An Analytical Study on Research Trends in Auriculotherapy in Korea

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Purpose: This study was done to analyze research articles and explore research trends in auriculotherapy between 2010 and 2019 in Korean academic journals. Methods: Domestic databases including KMbase, RISS, KISS, and NDSL were searched for studies published between 2010 and 2019. Research trends were analyzed according to The STandards Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) guidelines including research design, control group type, and intervention details from a total of 78 domestic papers. Descriptive statistics were analyzed by frequency and percentage. Results: Most studies were conducted in nursing. Regarding research design, a quasi-experimental design with a no-treatment control group was most common. There were 12 conditions with 4 participant categories. The most common intervention was four-point acupuncture-buried therapy. Interventions conducted weekly with cessation of 2 days for 6 weeks were popular. Regarding dropouts, few studies reported side-effects, with personal reasons being the most frequently reported. However, 50% of the studies failed to provide adequate information regarding intervention details according to the STRICTA guidelines, such as the practitioner background, ear point used for intervention, and a flow diagram. Conclusion: Interventional studies on auriculotherapy have been steadily increasing and have included more diversified conditions. Future studies should investigate the effects of auriculotherapy with more rigorous design, and report more detailed information regarding interventions.

Key Words: Acupressure; Acupuncture; Ear; Intervention studies

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INTRODUCTION

Complementary and alternative medicine (CAM) refers to diverse health care practices and products that are not currently considered as part of traditional medicine such as acupuncture, aromatherapy, Qi-gong, and herbalism [1]. Attention to CAM has increased rapidly worldwide since the 1990s and the World Health Organization has been developing the “Traditional Medicine Strategy” to strengthen the health care system by integrating traditional medicine and CAM since 2002[2]. According to a systematic review of 49 relevant studies, the rate of CAM use has increased up to 76% regardless of the types, definitions, and durations of CAM therapies [3,4].

Auriculotherapy, classified as a type of acupuncture, is a physical reflex therapy stimulating the specific ear points matched to parts of the body with physical or psychological symptoms using needles, magnets, or seeds [5,6]. The mechanism of auriculotherapy is closely related to the meridian theory, which states that the pathological changes in the organs of the human body appear on the surface of the ears when the meridians lose their balance [6]; thus, examining ears help diagnose problems in the internal organs, and symptoms can be alleviated by stimulating reflex points in the ears that correspond to the organs. Auriculotherapy is considered safer than other CAM therapies such as body acupuncture, moxibustion, and cupping. Additionally, non-invasive methods of auriculotherapy using seeds or pellets are most commonly used because they could eliminate the fear of needles and reduce the risk of infection and bleeding [6,7].

The effects of auriculotherapy on fever, sciatica, and even birth control have been reported in ancient China, Egypt, Greece, and Rome [4,5]. Several studies investigated its effectiveness in a wide variety of areas including pain control [8], obesity [9], sleep disorders [10], and symptoms related to cancer treatment [11]. Nursing researchers also began to explore the effects of auriculotherapy in 2000 and then expanded the target areas and detailed methods of auriculotherapy between 2006 and 2010[12], which increased the necessity for the systematized review of the interventions using auriculotherapy. However, most reviews had more interest in the effects of auriculotherapy on a specific symptom such as pain [7,11], obesity [9], insomnia [10] than the detailed methods of the interventions. Furthermore, no other reviews analyzed the methods of auriculotherapy according to the standardized reporting guideline although the heterogenous way of reporting on the interventions of previous studies has posed difficulty to better understand and interpret results of the intervention using auriculotherapy.

The STandards Reporting Interventions in Clinical Trials of Acupuncture (STRICTA), an international acupuncture research group, has provided authors with reporting guidelines for clinical results in non-pharmacological CAM intervention since 2001, which suggested it is necessary to report details on key components of interventions; acupuncture treatment, needling details, practitioner background, treatment regimens, other components of the treatment, and interventions for control group in research studies [13,14].

Therefore, this study aimed to identify research trends in auriculotherapy published in Korea in the past 10 years and systematically analyze the characteristics and types of auriculotherapy performed according to the STRICTA guidelines.

METHODS

1. Study Design

This was a descriptive study conducted to identify the Korean research trends related to auriculotherapy.

2. Search Strategy

This study included publications and scholarly dissertations from Korea from January 1, 2010 to June 25, 2019. Studies included all those on auriculotherapy, and there were no limitations in the inclusion criteria in terms of samples and study discipline. The keywords used “이압”, “이혈”, “귀 마사지”, “귀보완대체”, and “귀자극” via the KMbase, RISS, KISS, and NDSL. After an online search using these databases, a manual search was done additionally, using the list of references. If publications and academic dissertations were duplicates, the published papers were selected. Studies on animals or with only the abstract were excluded. The authors of this study (Kim and Chung) conducted the search and selection of the studies independently and resolved any disagreements through discussions.

