



Developing evaluation scales for horticultural therapy

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ABSTRACT

Objectives: This study developed evaluation scales for measuring the effects of horticultural therapy in practical settings.

Design: Qualitative and quantitative research, including three preliminary studies and a main study, were conducted.

Setting: In the first study, a total of 779 horticultural therapists answered an open-end questionnaire based on 58 items about elements of occupational therapy and seven factors about singularity of horticultural therapy. In the second study, 20 horticultural therapists participated in in-depth interviews. In the third study, a Delphi method was conducted with 24 horticultural therapists to build a model of assessment indexes and ensure the validity. In the final study, the reserve scales were tested by 121 horticultural therapists in their practical settings for 1045 clients, to verify their reliability and validity.

Main outcome measures: Preliminary questions in the effects area of horticultural therapy were developed in the first study, and validity for the components in the second study. In the third study, an expert Delphi survey was conducted as part of content validity verification of the preliminary tool of horticultural therapy for physical, cognitive, psychological-emotional, and social areas. In the final study, the evaluation tool, which verified the construct, convergence, discriminant, and predictive validity and reliability test, was used to finalise the evaluation tool.

Results: The effects of horticultural therapy were classified as four different aspects, namely, physical, cognitive, psycho-emotional, and social, based on previous studies on the effects of horticultural therapy. 98 questions in the four aspects were selected as reserve scales. The reliability of each scale was calculated as 0.982 in physical, 0.980 in cognitive, 0.965 in psycho-emotional, and 0.972 in social aspects based on the Cronbach's test of intrate-item internal consistency and half reliability of Spearman-Brown.

Conclusions: This study was the first to demonstrate validity and reliability by simultaneously developing four measures of horticultural therapy effectiveness, namely, physical, cognitive, psychological-emotional, and social, both locally and externally. It is especially worthwhile in that it can be applied in common to people.

1. Introduction

Horticultural therapy is a complementary and alternative medicine that is a professional treatment provided by trained professionals, by using horticultural activities with plants in an intervention pre-designed with therapeutic goals and objectives to improve or recover health conditions.^{1–3} Toward this end, horticultural therapy, attempts a holistic approach that integrates physical, cognitive, psycho-emotional, and social factors; this is also its salient feature.^{2–4} The status of horticultural therapy as a professional practice can be established by implementing a rational treatment program based on clinical diagnosis of the subject, by scientific means and methods, and having an evaluation system for its performance. Appropriate assessment systems not only

help in validating the effectiveness of the treatment but also contribute to the systematisation of related disciplines.⁵

Assessing the effectiveness of horticultural therapy also means measuring its performance in achieving the specific goals set within the general purpose category, as mentioned above. The assessment of goal achievement is an assessment of the degree of direct impact on a person to be treated, to determine how much the subject has changed or to what extent he or she has achieved an outcome.^{5,6} In the meantime, it can be considered that the horticultural therapy field has a tendency to evaluate the effect of the therapeutic activity in the form of such goal achievement evaluation.⁶

A review article on horticultural activity intervention and outcomes presented that 509 studies published before April 2014 have measured

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specific health conditions in the physical, psychological, cognitive, social, and educational aspects using various surveys or measurement tools.⁴ However, as these evaluations have computed the factors to be measured by the researchers as effective variables, the effectiveness of horticultural therapies has not been analysed comprehensively, but rather only by a few variables. Moreover, most of the 503 evaluation tools used so far in horticultural therapy studies were the self-esteem, depression, and geriatric depression scales that developed in an adjacent discipline.⁵ Moreover, it is not easy to guarantee the effectiveness of treatment according to the goal realisation, because it has been calculated by a questionnaire survey answered by the clients with problems, such as mental disorder, development disorder, intellectual disorder, frail elderly, elderly with dementia, and stroke patients.⁷

Several evaluation tools have been designed to evaluate the performance of horticultural therapy. For example, a horticultural therapy evaluation form was developed by Oseas.⁸ Horticultural therapy group activity treatment procedure was developed by the New York Medical Center; and a horticultural task skill inventory was developed by the Korean Horticultural Therapy and Well-being Association. However, these tools are limited in that the development process is not rigorous and the procedures for verifying the validity and reliability of evaluation tools basically required in tool development are not fulfilled.⁷ Therefore, the available evaluation work, which has been the focus of previous evaluations on the effect of the fragmentary aspect for the effectiveness of the horticultural therapy, contains many limitations in that it cannot show the multi-faceted effect of horticultural therapy properly. Thus, the existing evaluation trends of the effectiveness of horticultural therapy and the problems with the tools suggest the need for alternative assessment tools. Alternative assessment tools must reflect appropriately the characteristics of horticultural therapy, and must be able to measure the effects of the therapists as experts as a whole. Above all, the evaluation tools have been developed through rigorous verification procedures for the requirements similar to test tools.

