research: Principles and methods*. Philadelphia, PA: Lippincott.
- Roh, J.L. 1996. *The effects of smoking prevention program which emphasized social influence on high school boys*. Master dissertation, Department of Education, Yonsei University, Seoul.
- Roh, W.H. 2001. *Effectiveness of smoking prevention program based on social influence model in the middle school students*. Ph.D. dissertation, School of Medicine, Youngnam University, Daegu.
- Rooney, B., and Murray, D. 1996. A meta-analysis of smoking prevention programs after adjustment for errors in the unit of analysis. *Health Education Quarterly* 23(1):48-64.
- Seo, G.S. 2001. *The effect of smoking prevention education on the knowledge and attitude of smoking and self-esteem in the 5th and 6th graders of primary school children*. Master dissertation, Department of Education, Chonnam National University, Gwangju.
- Shin, Y.S. 2000. *Development of a smoking prevention education program and effectiveness on elementary school students-Focusing on students in 6th grade -*. Master dissertation, Department of Education, Andong National University, Andong.

ABSTRACT

This investigation was performed to summarize a few prominent features of smoking prevention program studies and to evaluate the quality of smoking prevention program studies using the Quality of Study Rating Form (QSRF). 24 school-based smoking prevention programs were subjected to an evaluation of study quality using QSRF. Study quality was 57.29 points out of 100 points on average, so it cannot be said that study quality was good. Most of the studies described the subjects and the intervention contents and intervention time. 50% stated where the intervention occurred specifically, 50% of the studies either discussed a specific theory that justified the use of one or more intervention methods, or they cited literature said to support the chosen intervention method. Only one study assigned subjects randomly to experimental groups or control groups and 50.0% of the studies showed baseline equality. There was no study where subjects were blind to being in the treatment or control group or where subjects were selected randomly by random sampling procedure. 79.2% of the studies had non-treated control groups and 20.8% of the studies had comparison groups with other treatments in the form of either other delivery methods or other contents. Sample sizes were larger than 21 in the experimental group for all studies. 75% of the studies stated face validity of outcome measure or cited from previous literature. 58.3% of the studies tested reliability and 45.8% reported the reliability measure was a figure of .70 or greater. There was no study where those rating outcomes were rated blind, because researchers generally collected data by themselves. Outcome measures were taken only after the intervention was completed and tests of statistical significance were generally referred to statistical method and p value in all studies. All studies met the criteria that follow-up was greater than 75%. The implications for the future studies were discussed.

Key words : Study quality, Evaluation, Smoking prevention programs, QSRF