Study Protocol

Assessment of metabolic risks for non-communicable diseases using Sasang constitution: a protocol for a systematic review and meta-analysis

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Background: Sasang constitutional medicine (SCM), which categorizes humans into four Sasang types according to their constitution-specific characteristics, has been identified as being useful in predicting metabolic risks and preventing non-communicable diseases (NCDs). However, no systematic review has evaluated this relationship previously. This study protocol describes a method for evaluating the association between Sasang constitution and the metabolic risk factors for NCDs.

Methods: The following nine academic databases will be used as data sources for entries: Medical Literature Analysis and Retrieval System Online, Excerpta Medica database, Web of Science, and six Korean databases. All cohort, case-control, and cross-sectional studies that were published by December 2021 and could explain the association between Sasang constitution and metabolic risk factors for NCDs will be considered eligible. Two independent researchers will select studies, extract data, assess quality of studies, and qualitatively evaluate clinical evidence, subsequently. The quality assessment will be evaluated using the Newcastle-Ottawa Scale, with modifications if necessary. Quantitative data will be synthesized as a random-effects model, if applicable. The strength of clinical evidence will be performed applying the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) or GRADE-Confidence in Evidence from Reviews of Qualitative research approach.

Discussion: This study will contribute to helping clinicians and health authorities detect any relevant metabolic risks that patients may have, based on systematic clinical evidence.

Trial Registration: Review Registry Unique Identifying Number: reviewregistry1213.

Keywords: Sasang constitutional medicine (SCM); metabolic risk; non-communicable diseases (NCDs); protocol; systematic review

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Introduction

Non-communicable diseases (NCDs) refer to conditions which include four disease clusters (cancers, cardiovascular disease, chronic pulmonary diseases, and diabetes), other than acute infection, injuries, maternal and perinatal conditions, parasite, and nutritional deficiencies, and hence are not transmitted from person to person (1). NCDs tend to progress chronically due to a combination of genetic, physiological, environmental, and behavioural factors. Over 70% of all global deaths are NCD-related (2). Increased blood pressure, hyperglycaemia, overweight (or obesity), and hyperlipidaemia, which are key metabolic risk indicators, are considered to be the four major factors that facilitate the burden of some conditions, but also provide opportunities for intervention (3). This means that if an individual's metabolic risk can be detected in a timely manner in clinical practice, it is more likely that their risk of NCDs can be mitigated.

Sasang constitutional medicine (SCM) is personalized medicine that approaches human health based on the individual's Sasang constitution. In SCM, considering their characteristics related to psychological, physical, and genetic factors, humans are categorized into four Sasang types. The four categories are So-Eum (SE type), Tae-Eum (TE type), So-Yang (SY type), and Tae-Yang (TY type) (4). This classification is generated by innate balance difference between hyper- and hypo-activity of metabolic functions in the lung, spleen, liver, and kidney systems. In SCM, the spleen and kidney systems control nutrient metabolism (drawing-in and sending-out of water and food), and the lung and liver systems control energy metabolism (inhalation and exhalation of energy and fluid) (5). The strength and weakness of function in each system is different for each Sasang type, and it makes unique physiological and pathological characteristics of each Sasang type. Therefore, each type is susceptible to certain disorders due to its unique pathophysiology (6). SCM can help explain the potential factors, including genetic factors, that contribute to increasing metabolic risks for NCDs (7,8). It is therefore presumed that the information from an individual's Sasang constitution is useful in predicting metabolic risks and preventing NCDs. However, there has been no systematic verification performed so far. In this study, we aim to systematically assess the association between Sasang constitution and metabolic risk factors for NCDs. We present the following article in accordance with the PRISMA-P reporting checklist (available at https://apm.amegroups.com/article/view/10.21037/apm-21-2929/rc) (9).

Methods

Study registration

This systematic review protocol was registered with the Research Registry (Identifying Number: reviewregistry1213) on August 21, 2021. Amendments will not cause any significant distortions in the study design. If detailed modifications occur, they will be tracked and dated in the Research Registry.

Research question

This study will aim to answer the following question:

Is there an association between Sasang constitution and metabolic risk factors for NCDs?

Eligibility criteria

Study design

All types of studies that can explain the association between Sasang constitution and metabolic risk factors for NCDs, including cohort, case-control, and cross-sectional studies, will be considered eligible. However, clinical trials, preclinical and animal studies, case reports, literature research, qualitative research, review studies, and conference presentations, will be regarded as ineligible.