3. Data Extraction

Of the 892 papers included, 890 studies were searched through online databases, and two were searched manually. The final selection was made from these studies through the following steps: 1) using the bibliographic management program, 198 duplicate studies were excluded; 2) out of 694 studies left after excluding the dupli-
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4. Data Analysis

The publications were classified into 5 disciplines including nursing. Study designs used in the studies were categorized into true experimental design, quasi-experimental design, and case studies. Data for terminologies related to auriculotherapy were extracted from the title and abstract of each paper. The study samples were categorized into 4 groups: healthy adolescents aged 10~18 years, healthy adults aged 19~64 years, older adults (65 years old or older), and patients. The outcome variables were described in terms of their characteristics by identifying the main symptoms in each study. Then, studies with experimental designs were analyzed based on five factors from the STRICTA guidelines: needling details, practitioner background, treatment regimen, control interventions and other components of treatment. All analyses were conducted using SPSS version 24.0 (IBM Co., Armonk, NY, USA). Descriptive statistics were used by numbers, frequencies, means, and percentages.

RESULTS

1. Characteristics of the Studies: Study Design, Terminology, Sample, and Outcome Variables

There were 29 academic dissertations and 49 journal articles on auriculotherapy published in Korea in the past 10 years. Among those papers, the most common were in the field of nursing (42 studies; 53.8%), followed by healthcare science (16 studies; 20.5%), Oriental medicine (9 studies; 11.5%), cosmetology (6 studies; 7.7%), and computational biology (5 studies; 6.4%). Among a total of 75 experimental studies, 601 studies that did not meet the inclusion criteria were excluded through titles and abstracts to result in the selection of 93 studies; 3) the 93 studies were checked to match the final selection criteria through the full-text reading. We excluded five studies that had identical contents, one study whose contents did not match the title, eight studies that were duplicates of the academic dissertations, and one that was judged not to meet the final selection criteria through a discussion. Finally, 78 studies were selected (Figure 1).

![Figure 1. Flow diagram of search process.](https://example.com)
studies, only 12 (15.4%) had a true experimental design, and among those, 10 studies were in the nursing discipline. Among the quasi-experimental studies, non-equivalent control group pretest-posttest design (46 studies; 73.0%) was most commonly used (Table 1). Auriculotherapy was most commonly referred to as 이압 (ear acupressure) (35 studies; 44.9%). Terms like 이혈 (ear therapy) (24 studies; 30.8%), 귀바지 (ear massage) (3 studies; 3.8%), 귀반사 (ear reflexology) (3 studies; 3.8%), and 귀자극 (ear stimulation) (2 studies; 2.6%) were also used (Table 1). In the majority of the studies, samples were composed of healthy adults (43 studies; 55.1%), followed by patients (18 studies; 23.1%). A substantial portion of the studies used psychological health problems (12 studies, 15.4%), pain (9 studies, 11.5%), obesity (9 studies, 11.5%), and menstrual syndrome (8 studies, 10.3%) as the outcome variables. Besides, studies on the prevention and management of chronic diseases such as blood pressure (5 studies, 6.4%) and diabetes (1 study, 1.3%) were performed. Applications for new health problems, such as eye problems including epiphora and xerophthalmia (3 studies, 3.8%), itching (1 study, 1.3%), and quitting smoking (6 studies, 7.6%) were also included (Table 1).

2. Characteristics of Auriculotherapy Intervention according to the STRICTA Guidelines

A total of 75 intervention studies applied two domains (needling details and practitioner background), excluding case studies and other domains were analyzed using 58 studies including the control groups (Table 2). As below was the detailed information on auriculotherapy intervention according to the STRICTA guidelines.

1) Needling details
Studies using buried therapy were the most common (62 studies; 82.7%), followed by those using acupuncture therapy (5 studies; 6.7%). The types of needles used for buried therapy were mostly Vaccaria seeds (18 studies; 29%). Other types were sticker-type acupuncture (15 studies; 24.2%), semen Sinapis albae seeds (9 studies; 14.5%), Sin-ban stone (9 studies; 14.5%), red clay ceramic ball (3 studies; 4.8%), Qi-tongseok (3 studies; 4.8%), ear stone (2 studies; 3.2%), and raphain semen (1 study; 1.6%). Six studies categorized as using a non-needle method used oil (2 studies; 33.3%), massage (2 study; 33.3%), head-set (1 study; 16.7%), and SUKI (1 study; 16.7%) (Table 2). The number of needles inserted in the experimental group was between 1 and 18 and the nursing discipline studies, in particular, used 4 needles. Regarding the auricular points used in the intervention, they were not reported in many studies (35 studies, 46.7%), while 19 studies reported using both ears (25.3%), 16 using the ears alternately (21.3%), and 3 using one ear (4.0%) (Table 2).

