Intervention Research: Pushing Back the Frontiers of Pediatric Psychology

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Intervention research in pediatric psychology assumes special importance given continuing pressures to develop and document the efficacy of interventions for pediatric populations. Studies presented in this issue illustrate the need for flexible approaches to intervention research including case studies and randomized trials, comprehensive assessment of health and psychological outcomes, assessment of social validity, identification of moderators of intervention effects, innovative treatment applications and strategies to integrate research and practice. Recommendations to enhance the scientific basis and clinical relevance of intervention research include using case series to document promising methods, collecting data in practice settings, assessing costs versus benefits, defining and assessing quality of psychological interventions, and conducting randomized clinical trials.

KEY WORDS: intervention; outcome evaluation; treatment research; quality of life.

It may seem surprising to describe the field of intervention research as a “frontier” of pediatric psychology. The promise that psychologists would develop interventions that were not only relevant to pediatric practice but were documented as effective based on research was heralded as a cornerstone of the then new field of pediatric psychology (Drotar, 1995). For example, Kagan’s (1965) vision of the marriage between pediatrics and psychology included the application of psychological theory and research to therapy with pediatric problems.

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Wright (1967) also urged pediatric psychologists to develop, utilize, and evaluate brief, prevention-focused treatments that were conducted in pediatric settings.

How far has the field of pediatric psychology progressed in the previous three decades in developing empirically based interventions that can be applied to practice? The short answer is not nearly so far as the founders of the field would have preferred, judging from the limited frequency of published research reports concerning intervention compared with description (Roberts, 1992) and the limited number of empirically based interventions being conducted by practicing pediatric psychologists. Leaders in the field have consistently underscored the importance of developing treatment outcome research in pediatric psychology (Roberts, 1992; La Greca & Varni, 1993), a recommendation that also applies to the field of clinical child psychology (Kazdin, Bass, Ayers, & Rogers, 1990).

As the year 2000 approaches, formidable forces now challenge pediatric psychologists to devote a lion’s share of their considerable energies to intervention research. The primary emphasis on cost containment in managed care will stimulate pediatric psychologists to put their interventions to the test and identify those that are both effective and cost effective (Rae & DiGirolamo, 1997). Despite pioneering efforts in evaluating behavioral interventions that are delivered in outpatient pediatric settings (Finney, Lemanek, Cataldo, Katz, & Fuqua, 1989; Finney, Riley, & Cataldo, 1991), very few data are available to support the efficacy of many of the interventions that are now being conducted for the wide range of problems that are seen in practice in pediatric settings. However, such information is critical if we are to create a unique niche for scientifically based clinical practice of pediatric psychology and give managed care companies a satisfactory answer to that predictable yet embarrassing question: Why should we reimburse the interventions conducted by pediatric psychologists as compared with those that can be done less expensively by other practitioners, including those without specialized training in pediatric psychology?

Beyond the difficult questions that are raised by the need to justify the costs and efficacy of our interventions, the poignancy of human need also challenges us to develop and evaluate interventions for vulnerable populations. Children and families present pediatricians and psychologists with an extraordinary array of physical, psychological, and social problems (Shonkoff, 1993). Many of these problems, such as child maltreatment and exposure to epidemic levels of violence (Osofsky, 1995), are rooted in complex social, psychological, and economic factors, which present very difficult challenges for intervention research (Black & Holden, 1995).

As has been the case throughout the short history of pediatric psychology, advances in medical treatment and technology have improved the course of many problems, but have created others, thus requiring the development of new intervention strategies and methods of evaluation (Perrin, 1992; Saylor, Casto, & Huntington, 1996). Consequently, there are continuing opportunities for research concerning the efficacy of medical and psychological intervention with vulner-
able populations, including the impact of managed care on children with chronic health conditions (Newacheck et al., 1996). However, most psychological research related to pediatric chronic illness has focused primarily on description of associated psychosocial problems (Thompson & Gustafson, 1996) rather than on interventions to reduce these problems (Bauman, Drotar, Perrin, Pless, & Leventhal, 1997).

Beyond these salient human needs, intervention research also provides a useful but as yet untraveled avenue to address scientific questions that have both practical and theoretical significance. For example, one of the needs in chronic illness research concerns identification of the mechanisms by which family influences affect the psychological adjustment of children with chronic health conditions (Drotar, 1997). It is very difficult to disentangle the effects of specific family influences on children's adjustment in traditional correlational designs, even in prospective studies. Well-controlled intervention studies provide a useful vehicle to address questions related to hypothesized mechanisms of effects. For example, based on correlational evidence, family conflict has been shown to be an important risk factor in the development and maintenance of psychological maladjustment in children with chronic health conditions (Drotar, 1997). Assuming this hypothesis is correct and a particular intervention is found to lessen family conflict, it should also reduce levels of children's psychological maladjustment and/or other clinically relevant outcomes (e.g., adherence to medical treatment), which are potentially affected by family conflict (Wysocki, White, Bubb, Harris, & Greco, 1995).