Subjects

Studies that have included individuals whose Sasang constitution types are presented according to a reasonable diagnostic criteria, including certified questionnaires [such as the Questionnaire for Sasang Constitutional Classification (QSCC) (10), QSCCII (11), QSCCII+ (12), Sasangin Diagnosis Questionnaire (SDQ) (13) and questionnaire in Sasang constitutional analysis tool (SCAT) (14)] and guideline-based diagnosis (15) by a SCM specialist, who is licensed for SCM expertise by the Korean government, will be regarded as study subjects, without restrictions on ethnicity, sex, age, or any biological status.

Exposures

Individuals' innate Sasang constitution (which is immutable).

Outcomes

Occurrence of NCDs or any metabolic risk factors for NCDs, such as hypertension, hyperglycaemia, overweight

Table 1 Search strategies for MEDLINE

Number	Search query
1	(sasang constitution OR sasang constitution* OR sasang typology OR sasang typolog* OR sasang): ti,ab
2	(so-eum OR so-yang OR tae-eum OR tae-yang OR Soeum OR Soyang OR Taeeum OR Taeyang OR soeumin OR soyangin OR taeeumin OR taeyangin OR SE type OR SY type OR TE type OR TY type OR SE constitutional type OR SY constitutional type OR TE constitutional type OR TY constitutional type): ti,ab
3	1 OR 2
4	Mesh term: (case-control OR chi-square distribution OR cohort studies OR comparative study OR cross-sectional studies OR evaluation study OR feasibility studies OR follow-up studies OR logistic models OR longitudinal studies OR multivariate analysis OR prognosis OR prospective studies OR regression analysis OR retrospective studies OR risk factors)
5	(case-control OR case control OR cohort OR compared OR compares OR comparing OR comparison* OR confounders OR Cox regression OR cross-sectional OR cross sectional OR determinant OR epidemiology OR follow-up OR follow up OR groups* OR health correlates OR logistic regression OR matched OR multivariate OR non-randomised OR non randomised OR non-randomized OR non randomized OR observational study OR odds ratio OR population at risk OR populations at risk OR predictive variables OR predictor OR prospective cohort OR prospective study OR retrospective * study OR relative risk OR risk factor OR risk scores): ti,ab
6	Mesh term: (morbidity OR incidence OR prevalence OR mortality OR epidemiology OR causality)
7	(incidence rate OR attack rate OR cumulative incidence OR mortality rate OR death rate OR etiology): ti,ab
8	Mesh term: (noncommunicable diseases OR cardiovascular diseases OR cancer OR pulmonary disease, chronic obstructive OR asthma OR diabetes mellitus OR metabolic diseases OR metabolic syndrome OR hypertension OR obesity OR overweight OR hyperglycemia OR hyperlipidemias OR heart disease risk factors OR cardiometabolic risk factors)
9	(non-communicable chronic diseases OR non-communicable diseases OR non-infectious diseases OR noninfectious diseases OR stroke OR tumor OR chronic respiratory diseases OR diabetes OR cardiometabolic syndrome OR hyperlipidemia OR cardiovascular risk):ti.ab
10	4 OR 5 OR 6 OR 7 OR 8 OR 9
11	3 AND 10

MEDLINE, Medical Literature Analysis and Retrieval System Online.

(or obesity), and hyperlipidaemia.

Search methods

Data sources and search strategy

The following nine academic databases will be used as data sources: three English databases [Medical Literature Analysis and Retrieval System Online (MEDLINE), Excerpta Medica database (EMBASE), and Web of Science], and six Korean databases [KoreaMed, Korean studies Information Service System (KISS), Research Information Sharing Service (RISS), ScienceON, Korean Medical Database (KMbase), and Database Periodical Information Academic (DBpia)]. All publications, which were published by December 2021 and identified in the mentioned database, will be searched without restricting language or publication status. In addition, a manual search will be performed on Google Scholar if identification of other studies is necessary.

We will use search terms related to SCM and epidemiological metabolic risks for NCDs, by changing the language and search form appropriately for each database. Search strategies have been established for increased sensitivity and comprehensiveness, by applying the methodology suggested in a previous study (16). As an example, *Table 1* shows the search strategies for MEDLINE.

