Effects, Efficacy, Efficiency and Effectiveness...in Physical Therapy
- How Far Are We?

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INTRODUCTION

One of the primary goals of therapy is to provide a balanced combination of ‘what the client needs the most?’ ‘what the disease/disorder requires the best?’ ‘what the best available sources of information advise?’ and ‘what the therapist decides most appropriate?’ Thus therapeutic decision making1 is just a beginning, it initiates a ‘relationship’ and an ensuing commitment and accountability on the therapist’s part to provide care with the Hippocrates principle primum non nocere (do no harm). As we witness the shift in role of therapist from a paternalistic (“therapist is God”) paradigm to a service provider, an informed patient is likely so and deserves to know not only the ifs and buts but also the whys and why nots as a part of the shared decision-making process. The aim of this editorial in this issue of Journal of Physical Therapy (JPT) is to provide a detailed overview on the effects, efficacy, efficiency and effectiveness as four inter-related yet different terms in the field of Physical therapy (PT) and an analysis of the historical background with perspectives for the future.

ABSTRACT

The Journal of Physical Therapy (JPT) is stepping over its third volume of successful dissemination of research findings with information shared across the globe in the field of physical therapy. The aim of this editorial in this issue of Journal of Physical Therapy (JPT) is to explore into the understanding behind the use of four common terms- effects, efficacy, efficiency and effectiveness as four inter-related yet different terms in the field of Physical therapy (PT) with a historical perspective and implications for the future.

Key words: Clinical decision-making, communication, therapeutic decision-making, terminology.

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Effects:

Wiktionary2 defines effect as, a result or outcome of a cause, where the cause here may either be a disease or treatment technique to produce the effect per se. Effect is a term to denote a change. The effects are studied for physical (personal, physiological, biological, chemical), mental (moral, psychological) and social (legal, economic, political, cultural). The research on study of effects of therapy may focus on either actual or potential and primary or secondary aspects. Broad categorization of effects into harmful (bad, negative, disastrous, undesirable, devastating, catastrophic, fatal) and beneficial (good, positive, intended, likely) is also widely applicable. Best used categories of effects depending on time-frame are immediate, short-term and long-term effects of a therapy. Also, depending upon the objectives, the therapeutic effects are categorized under cardiovascular, pulmonary, musculoskeletal, neurological, etc. Studies on effects are considered to be preliminary or laboratory studies focusing on technique-specific or dose-response inter-relationships.
Editorial

When the term ‘effects’ is used in the title of a study or a conversation, it implies of/on a particular change. E.g., Wong et al\textsuperscript{4} mentioned names of techniques and systems studied for their effects, and the animal model in their study. The same could be used for comparison of techniques as done by other authors.\textsuperscript{4,5} Nerve-specific effects due to neural manual therapy techniques were reported by Kumar et al\textsuperscript{6,7} illustrate the tissue-specific and technique-specific inter-relationship for the effects both in therapy for asymptomatic individuals\textsuperscript{8} or patients\textsuperscript{7} and educational training for students.\textsuperscript{8} Not only the individual clinical trials, the systematic reviews by Kromer et al\textsuperscript{9} and Kumar et al\textsuperscript{10} are amongst many other such examples.

Efficacy:

Efficacy, according to Wiktionary\textsuperscript{11} is the ability to produce effect. Efficacy of a therapy is best used on a disease/disorder/dysfunction as a whole compared to effects which are more for one or more manifestations of the disease in a target population. Efficacy is a broader term that includes multiple organ system effects due to therapy. Efficacy is on a disease condition more than on a clinical problem. Studies reported on efficacy highlight the disease-specific and therapy-specific inter-relationship.\textsuperscript{12,9} There were randomized clinical trials,\textsuperscript{14,17-9} reviews\textsuperscript{12,13} and meta-analyses\textsuperscript{15,16} that focused on efficacy.

Efficiency:

Efficiency in general describes the extent to which time or effort is well used for the intended task or purpose.\textsuperscript{20} Efficiency of therapy reflects on as a measurable concept, quantitatively determined by the ratio of patient outcome to therapeutic strategies. Efficiency is related to the effect in that it is a proportion of the cause and effect instead of effect per se. In real-life situations, therapeutic efficiency is often measured in terms of cost-benefit analysis. The two randomized clinical trials by Torstensen et al\textsuperscript{21} and Goldby et al\textsuperscript{22} are such good examples.