**BARRIERS TO INTERVENTION RESEARCH IN PEDIATRIC SETTINGS**

There is no doubting the importance of intervention research in advancing the field of pediatric psychology. Moreover, I know firsthand that pediatric psychologists are working assiduously conducting interventions day in and day out with many populations. Several questions immediately arise. Why are we not evaluating our interventions? If we are evaluating them, why are we not reporting our findings? What can be done to enhance the quantity and quality of intervention research?

In fact, the formidable barriers to conducting research concerning interventions with pediatric populations have limited progress. These include (among others) the time and costs that are involved in intervention research, the problems of conducting controlled clinical trials in field settings, the heterogeneity of clinical populations, specialized methodological problems (e.g., subject attrition) (Black & Holden, 1995), and the increasing pressures on pediatric psychologists and their colleagues in pediatrics to increase their levels of direct service and billable hours. However, billable hours do not translate into research, on
intervention or otherwise. Even more than this, pressures for clinical care contribute to a vicious cycle (e.g., more treatment but less research) that promises to limit the growth of intervention research in pediatric settings.

**OPPORTUNITIES FOR INTERVENTION RESEARCH WITH PEDIATRIC POPULATIONS**

Fortunately, the above barriers coexist with important opportunities for intervention and outcome-based research for pediatric psychologists, as illustrated by the wide range of studies that are represented in this issue. These studies clearly illustrate the need for flexibility of methodological approaches, especially in the early phases of research in this relatively undeveloped area of research. La Greca and Varni (1993) conceptualized four kinds of studies that encompass intervention research in pediatric psychology including (a) psychosocial and developmental factors that contribute to the treatment of pediatric conditions; (b) treatment of the emotional concomitants of disease, illness, and developmental disorders; (c) the promotion of health and health-related behaviors; and (d) prevention of injury among children and youth. Research is needed in all of these areas.

While each of the above topics presents salient opportunities, research that addresses the psychological impact of medical interventions is likely to be of special interest to our pediatric colleagues. Some of the medical treatments that are currently regarded as standards of clinical care for children with various pediatric problems have not been evaluated in controlled clinical trials. Moreover, many available pediatric treatments have a wide range of problematic effects on the psychological status and functioning of children and families, that need to be carefully documented. One current example is bone marrow transplantation, which is utilized with increasing frequency owing to improved survival rates, despite the extraordinary stresses, that are associated with negative effects on children’s social competence, self-esteem, and general emotional well-being (Phipps & Barclay, 1996; Phipps et al., 1995). To plan effective interventions to lessen the psychological morbidity of such problems on the lives of children and their families, research is needed to identify those areas of children’s quality of life (QOL) that are most vulnerable to the impact of these and other such medical treatments (Drotar, in press).

As an example of this type of research, Miller, Johann-Murphy, and Pit-ten Cate (1997) describe the psychological impact of one such medical treatment, selective posterior rhizotomy (SPR) a surgical technique that decreases spasticity among children with cerebral palsy and which involves a prolonged course of rehabilitation. After a child has undergone SPR, the child’s muscle tone is significantly reduced, which necessitates a course of physical rehabilitation that involves painful muscle stretching to increase the range of motion as well as
muscle strengthening to increase the child's endurance. While functional gains are associated with programs of muscle stretching, so are significant levels of pain, which had not been well-documented. Miller et al.'s careful documentation of improvements in children's pain over the course of SPR underscores the need for additional research in other settings on the outcomes of this treatment.

**Documenting the Impact of Interventions on Multiple Outcomes**

One of the salient needs in evaluating the impact of medical and psychological interventions with pediatric populations is to extend assessment of outcomes beyond physical status (Kaplan, 1990). Because medical treatments can affect a wide range of psychological outcomes, limiting assessments to outcomes such as physical symptoms or adverse medical events can be very misleading. A narrow approach to assessment of health outcomes will miss clinically relevant effects on such parameters as emotional functioning and role limitations, which reflect children's QOL (Spieth & Harris, 1996). Comprehensive approaches to outcome assessment can detect important relationships among medical and psychological outcomes. Moreover, evaluating the impact of medical interventions on children's functional status is also critical to effective assessment of the efficacy of managed care in a changing health care environment (Schor, in press).

