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## Review article

Research and perspectives on criteria for evaluation of nursing research achievements<sup>☆</sup>Jin-Lian Cheng<sup>a,\*</sup>, Yin-Ping Chu<sup>b</sup>, Shi-Fan Han<sup>a</sup>, Yu-Jiao Li<sup>a</sup>, Qian Tan<sup>c</sup><sup>a</sup> First Hospital of Shanxi Medical University, Taiyuan, Shanxi 030001, China<sup>b</sup> Shanxi Provincial People's Hospital, Taiyuan, Shanxi 030012, China<sup>c</sup> Shanxi Medical University, Taiyuan, Shanxi 030001, China

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## ABSTRACT

This paper introduces concepts related to scientific research achievements, analyzes current evaluation methods with regard to nursing research achievements and their application at home and abroad, and summarizes findings from the investigation of obstacles to the application of nursing research results in China, aiming to provide reference points for the evaluation and application of nursing research results in China.

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## 1. Introduction

The evaluation of nursing research results consists of the examination and determination of the scientificity, creativity, and scientific value of these results and the assessment of the specific quality and benefits of these results. With the ongoing development of the subspecialties of nursing, the cultivation of high-level talents, and increased funding support of nursing research by national governments, nursing research has achieved increasingly notable results. The evaluation of nursing research results has thus become a topic of critical interest that is receiving pointed attention from the current management agency and related researchers. Gennaro et al<sup>1</sup> believe that effective application of nursing research results in practice is not only beneficial to the healthcare of patients but also to promoting the development of nursing as an independent discipline. Therefore, evaluation of nursing research results requires greater attention. At present, few studies on the evaluation criteria of nursing research results have been conducted in China, which limits the transformation of nursing research results into practice.

This paper provides an overview of progress in research on the evaluation criteria of nursing research results at home and abroad.

## 2. Concepts related to nursing research results

## 2.1. Research results

Scientific research results refer to the results of research on the objective law of a problem in a certain research field.<sup>2</sup> They are expressed in different forms, such as papers, books, patents, standards, products, or drawings by scientific researchers based on their research and understanding of a problem.<sup>3</sup>

Scientific research results are characterized by four basic elements: basic research results must be evaluated by an authorized agency, while applied research results must be proven by practice; scientific research results must have a social impact and economic benefits; they must be expressed in a generally accepted format, such as papers, books, or reports; and they must have clear conclusions, such as the establishment of new theories, new hypotheses, new concepts, or new strategies.<sup>4</sup>

## 2.2. Nursing research results

Nursing research results refer to the results of research on the objective law of a problem in the nursing research field. Nursing

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research results are expressed in the form of nursing monographs, papers, investigation reports, or research reports. They have three attributes: innovation, scientificity, and transformability. They are the main driving force in the development of nursing science.<sup>5</sup>

### 2.3. Application of research results

The application of research results is termed research utilization (RU) in foreign countries. RU is derived from early exploratory research by Rodgers<sup>6</sup> and refers to the process of applying research-based knowledge to clinical practice.

### 2.4. Evaluation of scientific research results

Evaluation is a cognitive activity aimed at understanding the objective world and assessing the value of an object/matter. Its essence is to reveal the value relationship between the subject and the object. Evaluation is an organized whole composite of different levels of evaluation criteria according to the logical structure of the object/matter that is being evaluated. A system of evaluation guidelines is a set of systematic and closely related criteria or specific criteria that reflect the whole object/matter being evaluated. The establishment of a system of evaluation guidelines is the process of transforming value standards into a system of guidelines.<sup>7</sup> According to Weinberg's rules,<sup>8</sup> establishing a system of evaluation guidelines for basic research results should be based on internal guidelines regarding scientific contribution and external criteria regarding potential social and economic value.

