빅 데이터 분석을 활용한 콩 식품 중재가 대사증후군 위험요인에 미치는 영향 메타분석

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A Meta-Analysis of Influencing Soybean Food Interventions on the Metabolic Syndrome Risk Factors Utilizing Big Data

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요 약

빅 데이터 분석은 기존 데이터베이스 관리 도구로부터 데이터를 수집, 저장, 관리, 분석할 수 있는 역량을 말한다. 또한, 대량의 정형 또는 비정형 데이터 집합으로부터 가치를 추출하고 결과를 분석하는 기술을 의미한다. 따라서 메타분석은 여러 실증연구의 정량적인 결과를 통합과 분석을 통해 전체 결과를 조망할 수 있는 기회를 제공하는 통계적 통합 방법이다. 또한 분석을 위한 분석이라고도 말한다. 우리나라 학술지에 게재된 대사증후군 위험요인에 콩 식품 중재에 관련된 연구들을 계량적으로 통합하고 검토해보기 위해 진행하였다. 본 연구는 대사증후군 위험요인에 대한 문헌적 고찰을 통해 선행연구를 살펴보고 열거된 요인에 관한 실증 분석된 연구들을 메타분석하기 위해 2000년-2016년 국내 학술지에 게재된 연구논문을 대상으로 하였다. 따라서 분석결과를 바탕으로 연구의 한계와 시사점을 제시하고자 한다.

ABSTRACT

Big data analysis refers the ability to store, manage and analyze collected data from an existing database management tool. In addition, extract value from large amounts of structured or unstructured data set and means the technology to analyze the results. Meta-analysis is a statistical integration method that delivers an opportunity to overview the entire result of integrating and analyzing many quantitative research results. Meta-analysis is sometimes expressed as an analysis of another analysis. Commonly, factors of metabolic syndrome can be defined as abdominal obesity, high triglycerides, low high density lipoprotein cholesterol, elevated blood pressure, and elevated fasting glucose. This study will find meaningful mediator variables for criterion variables that affect before and after the metabolic syndrome studies, on the basis of the results of a meta-analysis. We reviewed a total of 5 studies related to metabolic syndrome published in Korea between 2000 and 2016, where a cause and effect relationship is established between variables that are specified in the conceptual model of this study.

키워드

Big data, Meta-analysis, Metabolic syndrome, Soybean, Diet, Obesity

Ⅰ. Introduction

Metabolic syndrome can be defined with clinical characteristics such as waist circumference (abdominal obesity), blood pressure disorder, fasting blood glucose, high triglycerides, and fasting high density lipoprotein cholesterol, etc. The metabolic syndrome risk factors are reported major variables such as age, gender, stress, insufficient exercise, improper eating, not healthy lifestyle habits, and smoking. The world prevalence rate of the metabolic syndrome within adults shows an increase from 20% to 30%, with Koreans also reporting 28.8%, which is a rate of one in four adult people [1-4]. In addition, cardiovascular disease risk in the target person of the metabolic syndrome is higher than twice as compared to the healthy person, with risk of diabetes mellitus occurrence reported to be higher at least 3.5 to 5 times. Thus, professional and systematic management is required for the prevention of complications of metabolic syndrome [1,5]. The Korean prevalence rate of the metabolic syndrome continues to be an increasing trend in 1998 (23.6%), 2007-2009 (25.1%), 2010 (25.9%). Currently, the worldwide obese population has been increasing rapidly, with the possibility that the prevalence rate of the metabolic syndrome increasing believed to be very large [6]. According to The National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III), the metabolic syndrome acceptance criteria are presented as follows: 1) waist circumference, Male ≥ 90cm, Female ≥ 80cm, 2) systolic blood pressure/diastolic blood pressure ≥ 130/85mmHg, 3) fasting blood glucose ≥ 110mg/dL, 4) high triglycerides ≥ 150mg/dL, 5) high density lipoprotein cholesterol, Male < 40mg/dL, Female < 50mg/dL, and medication ongoing target person are determined that it have be with the metabolic risk factors. If even three or more of the five diagnostic criteria are met, then the patient shall be classified as having metabolic syndrome [1]. The Korean prevalence rate of the metabolic syndrome continues to be an increasing trend in 1998 (23.6%), 2007-2009 (25.1%), and 2010 (25.9%). Currently, the worldwide obese population has been increasing rapidly, with the possibility that the prevalence rate of the metabolic syndrome increasing believed to be very large [6].