The contributors to this issue provide us with instructive examples of comprehensive outcome assessment of interventions for a variety of populations. Examples included anxiety, coping strategies, and functional difficulty as outcomes of cognitive behavioral interventions with adolescents with cystic fibrosis (CF) (Hains, Davies, Behrens, & Bilber, 1997), young children's cognitive and motor development, task engagement and affect during play as outcomes of home-based intervention in failure-to-thrive (FTT) (Hutcheson et al., 1997), children's reports and direct observation of anxiety cortisol levels, and parents' reports of pain as outcomes of massage therapy in juvenile rheumatoid arthritis (JRA) (Field et al., 1997) and observation and reports of pain and anxiety among children with cerebral palsy (Miller et al., 1997).

**Assessing the Social Validity of Interventions**

One of the most important needs in the field of intervention research in pediatric psychology is to document consumers' perceptions of salient needs for intervention and their appraisal of the utility and impact of interventions. Some of the contributors to this issue present data that are relevant to social validity of interventions. For example, Hains et al. (1997) note an interesting discrepancy concerning the treatments' assessment of adolescents who were judged as anxious based on treatment team's ratings versus those that were identified as anxious by children and parents. This finding indicates that one cannot assume that
the target problems and/or perceived need for intervention that are identified by children are synonymous with that of practitioners or parents. In fact, as practicing clinicians know only too well, parents', children's, and practitioners' appraisals of clinical problems are often discrepant. Unfortunately, there are few systematic data concerning how children and adolescents who present with clinical problems in pediatric settings perceive the impact of their problems and the need for intervention compared with their parents and physicians and/or nurses who make referrals for psychological services.

Just as one cannot assume that children and families share professionals' concepts of need for intervention, one cannot assume that they necessarily perceive the interventions that professionals commonly utilize as acceptable or meaningful. Consequently, an important but neglected set of questions in intervention research with pediatric populations concerns the following: Do those children and families who have received psychological treatments find them acceptable and applicable to their daily problems? Do they view improvements following interventions as meaningful and valuable (Kazdin, 1977)? Such questions have been largely neglected in research with children, including pediatric populations, with a few exceptions (Bennett, Power, Rostain, & Carr, 1996; Tarnowski, Kelly, & Mendelowitz, 1987).

To address this need, Wysocki et al. (1997) develop a measure of family members' perceptions of the acceptability, applicability, and effectiveness of two alternative interventions: (a) an educational and support group; and (b) a behavioral family systems therapy (BFST), which is a promising intervention that involves training in problem solving including conflict resolution, communication skills, and cognitive restructuring (Robin & Foster, 1989). It was interesting to note that not only was BFST effective in improving communication and problem-solving skills but it also was rated as more acceptable, applicable, and effective by family members in addressing the specific targets of family communication and problem solving than the education and support group intervention. Moreover, adolescents rated the acceptability of the education and support group lower than their parents did and lower than BFST. Such information concerning the acceptability of interventions can be gathered quite readily and would be very useful in determining family members' interest in new treatment approaches, helping to refine interventions to enhance their acceptability, and providing information to managed care companies concerning consumer satisfaction with psychological treatments (Wysocki et al., 1997).

Identification of Moderators of Intervention Effects with Pediatric Populations

Practitioners appreciate that psychological (and medical) interventions may have very different effects as a function of individual patients' and families'
characteristics. However, relatively little is known about how specific characteristics (e.g., comorbid problems, presence of associated risk and protective factors) influence the outcomes of interventions with pediatric populations. Readers may be interested in an instructive recent example from the Infant Health Development Program. Early intervention involving home visits, child development center services, and parent group meetings had greater effects on cognitive development and achievement of 8-year-olds who were heavier formerly low birth weight infants (McCarton et al., 1997).