2) Practitioner background
A total of 34 studies (45.3%) provided details on the practitioner background. Six studies (8.0%) provided unclear information about the practitioner background, and 35 studies (46.7%) did not provide this information (Table 2).

3) Treatment regimens
The mean of subjects in the experimental group was 24.79 persons (SD=10.61; range: 5~62), and in the control group was 23.91 persons (SD=11.19; range: 5~69); the number of samples between the two groups was similar. The mean of duration was 30.81 days (SD=22.62; range: 1~84), and the mean of sessions was 6.48 (SD=5.95; range: 1~30; Table 2). A design of one intervention per week and two days of rest for six weeks was most commonly observed. However, 36.2% of the studies did not report details about the rest period clearly (Table 2).

4) Control interventions
Regarding the types of the control groups, the most common were non-treated (27 studies; 46.6%), followed by sham-treated (14 studies, 24.1%), placebo-treated (10 studies, 17.2%), and comparators (7 studies, 12.1%) (Table 2).

5) Other components of treatment
Forty-two studies out of all studies presented the number of participants and the numbers used in the analysis, and the mean drop-out rate was 2.7%. The reason for the drop-out was most commonly personal in the experimental group (29 studies, 41 subjects) as well as control group (31 studies, 68 subjects). And fifteen people reported drop-out due to adverse effects in thirteen studies (Table 2).

DISCUSSION

This study extracted Korean publications on studies that applied auriculotherapy in the past 10 years, using 6 keywords and 4 literature search databases, and analyzed the intervention details according to the STRICTA guidelines. Seventy-eight studies on auriculotherapy in the past 10 years showed a consistently increasing trend, from 15 studies between 1991 and 2000 to 56 studies between 2001 and 2010[12]; the intervention and outcomes variables were also diversified. Among the previous studies in the nursing dis-
cipline, most (45.5%) were related to insomnia and limited to six areas (e.g., menstruation syndromes, quitting smoking, obesity, headache, and anxiety). However, the area of auriculotherapy expanded to management of chronic diseases such as blood pressure or diabetes, and various symptoms besides the six areas during the recent 10 years. The popularization of CAM in Korea can explain this result. A survey on Korean female and male adult samples in 1999 showed that only 26% of the respondents used CAM [15], while a recent study in 2019 reported that 81%

