

## **DATA INTEGRATION IN MIXED-METHOD RESEARCH STUDIES: CHALLENGE AND OPPORTUNITY FOR NURSING**

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Mixed-method research studies have been referred to as those that condense, in the same study, procedures of collection, analysis, and combination/integration of data from quantitative and qualitative approaches/strands. To this end, the ascending paradigm upon mixed methods advocates that the assumption of integration between the approaches is one of the most elementary characteristics for considering the study as mixed, as well as it is what may mitigate the limitations of a single-method research study.<sup>1</sup>

The data integration logic is to offer possibilities of answers that would not be accomplished from the explanation of only one or another approach (quantitative and qualitative), nor if these approaches were merely overlaid but not indeed integrated.<sup>1-2</sup> This reverberates the researcher's need for bearing in mind the justifications for the use of mixed-method research studies, as it is the case with the confirmation (corroboration/convergence) and complementarity (addition/enhancement) arguments. Furthermore, it should be apprehended that the integration must occur as the study goes, starting from the formulation of the research question, definition of the analysis unit, sampling, data collection, analysis, and strategies for the presentation of the results.<sup>3</sup>

There are four main mechanisms of data integration in mixed-method research studies: connection, construction, fusion, and incorporation.<sup>1</sup> Connection concerns the use of a set of analyzed data to lead the collection of other data, and it is very common in sequential explanatory research studies that start with the quantitative stage and use (connect) the statistical information to define even the subjects/participants of the subsequent qualitative stage. By construction, we understand that it is a commonly used way to integrate qualitative primary data, which, after analyzed, are used to construct means/instruments that will enable the extraction of subsequent quantitative data.<sup>1</sup> The construction is interpreted here as a way or nuance of connection, as it also keeps separate but combined/connected extremes of qualitative and quantitative data collection and analysis.

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Fusion is one type of data integration that occurs in a convergent manner in the data collection, analysis, discussion, and result interpretation processes in a continuous movement of comparison/confrontation and/or corroboration. It is enabled or facilitated by joint display (or conjunct presentation of results) strategies<sup>1</sup>, even though these illustrative strategies are not exclusive of studies that use fusion as a means to integrate the quantitative and qualitative data. Fusion is understood here as a process that demands intense authorial abstraction and advanced interpretive capacity.

As for incorporation, it permeates a form of data integration in research projects that are usually broader, of which quantitative and qualitative data are integrated by connection, construction and/or fusion in distinct phases of this large study.<sup>1</sup>

In nursing research, the use of mixed methods is signaled as highly valuable because, if the assumptions of this scientific paradigm (among them, the data combination/integration) are respected, there is the possibility of achieving complex inference and approximation on the study projects of the area, which also result in high density/complexity.<sup>2</sup> On the other hand, it was recently noted in a literature review conducted by researchers from Canada, Denmark, and the Philippines that, besides the use of mixed-method research still being low (1.89%) among studies (N=7,089) in the nursing field, there are also methodological gaps (or fragilities) in the research studies, especially with regard to the explanation of the study's design; to the due rationale for the mixed method option; to the non-declaration of the assigned weight among the phases and/or approaches of the study; and also, by the absence of more robust instruments of data integration, as the majority of the studies integrated quantitative and qualitative information at the interpretation level only in the findings' discussion.<sup>4</sup>

An emerging possibility of data integration in mixed-method research studies, including in nursing, is the so-called Pillar Integration Process (PIP) – which by itself is a type of joint display – and corresponds to a four-stage process: a) listing the most relevant qualitative and quantitative data at the extremes of a table/frame/matrix; b) combination/correspondence of data, on the opposite side of the table/frame/matrix, so that the qualitative data reflect patterns, parallels or similarities with the quantitative data or not, as the investigators may not notice correspondence and leave this space blank or describe “not found”, for example; c) checking/verification, which is an evaluation activity to see if the correspondence in the data set is refined, and an opportune time for the researchers to reflect on their lists of information, and to take up aspects or move forward in some direction; and, d) construction of pillars to write the inferences generated from the mixed analysis in the center of the table/frame/matrix.<sup>5</sup>

By taking over the mixed-method research studies, it is perceived that Nursing needs to devote to creative and, at the same time, methodologically rigorous ways to integrate quantitative and qualitative data. Although more “advanced” strategies such as the transformation of qualitative data into quantitative ones and vice-versa are still very common, as well as the aforementioned joint displays – less common but not prevalent<sup>4</sup> – it is pointed out that Nursing has an intense capacity to increment more and good ways of data integration. That is because, over its history, Nursing organizes itself in its work in a peculiar and individually/identity manner, which can also be observed at some level in the scientific environment. Examples of this are the own methodological references (citing here, with honors, the Brazilian Convergent Assistential Research Study<sup>6</sup>) and means of analysis and interpretation of data that are imbued with concepts and theories inherent to the profession.

Being a scientific paradigm under construction (and even due to the nature of science), it is expected that the assumptions involving mixed-method research studies will have movements of comings and goings, as well as of evolution. This includes, with emphasis, data integration as a factor that confirms/conveys a mixed-research status to the study. For Nursing, this scenario imposes challenges on appropriating the means and strategies of integration and other assumptions of mixed methods, in addition to the need to rigorously conduct the quantitative and qualitative strands of the

study “in isolation”. Even if these challenges are concrete, Nursing can stand out in the endeavor towards robust mixed studies through the use of not only advanced data integration strategies, but also identity ones, which strengthens its peculiar scientific field.

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