Accordingly, this study aims to develop a new evaluation tool that can measure the effectiveness of horticultural therapy to meet this need. The evaluation tool developed in this study may provide guidance to horticultural therapists in setting treatment plans for individual subjects.

2. Materials & methods

2.1. Study procedure

To develop evaluation scales for horticultural therapy, a qualitative and quantitative research, including three preliminary studies and a main study, were conducted.

Preliminary questions were developed in the first study, and validity for the components in the second study. In the third study, an expert Delphi survey was conducted as part of content validity verification of the preliminary tool. In the final study, the evaluation tool, which verified the construct, convergence, discriminant, and predictive validity and reliability test, was used to finalise the evaluation tool.

2.1.1. Study 1: developing the preliminary questions

Firstly, for the preparation of the preliminary questions, 55 items in the effects area of horticultural therapy were selected through the literature reviews of a meta-analysis study of horticultural therapy⁹ and expert recognition of clinical sites.¹⁰ In addition, 55 treatment items presented in occupational therapy and items of seven factors related to the unique characteristics of horticultural therapy^{6,11} were based on the survey that was developed in this study.

The survey questionnaire for developing preliminary questions were mailed or e-mailed to 779 Korean horticultural therapists who obtained a horticultural therapy certification from the Korean Horticultural Therapy and Well-being Association in February 2009. Finally, 258 (33.1%) responses were obtained. The major reason for the missing

responses was address change and indifference. Of the collected responses, 220 were used in the data analysis, except for those lacking answers.

The gender composition of the respondents reflects the fact that 85% of horticultural therapists in South Korea are women. Age was distributed evenly across the 20s – 50s. The collected data were analysed, and the therapeutic effect evaluation area was divided into physical, cognitive, psychological-emotional, and social domains. The physical domain contained 91 items; the cognitive domain, 55 items; the psychological-emotional domain, 86 items, and social domain, 78 items. A total of 310 items were selected as preliminary questions.

2.1.2. Study 2: validity for the components

As a follow-up procedure for the preliminary questions in the first study, in-depth interviews were conducted with 20 horticultural therapists in June 2009. Among the participants, 75% were female; 45% obtained a doctoral degree that is related to the field; and more than half had more than 10 years of experience. The validation process of evaluation tool components was completed by an open coding method of grounded theory proposed by Strauss and Corbin.¹² The grounded theory method was selected given that there are no standardised therapeutic tools in Korea and elsewhere, the therapists working in the clinical field must be aware of their interaction with the subject and understand the meanings that may occur in the future. The analysis revealed 89 concepts in four categories, namely, physical, cognitive, psycho-emotional, and social, with 17 subcategories.

2.1.3. Study 3: content validity verification of the preliminary tool by Delphi survey

In the third study, the validity of the content was verified using the expert group, horticultural therapists consensus Delphi method.⁷ The subjects were 24 horticultural therapists (average 9 years of clinical career for horticultural therapy) who conducted a Delphi survey over three rounds, through e-mail, in August 2009. Detail information for the study 3 was in the published paper by Im et al.⁷ The results of the third Delphi survey were used to finalise the content structure of the preliminary scales with 98 items.

2.1.4. Study 4: verification of the construct, convergence, discriminant, and predictive validity and reliability test of the evaluation tool

2.1.4.1. *Study subject.* This survey verified the validity and reliability of the model of the structured scale through the preliminary survey, and finalised the evaluation tool. A total of 1045 students were sampled randomly among the those who participated in clinical activities across South Korea.

2.1.4.2. *Assessment tool.* The evaluation tools of physical, cognitive, psychological-emotional, and social areas were applied in this study. They were validated by the expert Delphi survey,⁷ which was the final stage of the preliminary survey. The response form of the test was composed of a five-point Likert-type scale, which has been used widely to reflect the individual differences in the respondents' response.¹³ The instruments consisted of 'very bad (1 point), slightly worse (2 points), normal (3 points), slightly better (4 points), and very good (5 points)'. A higher total score in each evaluation tool indicates better condition of the subject. The negative emotions (e.g., depression, anger, shrinking, fear, etc.) of the psychological-emotional tools (Table 9) that contain negative contents, unlike the other items, showed that a low score suggested better condition of the subject, and the reaction of the subjects was based on this.

2.1.4.3. *Data collection.* The horticultural therapists, who conducted the program throughout the country and a mail survey, collected the data used in this study. The data collection period is from October 2009 to January 2010. Of the total 1200 questionnaires that were sent out, 1098 copies were collected, showing a recovery rate of 91.5%. Of the

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