### Table 1. Characteristics of Included Studies (N=78)

| Characteristics                      | Nursing  | Oriental medicine | Cosmetology | Computational biology | Healthcare science | Total |
|--------------------------------------|----------|-------------------|-------------|-----------------------|--------------------|-------|
|                                      | n (%)    | n (%)             | n (%)       | n (%)                 | n (%)              | n (%) |
| Type of publication                  |          |                   |             |                       |                    |       |
| Academic publication                 | 18 (23.1)| 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 11 (14.1)          | 29 (37.2) |
| Journal article                      | 24 (57.1)| 9 (11.5)          | 6 (7.7)     | 5 (6.4)               | 5 (6.4)            | 49 (62.8) |
| Sub total                            | 42 (53.8)| 9 (11.5)          | 6 (7.7)     | 5 (6.4)               | 16 (20.5)          | 78 (100) |
| Terms for auriculotherapy            |          |                   |             |                       |                    |       |
| 귀자극 (ear acupuncture)             | 31 (39.7)| 2 (2.6)           | 0 (0.0)     | 0 (0.0)               | 2 (2.6)            | 35 (44.9) |
| 귀반사 (ear therapy)                 | 6 (7.7)  | 2 (2.6)           | 1 (1.3)     | 4 (5.2)               | 11 (14.1)          | 24 (30.8) |
| 귀침 (ear acupuncture)               | 2 (2.6)  | 5 (6.4)           | 2 (2.6)     | 1 (1.3)               | 1 (1.3)            | 11 (14.1) |
| 귀 마사지 (ear massage)              | 1 (1.3)  | 0 (0.0)           | 2 (2.6)     | 0 (0.0)               | 0 (0.0)            | 3 (3.8) |
| 귀반사 (ear reflexology)             | 1 (1.3)  | 0 (0.0)           | 1 (1.3)     | 0 (0.0)               | 1 (1.3)            | 3 (3.8) |
| 귀 자극 (ear stimulation)            | 1 (1.3)  | 0 (0.0)           | 0 (0.0)     | 1 (1.3)               | 2 (2.6)            |       |
| Research design                      |          |                   |             |                       |                    |       |
| True experimental design             | 10 (12.8)| 2 (2.6)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 12 (15.4) |
| Quasi-experimental design            |          |                   |             |                       |                    | 63 (80.8) |
| One-group pre- and post-test         | 4 (6.4)  | 2 (2.6)           | 3 (4.8)     | 5 (7.9)               | 2 (2.6)            | 16 (21.5) |
| Nonequivalent control group pre- and post-test | 28 (44.4)| 3 (4.8)          | 3 (4.8)     | 0 (0.0)               | 12 (19.0)          | 46 (73.0) |
| Interrupted time-series              | 0 (0.0)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 1 (1.6)            | 1 (1.6) |
| Design with multiple Treatment replications |        |                   |             |                       |                    |       |
| Sub total                            | 32 (50.8)| 5 (7.9)           | 6 (9.6)     | 5 (7.9)               | 15 (23.8)          | 63 (100) |
| Case study                           | 0 (0.0)  | 2 (2.6)           | 0 (0.0)     | 0 (0.0)               | 1 (1.2)            | 3 (3.8) |
| Sample                               |          |                   |             |                       |                    |       |
| Healthy adolescents                  | 6 (7.7)  | 1 (1.3)           | 0 (0.0)     | 0 (0.0)               | 1 (1.3)            | 8 (10.3) |
| Healthy adults                       | 18 (23.1)| 5 (6.4)           | 5 (6.4)     | 5 (6.4)               | 11 (14.1)          | 43 (55.1) |
| Older adults                         | 6 (7.7)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 3 (3.8)            | 9 (11.5) |
| Patients                             | 13 (16.7)| 3 (3.8)           | 1 (1.3)     | 0 (0.0)               | 1 (1.3)            | 18 (23.1) |
| Outcome variables                    |          |                   |             |                       |                    |       |
| Psychological problems               | 6 (7.7)  | 0 (0.0)           | 3 (3.8)     | 0 (0.0)               | 3 (3.8)            | 12 (15.4) |
| Pain                                 | 6 (7.7)  | 0 (0.0)           | 2 (2.6)     | 0 (0.0)               | 1 (1.3)            | 9 (11.5) |
| Obesity                              | 2 (2.6)  | 0 (0.0)           | 1 (1.3)     | 0 (0.0)               | 6 (7.7)            | 9 (11.5) |
| Menstruation syndromes              | 7 (9.0)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 1 (1.3)            | 8 (10.3) |
| Diagnosis                            | 0 (0.0)  | 1 (1.3)           | 0 (0.0)     | 5 (6.4)               | 1 (1.3)            | 7 (9.0) |
| Quit smoking                         | 2 (2.6)  | 4 (6.4)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 6 (7.7) |
| Blood pressure                       | 2 (2.6)  | 1 (1.3)           | 0 (0.0)     | 0 (0.0)               | 2 (2.6)            | 5 (6.4) |
| Sleep disturbance                    | 2 (2.6)  | 1 (1.3)           | 0 (0.0)     | 0 (0.0)               | 1 (1.3)            | 4 (5.1) |
| Rhinitis                             | 3 (3.8)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 1 (1.3)            | 4 (5.1) |
| Constipation                         | 3 (3.8)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 3 (3.8) |
| Nausea and vomiting                  | 2 (2.6)  | 1 (1.3)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 3 (3.8) |
| Eye problems                         | 2 (2.6)  | 1 (1.3)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 3 (3.8) |
| Bowel syndromes                      | 2 (2.6)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 2 (2.6) |
| Diabetes                             | 1 (1.3)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 1 (1.3) |
| Itching                              | 1 (1.3)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 1 (1.3) |
| Function                             | 1 (1.3)  | 0 (0.0)           | 0 (0.0)     | 0 (0.0)               | 0 (0.0)            | 1 (1.3) |
### Table 2. Intervention Details According to the STAndards Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) Guidelines