Ⅱ. Research methodology

The risk factors of metabolic syndrome in this study are only targeted factors such as waist circumference, systolic blood pressure, diastolic blood pressure, fasting blood glucose, triglyceride and high density lipoprotein cholesterol. The conceptual model is shown in Figure 1. Among studies that examined the effects of obesity improvement in Korea, athletic interventions are listed as aerobic exercise, cycling, complex exercise, aquatic exercise, bicycling, jumping rope, taekwondo, fencing training, walking, etc., health care. Also, among studies that examined the effects of obesity improvement, dietary interventions are checked as eating greens, vegetables, fruits, eating vitamins, nutrition educations, diet, grain, and etc., nuts [7]. In studies among target groups of obesity improvement could be confirm the most frequently in the adult group, older, breast patients, diabetes mellitus patients, lower metabolic syndrome, higher metabolic syndrome, no metabolic syndrome, etc., it is directed to various groups.

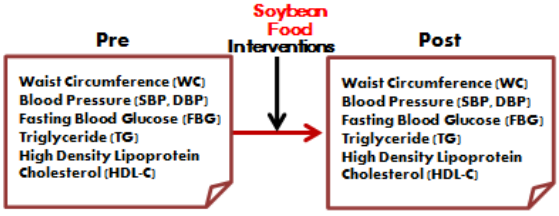

Fig. 1. The conceptual model

In searching previous research related meta-analysis of influencing mediator athletics related to metabolic syndrome and obesity, the study on "Effectiveness of Obesity Management Programs: Systematic Review and Meta-analysis" [8], listed mostly the effect size (r = .500) or more. In addition, the study "A Meta-analysis of Influencing Mediator Athletics on the Metabolic Syndrome Risk Factors Utilized Big Data Analysis" [7], listed the effect size (r = -.420, -.375, -.234, -.368, -.303, .402) to athletic interventions on (WC, SBG, DBP, FBG, TG, HDL-C) of the metabolic syndrome. Also, the study "A meta analysis for the anti-hyperlipidemia effect of soybeans" [9], Applying the fixed-effects model analysis of FC and TC and TG showed a statistically significant reduction in HDL-C increase was statistically

significant at. Thus, A study on "A Meta-Analysis of Obesity Management Effects of Aromatherapy Use" [10], reported the effect size (r = -.320, -.200, .210) to aromatherapy interventions on (WC, TG, HDL-C) of the metabolic syndrome. The papers included in this study meta-analysis were identified using the keywords "Metabolic Syndrome Soybean", "Metabolic syndrome Isoflavone", specifying on RISS, DBpia, eArticle, and Kyobo Scholar in database articles of social science. The final analysis used a total of 5 studies for journals and theses published in Korea. The following Table 1 lists authors, groups, interventions and samples used as the raw data for the meta-analysis.

Table 1. Raw data of studies included in the meta-analysis

N0	Authors	G	I	*n*
1	Lee et al. (2010)	PRW	SI	102
2		PMW	SI	82
3	Go et al. (2012)	MW	BS	29
4	J. H. Kang (2002)	POS	IS	11
5	Kim et al (2003)	MI	CK	21
6	K. O. Kim (2007)	MI	SS	10
Sum of Samples				255

BS: Black Soybean, CK: Chongkukjang, G: Group, I: Interventions, IS: Isoflavone, MI: Mice, MW: Middle-aged Women, POS: Polycystic Ovary Syndrome, PMW: Post-Menopausal Women, PRW: Pre-Menopausal Women, SI: Soy Isoflavone, SS: Soy Sprout

By using collected raw data, the calculated number of standard deviations and samples were coded that verified studies influencing pre and post in metabolic syndrome risk factors. Therefore, the mean, standard deviation, and the number of samples calculated the effect size using Equation. The homogeneity test in the meta-analysis was performed on these research subjects to find that the effect sizes of multiple independent studies are values extracted from the same population [6]. The null hypothesis for the statistical homogeneity test is that there is no difference in the estimated effect sizes of the individual study results. Therefore, if the null hypothesis is proved, we can perform a meta-analysis to obtain estimates of the overall effect size by incorporating effect size estimates. The interpretation of the homogeneity test is based on a chi-square distribution of the test statistic, Q value, since the Q value is equal to the chi-square distribution [11,12].

III. Meta-analysis and Results

This study reanalyzed the research papers with the purpose of classifying the results of the previous studies which analyzed causal relationships between pre and post of waist circumference, systolic blood pressure, diastolic blood pressure, fasting blood glucose, triglyceride and high density lipoprotein cholesterol in the designed metabolic syndrome risk factors included 5 studies for journals and theses published in Korea between 2000 and 2016. Based on information from these literature reviews, paths presented in the conceptual model in this study are converted to values of average effect size by using calibrated inverse variance weighting values and a random-effects model. In the following study, using the statistical package be try to implement a meta-analysis on the basis of the raw data set.

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