Effectiveness:

Effectiveness is the capability of producing a desired result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression.\textsuperscript{23} Effectiveness is a property of being effective that is, having the power to produce an effect.\textsuperscript{24} In contrast to efficacy which is an ability to produce an effect, effectiveness is for a desired effect. A technique is efficacious if it has the ability to produce effects, whereas it is effective if it has the ability to produce expected or desired effects. Effectiveness is also implied for therapy in disease conditions\textsuperscript{25-8} similar to efficacy but the outcomes measured will include issues faced in real-life situations such as in pragmatic clinical trials. The effectiveness is measured and reported usually in terms of cost-effectiveness,\textsuperscript{29,30} and treatment approaches\textsuperscript{31} and professions\textsuperscript{32} rather than treatments are studied for their effectiveness indicating that effectiveness is an umbrella term. A classic example for effectiveness is a systematic review by Bilney et al\textsuperscript{32} which compared three professional approaches in the treatment of Huntington’s disease. Hence, effectiveness is for a target population under consideration and hence statistical analysis of such reports should include population-based statistics.\textsuperscript{33} The professional approach per se in the field of physical therapy or the group of techniques\textsuperscript{34,35} could be studied for effectiveness using process or outcome studies.\textsuperscript{36} It is also feasible to measure effectiveness in a department-based setting by including multi-faceted outcomes (therapist-rated or patient/caregiver-rated and International Classification of Functioning, Disability, Health categories).\textsuperscript{37}

Combined and comparisons:

Studies comparing effects versus efficacy or efficacy versus effectiveness are rare and are often very few. One such study by Buchbinder et al\textsuperscript{38} reported both efficacy and effectiveness.

DISCUSSION

The four probable questions asked often by patients during a shared decision-making process in a patient-therapist communication\textsuperscript{39} are:

“Does the technique produce any or particular effects?” (change); “Is the treatment efficacious?” (property); “Is therapy efficient?” (quality); and, “Is physiotherapy effective?” (nature).

Effects, efficacy, efficiency, effectiveness

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Clinically, this could be noticeable in a patient with shoulder complaints as follows:

“Will this technique improve my shoulder mobility?” (Effects); “Will this treatment improve my ability for overhead movements?” (Efficacy); “Will this therapy be efficient enough to improve my activities?” (Efficiency); and, “Will physiotherapy be effective to return me back to being normal?” (Effectiveness).

With improving professional autonomy and Physical therapy enjoying enhanced awareness among the general public, in an effort to bridge the need-reality gap in PT and to improve patient adherence to treatment recommendations, it is necessary to differentially identify the four terms in daily routine. As we step into a new era of evidence-informed paradigm shift, we therapists should realize that assessment-planning-treatment-outcome is an ongoing continuum upon which we base our therapeutic goals and therapeutic interventions on a symptom-control to quality-of-life continuum. As proponents of strong high-quality evidence, authors of systematic reviews hold a greater responsibility and should identify clinical trials based on their objectives.

Understanding the efficacy-effectiveness gap is essential for clinicians to differentiate between “which patient for this therapy?” versus “which therapy for this patient?” where the latter depends upon quality of prescribing and patient adherence. When a clinician expects a therapy to be effective, it is efficacious and when it is in reality, it is said to be effective. Expectation is associated with efficacy (studied using exploratory research) as is reality with effectiveness (studied using pragmatic research). Efficacy is the extent to which an intervention does more good than harm under ideal circumstances. Effectiveness is the extent to which an intervention does more good than harm when provided under the usual circumstances of health care practice.

The Society for Prevention Research (SPR) designed these Standards to assist practitioners, policy makers, and administrators to determine which interventions are efficacious, which are effective, and which are ready for dissemination. Under these Standards, an efficacious intervention will have been tested in at least two rigorous trials that (1) involved defined populations, (2) used psychometrically sound measures and data collection procedures; (3) analyzed their data with rigorous statistical approaches; (4) showed consistent positive effects (without serious iatrogenic effects); and (5) reported at least one significant long-term follow-up. An effective intervention under these Standards will not only meet all standards for efficacious interventions, but also will have (1) manuals, appropriate training, and technical support available to allow third parties to adopt and implement the intervention; (2) been evaluated under real-world conditions in studies that included sound measurement of the level of implementation and engagement of the target audience (in both the intervention and control conditions); (3) indicated the practical importance of intervention outcome effects; and (4) clearly demonstrated to whom intervention findings can be generalized. An intervention recognized as ready for broad dissemination under these Standards will not only meet all standards for efficacious and effective interventions, but will also provide (1) evidence of the ability to “go to scale”; (2) clear cost information; and (3) monitoring and evaluation tools so that adopting agencies can monitor or evaluate how well the intervention works in their settings. It is the need of the hour, to develop such PT interventions using the Standards and the resulting therapeutic dissemination.

CONCLUSION

As teachers, we hold ourselves responsible for better dissemination of knowledge that differentially identifies each of the four terms. As researchers, we should vow to honestly report the ‘exact’ term as it implies when used in titles or objectives of research studies. As clinicians, we should avoid using the terms interchangeably when we communicate with clients and stakeholders and understand the implications of applying the evidence on one or more of the four terms for a particular therapy. As the Journal of Physical Therapy (JPT) steps...
over third consecutive step (third published volume), the editorial board assures the reader of the accuracy in reporting these terms in future published studies of JPT.

“A technique is studied for its effects; A treatment is studied for its efficacy; A therapy is studied for its efficiency; and, A professional approach is studied for its effectiveness?”

Let’s move PT forward into being a professional approach rather than simply a bunch of techniques, by thinking-out-of-the-box, and fostering high-quality, pragmatic (real-life or realistic), population-based, long-term studies to establish it as an effective profession.

REFERENCES


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CONFLICTS OF INTEREST

None declared or identified.