| Domain          | Characteristics                          | Categories                     | Nursing          | Oriental Medicine | Cosmetology | Computational Biology | Healthcare Science | Total |
|-----------------|------------------------------------------|-------------------------------|------------------|------------------|-------------|----------------------|-------------------|-------|
| Needling details (n=75) | Type of acupuncture                       | Acupuncture therapy           | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 4 (5.3)              | 1 (1.3)           | 5 (6.7) |
|                 | Needles                                  |                               | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 4 (8.0)              | 0 (0.0)           | 4 (8.0) |
|                 | Needles with electric stimulation         |                               | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 1 (2.0)           | 1 (2.0) |
|                 | Sub total                                 |                               | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 4 (8.0)              | 1 (2.0)           | 5 (10.0) |
| Acupuncture buried therapy |                                      |                               |                 |                  |             |                     |                   |       |
|                 | Vaccaria seeds                           |                               | 17 (27.4)        | 1 (1.6)          | 0 (0.0)     | 0 (0.0)              | 0 (0.0)           | 18 (29.0) |
|                 | Sticker-type acupuncture                  |                               | 7 (11.3)         | 3 (4.8)          | 1 (1.6)     | 1 (1.6)              | 3 (4.8)           | 15 (24.2) |
|                 | Semen Sinapis albae seeds                |                               | 8 (12.9)         | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 1 (1.6)           | 9 (14.5) |
|                 | Sin-ban stone                            |                               | 5 (8.1)          | 0 (0.0)          | 1 (1.6)     | 0 (0.0)              | 3 (4.8)           | 9 (14.5) |
|                 | Red clay ceramic ball                    |                               | 1 (1.6)          | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 2 (3.2)           | 3 (4.8)  |
|                 | Qi-tongseok                              |                               | 0 (0.0)          | 2 (3.2)          | 1 (1.6)     | 0 (0.0)              | 0 (0.0)           | 2 (3.2)  |
|                 | Ear stone                                |                               | 2 (3.2)          | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 0 (0.0)           | 2 (3.2)  |
|                 | Raphain semen                            |                               | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 1 (1.6)           | 1 (1.6)  |
|                 | No specific description                   |                               | 1 (1.6)          | 0 (0.0)          | 1 (1.6)     | 0 (0.0)              | 0 (0.0)           | 2 (3.2)  |
|                 | Sub total                                 |                               | 41 (66.1)        | 6 (9.7)          | 4 (6.5)     | 1 (1.6)              | 10 (16.1)         | 62 (100.0) |
| Acupuncture non-buried therapy |                                      |                               |                 |                  |             |                     |                   |       |
|                 | Oil                                      |                               | 1 (16.7)         | 0 (0.0)          | 1 (16.7)   | 0 (0.0)              | 0 (0.0)           | 2 (33.3) |
|                 | Massage                                  |                               | 0 (0.0)          | 0 (0.0)          | 1 (16.7)   | 0 (0.0)              | 1 (16.7)          | 2 (33.3) |
|                 | Headset                                  |                               | 0 (0.0)          | 1 (16.7)         | 0 (0.0)     | 0 (0.0)              | 0 (0.0)           | 1 (16.7) |
|                 | SUKI                                     |                               | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 1 (16.7)          | 1 (16.7) |
|                 | Sub total                                 |                               | 1 (16.7)         | 1 (16.7)         | 2 (33.3)   | 0 (0.0)              | 2 (33.3)          | 6 (100.0) |