## 3. Study on the guidelines for the evaluation of nursing research results in other countries

The evaluation criteria commonly used in other countries mainly include three aspects: the quality, quantity, and impact of research results.<sup>7</sup> The evaluation of scientific research results in other countries has the following characteristics: (1) legal protection; (2) funded but not directly evaluated by government; (3) quality of results is the most important evaluation criterion; (4) includes a combination of quantitative and qualitative evaluation methods; and (5) undergoes an open and transparent assessment process.<sup>9</sup> When systems of evaluation guidelines have been established in foreign countries, indicators gauging the quality of results have received particular attention. For example, the research assessment exercise (RAE) in England does not require a large quantity of scientific research results but only requires researchers to provide four pieces of representative scientific research results. In the Netherlands, in addition to a list of publications, the basic scientific research evaluation guidelines also require researchers to provide five key publications and indicators of their quality and reputation.<sup>7</sup>

### 3.1. US

Scientific and technological evaluation started in the 1920s in the United States. The "Technology Assessment Law" was passed in 1972, and the "Government Performance and Results Act" was passed in 1993 by the 103rd Congress,<sup>9,10</sup> providing legal protection in the form of legislation for scientific and technological assessment activities. Under the impetus of this Act, assessment strategies have played a significant role in science and technology performance evaluation activities.<sup>11</sup> Evaluation indicators commonly used in the United States currently include citation, direct products based on the research, long-term indirect results of a project, humanistic development, rate of return, and other economic indicators as well as the international status of the research results.<sup>12,13</sup>

Two independent subsystems have been formed for scientific research innovation evaluation in the US: one is the evaluation subsystem based on peer review of papers in academia, while the other is the evaluation subsystem based on transformation of productivity in industry.

### 3.2. UK

The evaluation agency in the UK is composed of the government, research institutions, and technology intermediaries. The assessment of national scientific and technological development is performed by the government, while the evaluation of specific research results and scientific research institutions is conducted by specific research institutes and intermediaries.<sup>11,14</sup> To evaluate basic science research results, the UK has been using as the evaluation criteria the quantity and quality of scientific publications by the scientific researchers responsible for the results in journals of different levels internationally and domestically. To reduce the emotional factors present among individuals and objectively evaluate scientific and technological results, all the papers reviewed by the British Science Policy Research Unit are anonymous, with contact between the authors and the reviewers was prohibited during the review.<sup>7</sup> Evaluation criteria commonly used in the UK currently include peer review, citation in literature, quality and impact of publications, invitations to present at domestic and international academic conferences (the main indicator for recognition by peers in the UK and the world), and awards.<sup>15</sup>

### 3.3. Germany

Scientific and technological evaluation started in the 1940s in Germany and originated from the science motion submitted to the parliament by the original West German government.<sup>16</sup> Evaluation criteria commonly used in Germany currently include the number of achieved scientific results, number of published papers, domestic and international awards, and reputation. The most important measure is the leading position of specific scientific and technological results domestically and internationally and their role in international organizations.<sup>17</sup>

### 3.4. Japan

In Japan, the factors considered in the evaluation of scientific research results include published papers, books, recognition in the field, number of invitations to present, involvement in personnel training and exchanges, research innovation and guidance capability, application in technology development, and supplement to theoretical basis.<sup>18</sup>

### 3.5. Other

In recent years, foreign scholars in the field of scientific research evaluation have conducted an active exploration to promote the application of the critical realism method in the field of nursing research. McEvoy and Richards<sup>19</sup> showed that critical realism is a new philosophical perspective, which combines ontological realism and epistemological relativism and develops into a mature form of relativism. The potential benefits of adopting critical realism can be considered from two aspects in scientific research evaluation: theory-oriented program evaluation and policy evaluation. Clark et al.<sup>20</sup> showed that critical realism is conducive to understanding complex conclusions, which ensures the optimization of the intervention and is applicable to studies in the field of biological psychology and social medicine. In 2005, Professor Jorge Hirsch, a physicist at the University of California, San Diego,

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