The more data that are gathered about moderators of intervention, outcomes, or intervention effects, the greater our potential to reach that noble but elusive goal of tailoring our treatments to clinically-relevant characteristics of populations. While practitioners generally individualize their interventions to client characteristics (so much so that it is often very difficult to study them!), pediatric psychology researchers have generally focused their evaluations of interventions that reflect "one size fits all" models. Fortunately, there are exceptions. For example, Hutcheson et al. (1997) assess the influence of two risk factors: demographics and maternal depression on the outcomes of a comprehensive outreach intervention for preschool children with FTT. This model of intervention had demonstrated positive effects on infants' cognitive and language development in prior research (Black, Dubowitz, Hutcheson, Berenson-Howard, & Starr, 1995). Consistent with hypotheses, maternal depressive symptoms moderated the impact of the intervention. Children of mothers who reported low levels of negative affectivity showed beneficial effects of the home intervention services on measures of children's cognitive development and behavior during play, while children of mothers with high levels of negative affectivity did not. These results suggest that some mothers of children who fail to thrive may be too depressed to take full advantage of the interventions that were offered. Consequently, alternative models of intervention (e.g., psychotherapy and/or pharmacological approaches) may be needed to help these mothers to benefit from home-based interventions. This study clearly underscores the need for an informed diagnostic assessment strategy to guide choice of interventions with pediatric populations.

Strategies to Integrate Research and Practice in Studying Interventions in Pediatric Settings

Progress in intervention research with pediatric populations have been limited by the fact that such research has been largely separated from the context of practice. For the most part, pediatric psychologists are not conducting (or are at least not reporting) research that focuses on populations that are seen in practice. However, the research presented in this issue suggested several potential ways to
research and practice concerning interventions. For example, Stark et al. (1997) document the efficacy of short-term combined medical and behavioral intervention for retentive encopresis among a clinical population of children who failed standard medical management for this condition. Medical management included enema clean out, increasing dietary fiber, and daily toilet sitting. Behavioral management included strategies of differential attention contingency management, and contracting. In this era of managed care, it is important to note that many of the children included in this study had received a variety of unsuccessful interventions prior to being referred for this successful treatment program (Stark et al., 1997). This study is also noteworthy because it provides a replication of previous findings (Stark, Owens-Stively, Spirito, Lewis, & Guevermont, 1990). Replication is a powerful strategy that can be used to enhance the generalizability of treatment effects, but one that has rarely been used in pediatric psychology research.

Another example of a potential integration of intervention research with practice is Hains et al.'s (1997) report of cognitive-behavioral intervention for adolescents with cystic fibrosis (CF). Despite the fact that adolescents with CF have been consistently noted to have significant psychological distress (Thompson, Gustafson, Hamlett, & Spock, 1992), to my knowledge no evaluations of interventions have been described for these problems. The three key elements of Hains et al.'s treatment approach include (a) a conceptualization phase in which adolescents were taught the theoretical basis for cognitive restructuring and problem solving and to identify negative, self-defeating cognition; (b) a skills acquisition and rehearsal phase in which these adolescents were taught to question their self-defeating thoughts by examining evidence and problem-solving strategies to stress; and (c) an acquisition phase in which the youths were given opportunity to practice skills in anticipation of future or potential stressor. Assessment of this case series indicates that this intervention model is associated with decreases in anxiety and negative coping techniques concerning problems related to CF, and perceived functional disability as well as increases in positive coping. These data suggest that this intervention warrants evaluation in a larger sample, ideally in the context of a randomized control study.

**Innovative Applications of New Treatments**

Pediatric psychologists need to push the frontiers of research by developing and evaluating innovative treatments for pediatric problems that carry a high level of psychological and/or functional morbidity. Field et al. (1997) provide an excellent example of an innovative treatment in describing the efficacy of massage therapy on pain and distress for children with JRA. Pain is an undertreated clinical problem among children in this condition, for which nonpharmacological
methods of pain management need to be developed (Walco, Varni, & Ilowitze, 1992). Massage therapy has recently been shown to be a promising treatment for a range of problems in children (Field, 1995) and the application to children and adolescents with JRA reported here was unique: Children who received a daily 15-minute massage by one of their parents for over 30 days experienced immediate lowering of anxiety and cortisol levels and decrease in pain and pain-limiting activities over 30 days compared to controls who experienced a relaxation session. These data suggest that massage therapy may offer a cost-effective treatment that clearly warrants further study. In particular, future research is needed to document long-term effects of massage therapy and to determine the specific factors that are responsible for the positive effects.

**FUTURE DIRECTIONS FOR INTERVENTION RESEARCH**

The research presented in this issue represents a cross-section of the current state of the art in intervention research in pediatric psychology. These studies should challenge investigators to take intervention research to the next level. To this end, several recommendations are made to increase the scientific basis and clinical relevance of intervention research in pediatric psychology.