|                 | No description                           |                               | 0 (0.0)          | 0 (0.0)          | 0 (0.0)     | 0 (0.0)              | 2 (2.6)           | 2 (2.6)  |
| Numbers of needles inserted in the experimental group |                                      |                               | 40 (53.3)        | 7 (9.3)         | 4 (5.3)    | 2 (2.7)              | 13 (17.3)         | 66 (88.0) |
|                 | Range                                    |                               | 3~18             | 2~6              | 5~11       | 1                   | 1                 | 15 (21.3) |
|                 | Mode                                     |                               | 4                 | 3                 | 3          | 1                   | 7                 | N/A |
|                 | No description                           |                               | 2 (2.7)          | 0                 | 1 (1.3)    | 3 (4.0)              | 3 (4.0)           | 9 (12.0) |
| Point used      | Unilateral                               |                               | 1 (1.3)          | 1 (1.3)          | 0 (0.0)    | 0 (0.0)              | 1 (1.3)           | 3 (4.0)  |
|                 | Bilateral                                |                               | 12 (16.0)        | 1 (1.3)          | 2 (2.7)    | 0 (0.0)              | 4 (5.3)           | 19 (25.3) |
|                 | Used alternately                         |                               | 12 (16.0)        | 3 (4.0)          | 0 (0.0)    | 0 (0.0)              | 1 (1.3)           | 16 (21.3) |
|                 | No AD after one side                     |                               | 2 (2.7)          | 0 (0.0)          | 0 (0.0)    | 0 (0.0)              | 0 (0.0)           | 2 (2.7)  |
|                 | No description                           |                               | 15 (20.0)        | 2 (2.7)          | 4 (5.3)    | 5 (6.7)              | 9 (12.0)          | 35 (46.7) |
| Practitioner background (n=75) | Expertise in specific condition           | Description          | 29 (38.4)        | 1 (1.3)         | 1 (1.3)    | 0 (0.0)              | 3 (4.0)           | 34 (45.3) |
|                 |                                         | Unclear               | 4 (5.3)          | 0 (0.0)         | 0 (0.0)    | 0 (0.0)              | 2 (2.7)           | 6 (8.0)  |
|                 |                                         | No description        | 9 (12.0)         | 7 (7.3)         | 5 (6.7)    | 5 (6.7)              | 10 (13.3)         | 35 (46.7) |
| Treatment regimen (n=58) | Number of samples                        | Experimental group (range) | 17~49            | 6~62             | 5~10       | N/A                  | 10~50             | 24.79±10.61 |
|                 |                                         | Control group (range)  | 11~48            | 6~69             | 5~10       | N/A                  | 10~50             | 23.91±11.19 |
|                 | Treatment regimen                        | Duration of treatment (days) | 1~70             | 1~56             | 1~56       | N/A                  | 1~84              | 30.81±22.62 |
|                 |                                         | Number of TS (range)   | 1~30             | 1~12             | 1~16       | N/A                  | 1~24              | 6.48±5.95 |
|                 |                                         | Duration of cessation (days) | 47 (81.0)       |                  |            |                     |                   |       |
|                 |                                         | 0                     | 4 (8.1)          | 1 (2.1)          | 0 (0.0)    | N/A                  | 0 (0.0)           | 5 (10.6) |
|                 |                                         | 1                     | 3 (6.4)          | 0 (0.0)          | 0 (0.0)    | N/A                  | 3 (6.4)           | 6 (12.8) |
|                 |                                         | 2                     | 16 (34.0)        | 0 (0.0)          | 0 (0.0)    | N/A                  | 0 (0.0)           | 16 (34.0) |
|                 |                                         | 3                     | 2 (4.3)          | 0 (0.0)          | 0 (0.0)    | N/A                  | 1 (2.1)           | 3 (6.4)  |
|                 |                                         | No description        | 7 (14.9)         | 2 (4.3)          | 2 (4.3)    | N/A                  | 6 (12.7)          | 17 (36.2) |
|                 |                                         | Sub total             | 32 (68.1)        | 3 (6.4)          | 2 (4.3)    | N/A                  | 10 (21.2)         | 47 (100.0) |