Study selection

For all retrieved studies, two independent researchers (HO and YC) will perform the screening and eligibility assessing process, blinded to each other. Among the remaining studies with duplicates removed, their eligibility will be evaluated by screening the titles and abstracts and a full-text review, subsequently. If there is a disagreement between two reviewers at any step of the study selection process, it will be resolved through discussion with other researchers. The

selection process will be reported according to the criteria by the PRISMA statement (*Figure 1*) (17).

Data extraction

Two independent researchers (HO and YC) will extract the data from the selected studies and arrange it in a predefined form. This form includes general information (title, authors, and country of study, year of publication, and study design), population demographics (age and sex), details of exposure (Sasang constitution and diagnostic criteria), and outcomes (occurrence of NCDs or metabolic risks for NCDs, respective diagnostic criteria, and effect size). Discrepancies will be resolved by discussions with other researchers. If data is missing or insufficient, we will ask the corresponding authors of relevant study to provide the data.

Quality assessment

Among the included studies, the cohort and case-control studies will evaluate their methodological quality by using the Newcastle-Ottawa Scale (NOS), depending on its commonness (18,19). The NOS evaluates epidemiological quality based on the clarity of exposure, control of confounding bias and selection bias, and adequateness of sample size. The scoring items are as follows: (I) selection (0–4 points); (II) comparability (0–2 points); and (III) ascertainment (0–3 points).

Meanwhile, cross-sectional studies will be assessed using an appropriately modified NOS, as previously described (20). The scoring items are as follows: (I) selection (0–4 points); (II) comparability (0–2 points); and (III) ascertainment (0–2 points).

Data synthesis

The model applied random-effects will be utilized to express the merged effect size of outcomes as odds ratios, together with 95% confidence intervals, considering the sampling error and heterogeneity between studies, if applicable. Further, sub-analysis according to different types of outcomes will be performed, if possible. I^2 statistics will be computed to assess the statistical heterogeneity among studies. Assuming that the number of studies is sufficient, we will check whether there is a publication bias using a funnel plot. All analyses will be conducted using Review Manager software version 5.3 (Cochrane Collaboration, Oxford, UK).

Qualitative evaluation of clinical evidence

The strength of clinical evidence will be performed by applying the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach if quantitative evidence synthesis is possible (21). In this case, risk of bias, inconsistency, indirectness and imprecision of the results, and publication bias of findings will be assessed, and the quality of clinical evidence will be evaluated as "high", "moderate", "low" or "very low". If impossible, that will be performed applying the GRADE-Confidence in Evidence from Reviews of Qualitative research (GRADE-CERQual) approach (22,23). In this case, methodological limitations, coherence, adequacy of data, and relevance, and publication bias of findings will be assessed and the confidence in the evidence will be evaluated as "high", "moderate", "low" or "very low". The overall assessment for each finding will be summarized in a table.

Ethics and dissemination

Ethical approval is not required for this study because it uses data collected from literature studies that have already been published. Privacy concerns will not arise from this study. The findings of this study will be shared through peer-reviewed publications or conference presentations.

Discussion

To reduce the socioeconomic burden of NCDs, it is necessary to develop a strategy to determine the time- and cost-effective prediction of metabolic risks. A preventive medicine approach based on SCM will help us predict individual metabolic risks more effectively and efficiently, referring to the suggestion of a previous study that Sasang types may act as an independent risk factor for metabolic risks (24). This study will contribute to a better understanding of individuals' inborn metabolic risks. Moreover, if the association between Sasang constitution and metabolic risk factors for NCDs is proved, it is expected to help clinicians and health authorities detect any relevant metabolic risks that patients may have, based on systematic clinical evidence.

Trial registration

Review Registry Unique Identifying Number: reviewregistry1213.