*Using Case Series to Document Promising Interventions*

Readers should take note that a variety of methods including controlled studies and case series were utilized in the research in this issue. Researchers do not always have sufficient empirical data to support the development of randomized, controlled clinical trials in the early phases of the development of clinical interventions. Consequently, there is a need for detailed case series to document the effects of promising treatments. Although well-documented case series clearly have a place in the future of research on intervention in pediatric psychology, the small number of submissions of case reports and series in response to our editors' call, which is now several years old (Drotar, LaGreca, Lemanek, & Kazak, 1995), indicate that such work is difficult to execute in practice. However, I hope that investigators will not give up the effort. In this regard, see Lucyshyn, Albin, and Nixon (1997) for an interesting, recent application of experimental single-case analysis in evaluating the effects of a behavioral family intervention on the outcomes of a child with multiple physical disabilities.

Pediatric psychologists have significant roles to play in helping to design effective evaluations of the impact of medical interventions for children with chronic conditions (Bradlyn et al., 1996). In addition to designing comprehensive evaluations of medical interventions, pediatric psychologists need to develop and evaluate their own randomized controlled trials of clinically relevant
interventions (see Kazak et al., 1996). Whenever possible, these interventions should involve multisite studies, which, while always very difficult from a logistical standpoint, have tremendous advantages from the standpoint of statistical power and generalizability of effects (Droter, 1994).

Using Data to Monitor the Practice of Pediatric Psychology and Pediatric Medicine

Another important tool in the advancement of integration and practice in pediatric psychology is the development of databases to monitor clinical outcomes in psychological practice. See Finney et al. (1989, 1991) for examples of such research with children with behavioral problems in primary care settings.

Another promising direction is to utilize methods of health-related QOL to document the perceived costs and benefits of pediatric treatment outcomes based on the vantage points of parents and children (Drotar et al., in press). Data concerning parents' and children's perceptions of the functional outcomes associated with various conditions and treatments will also inform decisions concerning medical treatment.

Studies of the Economic Costs and Benefits of Interventions

The assessment of the economic costs and benefits of interventions have been a neglected topic within the field of pediatric and child health psychology (for an exception, see Pinto & Hollandsworth, 1989), but remains a critical item on our research agenda that will undoubtedly influence the development of pediatric psychological services in the future. As psychologists, we have not been trained to conduct cost-benefit analyses. However, we must not be deterred by mere lack of experience but need to develop the necessary expertise and/or collaborate with those who have it.

Defining and Assessing Quality of Psychological Care

If we asked a group of pediatric psychologists how they would define quality of the services that they deliver, what would they say? Such parameters as timeliness, access, efficacy in symptom reduction, patient, family, and provider satisfaction, all come to mind. However, precious little information has been documented about the quality of care or patient/family satisfaction with psychological services with pediatric populations (for an exception, see Baine, Rosenbaum, & King, 1995). Shapiro, Walker, and Jacobson (1997) have developed an
interesting measure of children's satisfaction with mental health services that
could be adapted for use with pediatric populations.

Another critical but unanswered question is access to psychological services
among pediatric populations. The question of access to care has been an impor-
tant issue in pediatrics (Schor, in press). It is not unreasonable to assume that
many children and their families also have difficulty accessing psychological
services, and increasingly so in an era of managed care. However, very little is
known about the extent of the problem, including which populations are the most
vulnerable to problems of access. In particular, we need to document the access
to mental health services for various pediatric populations (e.g., children with
chronic conditions) who struggle with significant barriers that limit their access
to psychological services despite high levels of need (Sabbeth & Stein, 1990).

Disseminating and Applying Information Concerning Intervention

In the year 2000 and beyond, successful pediatric psychologists will need to
develop knowledge and skills in disseminating information concerning success-
ful (and unsuccessful) interventions to their colleagues in different professions as
well as to managed care organizations. We also need to become more skilled at
summarizing and distilling the essentials of our intervention methods and out-
comes to colleagues and insurance carriers. The need for rapid dissemination of
information about interventions may appear to go against the scientific grain of
weighing evidence carefully, but it need not. We just need to work and think
more quickly, which are attributes that successful psychological consultants have
cultivated (Drotar, 1995).

Pediatric psychologists who are fortunate enough to practice and conduct
research in the millennium clearly have a great deal to accomplish if the field is
to achieve its initial promise to develop, evaluate, and implement a wide range of
clinically relevant interventions. Neither Kagan (1965) nor Wright (1967) fore-
saw the powerful forces of managed care, the limitations of practice under the
forced economies of managed resource allocation, or the extraordinary diffi-
culties of conducting intervention research in pediatric settings. However, in
describing the promise of interventions in pediatric settings they had confidence
in the energies and ingenuities of pediatric psychologists. I do not think that their
confidence was misplaced, but, as always, time will tell.

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