1 Sham I: Same treatment on different ear acupuncture points used in the experimental group that are not theoretically effective for the condition. II: Same treatment using another needle. III: Same treatment on other sample. 1 Sham II: Adhesive patches without pellet or seed on the same acupuncture as in the experimental group; II: Placebo needles on other acupuncture used in the experimental group; AD=additional description; N/A=Not Applicable; TS=treatment sessions.
As the rate of CAM use is thus expected to continue to rise, particularly in the middle-aged generation as home remedies in the past [16]. Particularly, CAM use has extended to the younger people in their 20s and 30s through the spread of information via the internet and mass media in contrast to the frequent use of CAM by the elderly. Notably, studies using a true experimental design showed an increase to 15.4%. According to a previous study, the variability in the studies using auriculotherapy will rise.

Regarding study design, the quasi-experimental design was most commonly used, consistent with a previous study that analyzed research trends in nursing in Korea [17]. Notably, studies using a true experimental design showed an increase to 15.4%. According to a previous study, the

**Table 2. Intervention Details According to the STandards Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) Guidelines (Continued)**

| Domain                  | Characteristics                  | Categories | Nursing (n=58) | Oriental Medicine (n=58) | Cosmetology (n=58) | Computational Biology (n=58) | Healthcare Science (n=58) | Total (n=58) |
|-------------------------|----------------------------------|------------|----------------|-------------------------|--------------------|-----------------------------|--------------------------|-------------|
| Control interventions   | Type of control                  | Comparator | 0 (0.0)        | 1 (1.7)                 | 2 (3.5)            | 0 (0.0)                     | 4 (6.9)                  | 7 (12.1)    |
|                         |                                  | Sham       | 9 (15.5)       | 2 (3.5)                 | 0 (0.0)            | 0 (0.0)                     | 3 (5.2)                  | 14 (24.1)   |
|                         |                                  | S_I        | 9 (64.3)       | 1 (7.1)                 | 0 (0.0)            | 0 (0.0)                     | 2 (14.3)                 | 12 (85.7)   |
|                         |                                  | S_II       | 0 (0.0)        | 0 (0.0)                 | 0 (0.0)            | 0 (0.0)                     | 1 (7.1)                  | 1 (7.1)     |
|                         |                                  | S_III      | 0 (0.0)        | 1 (7.1)                 | 0 (0.0)            | 0 (0.0)                     | 0 (0.0)                  | 1 (7.1)     |
|                         |                                  | Sub total  | 9 (64.3)       | 2 (14.3)                | 0 (0.0)            | 0 (0.0)                     | 3 (4.0)                  | 14 (100.0)  |
|                         | Placebo                          |            | 9 (15.5)       | 0 (0.0)                 | 1 (1.7)            | 0 (0.0)                     | 0 (0.0)                  | 10 (17.2)   |
|                         |                                  | P_I        | 6 (60.0)       | 0 (0.0)                 | 1 (10.0)           | 0 (0.0)                     | 0 (0.0)                  | 7 (70.0)    |
|                         |                                  | P_II       | 3 (30.0)       | 0 (0.0)                 | 0 (0.0)            | 0 (0.0)                     | 0 (0.0)                  | 3 (30.0)    |
|                         |                                  | Sub total  | 9 (90.0)       | 0 (0.0)                 | 1 (10.0)           | 0 (0.0)                     | 0 (0.0)                  | 10 (100.0)  |

* Summary of dropouts:
- **Number of dropout articles**
  - Total rate (%)
  - Range of experimental group
  - Range of control group
  - Average of experimental group
  - Average of control group
  - Sub total
  - N/A

* Reason for dropout in exp.: articles/samples
  - Personal reasons
  - Non-attendance
  - Fall off seeds
  - No-effects
  - Without acupressure
  - Cosmetically
  - Problem with measurement
  - Others
  - Adverse-effects

* Reason for dropout in cont.: articles (samples)
  - Personal reasons
  - Fall off seeds
  - Non-attendance
  - No-effects
  - Without acupressure
  - Cosmetically
  - Problem with measurement
  - Others
  - Adverse-effects

$n=58$  
1 Sham I: Same treatment on different ear acupoints from those used in the experimental group that are not theoretically effective for the condition; II: Same treatment on another needle; III: Same treatment on other sample; Placebo I: Adhesive patches without pellet or seed on the same acupoints as in the experimental group that are not theoretically effective for the condition; II: Same treatment on different ear acupoints from those used in the experimental group that are not theoretically effective for the condition; III: Same treatment on other acupoints used in the experimental group; cont.=control group; exp.=experimental group; N/A=Not Applicable.
number of studies using a quasi-experimental design consistently increased among all research studies conducted in the field of nursing from 1991 to 2000 while the true experimental design showed a decreasing trend from 9.0% to 3.7% between 2001 and 2010[17]. Furthermore, considering that only 5.6% of studies had a true experimental design in another previous study analyzing the research trends of auriculotherapy between 1991 and 2010 in Korea [12], this result showed that there was substantial qualitative growth of auriculotherapy research in the past 10 years. Given the controversies on the quality of studies on CAM, the increasing number of true experimental studies that provided a high standard of evidence can contribute to establish the efficacy and safety of auriculotherapy. However, as for the control interventions, approximately the half of the studies used experimental design with no-treatment control group, which could not rule out the placebo effect. Hence, intervention studies with an active control group is needed to effectively rule out the placebo effect and prove the superior effect of auriculotherapy [18].

We also found that the nursing discipline conducted intervention studies for the patients in 13 studies, while only 18 studies were on the symptoms of people with disease or symptoms across all the disciplines, which showed the usefulness of auriculotherapy as a nursing intervention. This result can be explained as follows. First, the perspectives of auriculotherapy and nursing are similar. The importance of seeing and nursing a person from an integrated perspective has been discussed since the 1970s in the nursing discipline [19]. This is similar to the perspective and philosophical context of auriculotherapy, which states that human organs represent a single entity and require a holistic treatment [5,6]. Thus, it can be inferred that auriculotherapy can be easily applied to patients as a nursing intervention. Second, the low level of adverse effects is an important consideration for selecting and applying auriculotherapy as a nursing intervention. As shown in the results of this study, the main cause of dropouts was personal reasons, and only 9.6% and 5.4% of the experimental group and control group, respectively, dropped out owing to adverse effects. In the experimental group, nine people across seven studies reported nausea, pain, and discomfort, and in the control group, six people across six studies dropped out due to the same reasons; however, no serious adverse effects were reported. These results are in line with those from a systematic review reporting nausea, pain, irritation on the skin area of intervention, and discomfort as the adverse effects of auriculotherapy [7]. Therefore, prior education about the predictable problematic symptoms and efforts to increase safety through continued observation can establish auriculotherapy as a more safely applicable nursing intervention method.