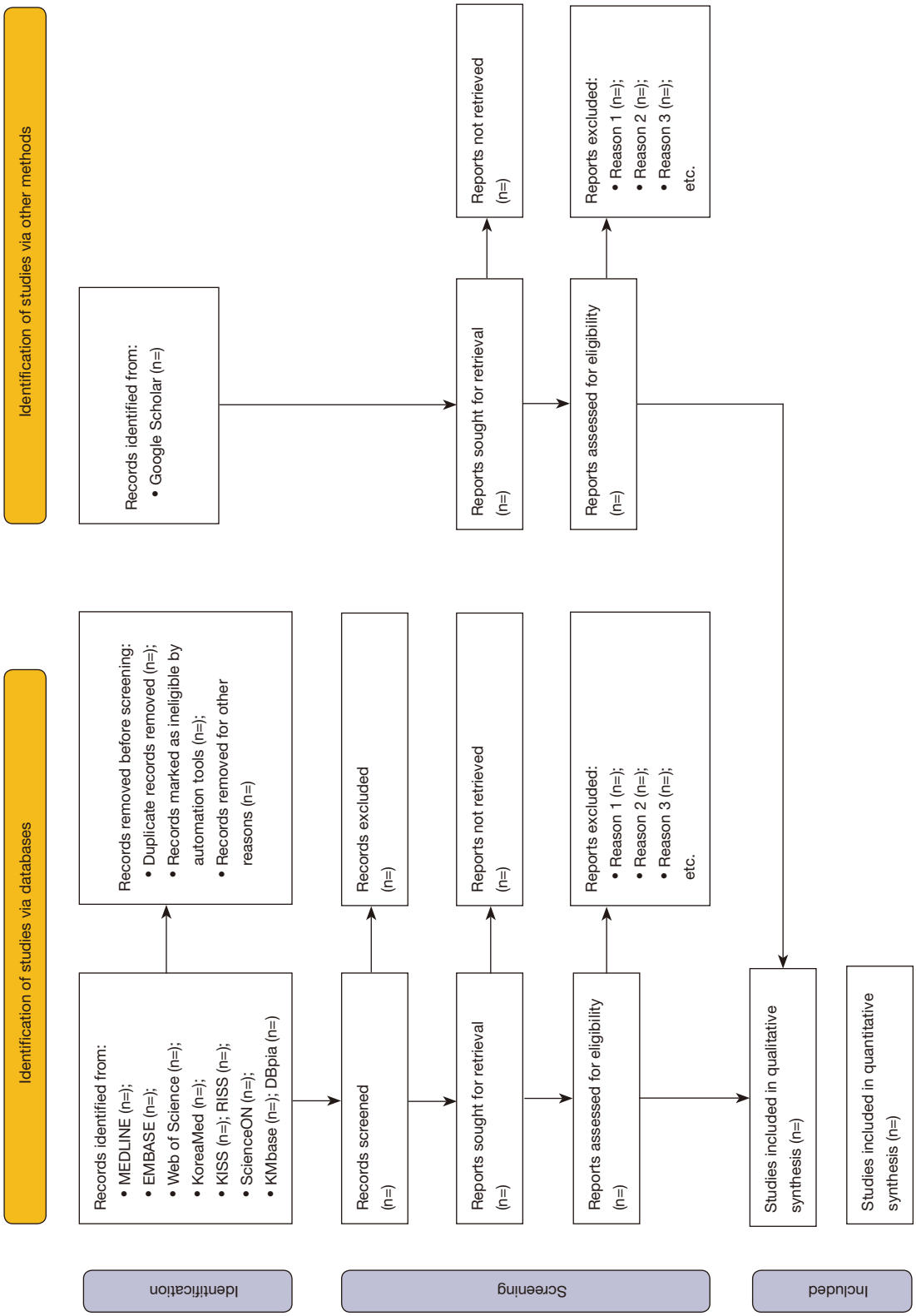

Figure 1 PRISMA flow diagram for systematic reviews for SCM and epidemiological metabolic risks for NCDs. DBpia, Database Periodical Information Academic; EMBASE, Excerpta Medica database via Elsevier; KISS, Korean Studies Information Service System; KMbase, Korean Medical Database; MEDLINE, Medical Literature Analysis and Retrieval System Online; NCDs, non-communicable diseases; RISS, Research Information Sharing Service; SCM, Sasang constitutional medicine.

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Footnote

Reporting Checklist: The authors have completed the PRISMA-P reporting checklist. Available at https://apm.amegroups.com/article/view/10.21037/apm-21-2929/rc

Peer Review File: Available at https://apm.amegroups.com/article/view/10.21037/apm-21-2929/prf

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://apm.amegroups.com/article/view/10.21037/apm-21-2929/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Ethical approval is not required for this study because it uses data collected from literature studies that have already been published. Privacy concerns will not arise from this study. The findings of this study will be shared through peer-reviewed publications or conference presentations.

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