As for the treatment regimen, the buried therapy was most frequently used. Buried therapy, which is a non-invasive method, has a reduced risk of infection compared to the invasive method of acupuncture therapy, thus reducing complications. Additionally, level of pain during treatment is relatively low, thus reducing the drop-out rate. Vaccaria seeds are widely used because they are known to have a warm characteristic, they are non-toxic, and help to augment flow of the Qi [20]. Meanwhile, there were inconsistent results on the effectiveness of the types of needle used in auriculotherapy. A study to compare the effect of two different types of auriculotherapy applied for shoulder pain in Korean female adults reported that the experimental group using Sin-ban stone had significant pain relief when compared with the control group that used acupressure pellet [21]. Additionally, a study on teenagers with BMI over 23 showed that the group that used magnetic pearls had a greater reduction in BMI when compared with the one that used Vaccaria seeds [22]. On the contrary, a study on pain reduction during the endoscopic examination of large intestine indicated that auriculotherapy reduced pain but did not show any differences between the use of Vaccaria seeds and the transcutaneous auricular stimulation [23]. For better implementation of auriculotherapy, further studies should be conducted to compare the effects depending on needle types used in auriculotherapy.

In line with the results of previous literatures indicating that the appropriate auriculotherapy period is less than five days per treatment [5,6], we found that the preferred frequency of intervention session was once a week including a cessation time of two days. Several studies reported that appropriate cessation was important to prevent the risk for skin damage, infection, and any allergic reactions caused by the seeds, and tapes used for non-invasive type of auriculotherapy [5-7,24]. This result might help to decide the effective dose of treatment with decreased risk for adverse effects when applying long-term auriculotherapy intervention in the future study.

Additionally, the intervention period in the previous trend analysis was “less than one week” and “between one week and one month” in 33.8% each [12]. In contrast, the results of this study showed that the duration of intervention has been extended to more than a month in 42.7% of the studies. The changing trend of the outcome variables can be related to this result. From the 1990s to 2010, auriculotherapy had been usually limited to quitting smoking, relieving sleep disturbances and menstruation synd-
romes. On the contrary, outcome variables applied were diversified in the last 10 years. Furthermore, we analyzed the treatment regimen including the sessions, days, and time of cessation of the intervention and tried to compare it with the existing data. However, no previous study has examined these aspects, and thus, no direct comparison was possible. Therefore, it will be necessary to identify which intervention method is more effective depending on the disease and condition for which auriculotherapy is applied by conducting a systematic review based on the results of this study.

Quality intervention requires systematic reporting that can reduce ambiguity and increase the reliability and applicability of the results by providing evidence for decision-making regarding the intervention method [14]. However, several studies on auriculotherapy did not report the detailed information on the intervention as suggested by the STRICTA. Specifically, the patients' backgrounds were unclearly or nonspecifically described in 54.7% and information on the auricular points in the intervention was not explained in 46.7% of the studies. Besides, the term used to refer to auriculotherapy overlaps with six different terms, which makes it difficult to conduct a systematic review for auriculotherapy. In particular, there was no uniform terminology used within the nursing discipline. The use of standardized terminology can facilitate communication among nurses or with other health care providers and guide future studies through the synthesis of results [25]. Therefore, researchers should make an effort to unify terminology on auriculotherapy and establish the completeness, clarity, and transparency of the papers through detailed reporting that follow the guidelines.

Finally, multidisciplinary studies can generate higher impact on the science community by providing better evidence for intervention. A bibliometric analysis of 17,002 papers on various CAM therapies published during 1980~2009 has shown that collaborative studies indicated higher citation impact than single discipline studies [26]. As presented in this study, the number of studies on auriculotherapy in other academic disciplines is also increasing. Therefore, nursing researchers should create opportunities for further improvement in auriculotherapy through a collaborative study based on a multidisciplinary approach.

**CONCLUSION**

This study provided an overview of research trends and intervention characteristics in auriculotherapy studies published in Korea. Nursing studies have been growing the body of evidence as well as improving quality in auriculotherapy during past 10 years. More rigorous design, and systematic report according to guidelines are becoming significantly important for healthcare providers as well as researchers. The results of this study call for further discussion to develop detailed nursing guidelines in auriculotherapy.

**CONFLICTS OF INTEREST**
The authors declared no conflict of interest.

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