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Implementation Research and Wraparound Literature: Building a Research Agenda

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Abstract We used the framework identified by the National Implementation Research Network's (NIRN) analysis of 35 years of implementation outcomes literature from diverse fields of endeavor to review the current state of wraparound implementation research. Model definition, model fidelity and intervention outcomes were areas of relatively greater development, while target population, theory base and theory of change, organizational context and readiness, staff selection, training, supervision or coaching, purveyor selection, and program installation were less examined or even overlooked. We conclude with suggestions for building a research agenda on wraparound implementation.

Keywords Wraparound · Implementation research · Program implementation · Evidence-based practice · Research methods · Literature review · Research agenda

Introduction

Wraparound is a community-based, family-driven collaborative team planning process that engages informal supports and formal services with families in culturally competent,

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individualized, strengths-based assessment and interventions. Outcomes of these efforts are monitored closely and guide adjustments to team composition and structure, as well as to team assessments and interventions (Burchard et al. 2002; Burchard and Clarke 1990; VanDenBerg and Grealish 1996; Walker et al. 2004). Wraparound has been a model for service delivery in over 100 federal systems of care children's mental health grants since 1992 (Center for Mental Health Services 2008). Estimated to serve approximately 100,000 youth annually in nearly 1,000 programs across the United States, wraparound has been the subject of more than 100 publications, and has been described as an evidence-based, a promising, or a best practice model (Walker and Bruns 2006; Walker 2008).

Defined by value-based principles, wraparound has sometimes been misunderstood (Bruns and Walker 2008). Service providers whose abilities were developed in expert practice models sometimes interpreted those principles through the lens of their previous experience and applied wraparound as a family friendly means of case management. However, even purveyors and practitioners with many years of wraparound experience sometimes differed on the meaning and practical intent of its value-based principles (Bertram and Bertram 2004; Bruns et al. 2004b; Malysiak 1997, 1998; Walker et al. 2004).

To address variations in interpretation of wraparound principles and practice, the National Wraparound Initiative (NWI) was established in 2003 to clarify and support model definition, process, and implementation. Composed of advisors with considerable wraparound implementation and research experience, NWI meets annually to share lessons learned, and to identify next steps for model development and study. Between meetings advisors share information, conduct studies, and develop resources for the field (Walker and Bruns 2006).

In the past few years, there have been several reviews on the effectiveness of wraparound (Burchard et al. 2002; Farmer et al. 2004; Suter and Bruns 2008, 2009). These reviews document steady growth in wraparound's intervention outcomes research base. Though these outcomes are encouraging, these reviews also acknowledged wide variability in wraparound implementation across studies.

In 2007, advisors working with the NWI's research and evaluation group discussed gaps in the wraparound research base and how these might be addressed. This group noted that wraparound implementation had received relatively little systematic examination, especially when compared to intervention outcomes research, and that no review of wraparound implementation research had been completed and published in peer-reviewed literature. This gap in the wraparound research base was troublesome due to both the variety of settings in which wraparound has been applied, and to the variation in its implementation from community to community (Bruns 2008).

To structure our review of wraparound implementation research, we applied a framework identified by the National Implementation Research Network (NIRN) (Fixen et al. 2005). Their monograph presented results of an analysis of over three decades of empirical literature on implementation of diverse endeavors in corporate business, farming, hospital administration, nursing, education, mental health, juvenile justice, and other social services. From this analysis they identified a framework for effective implementation, including components of the intervention model, components within and outside the organization that influence how effectively it implements that model, as well as developmental stages of an organization's implementation of the intervention model. Implementation was defined by NIRN as:

> A specified set of activities designed to put into practice an activity or program of known dimensions. …implementation processes are purposeful and are described in sufficient detail such that independent observers can detect the presence and strength of the "specific set of activities" (Fixen et al. 2005, p. 5).

NIRN observed that *intervention* science related to developing evidence-based practices had improved through use of manuals that clarified interventions and through development of model fidelity measures. However they also noted that the *implementation* science that guides organizational adjustments to support consistent model fidelity and improved outcomes in community settings had lagged far behind initial development of those evidence-based practices (Fixen et al. 2005).

Their review produced a conceptual framework to guide effective organizational implementation of a specified intervention model. They asserted that effective

Table 1 NIRN component framework

Core intervention components
Model definition
Target population
Alternative or typical models used
Theory base
Theory of change
Core implementation components
Organizational context
Organizational readiness
Facilitative administration (structures and practice)
Organizational fidelity assessment
Systems level interventions to support direct service
Model fidelity assessment
Supervision or coaching
Staff selection
Staff training
Purveyor selection

implementation requires careful consideration of core intervention components, core implementation components, and stages of implementation (See Tables 1 and 2). Core intervention components represent essential elements for effective selection and replication of an intervention model. They include, (1) A clear definition of the model, (2) Characteristics of the target population and how the chosen model addresses them, (3) Alternative models for addressing that population and why those alternatives were not selected, (4) Theory base of the chosen model, and (5) The chosen model's theory of change (See Table 1).

To implement the chosen model effectively, efficiently, and with fidelity, an organization or program must make adjustments. Within the NIRN framework, these program adjustments are driven through core implementation components that include, (1) Organizational context and readiness, (2) Facilitative administration (structures and practice), (3) Systems level interventions to support direct service, (4) Model fidelity assessment in direct service and within the organization, (5) Staff selection and training, (6) Staff coaching and supervision, and (7) Selection of purveyors who provide consultation and training that supports these drivers of program implementation (See Table 1).

Finally, the NIRN review of literature suggested that an organization's implementation of a well-defined intervention model is not an event but an iterative process unfolding through 2–4 years in a considered socio-political context. This process produces both intervention and implementation outcomes throughout stages of (1) Exploration and adoption, (2) Program installation, (3) Initial implementation, (4) Full operation, (5) Innovation, and (6) Sustainability (See Table 2).

Table 2 NIRN stages of implementation

Stages of implementation
Socio-economic and political context
Exploration and adoption
Program installation
Initial implementation
Full operation
Innovation
Sustainability
Outcomes
Intervention
Implementation

While the NIRN framework is thoroughly grounded in a deep, extensive review of more than three decades of literature from diverse fields of endeavor, we believe our study may be the first time that researchers have applied it to assess the body of literature that describes and examines a specific practice model. Our goal was to identify which components or stages of the NIRN framework had been well addressed, and which had received limited attention or had been overlooked in wraparound's development and dissemination. Prior to analysis we were aware that much had been published regarding wraparound model definition, model fidelity, and outcomes. By highlighting components or stages that have been overlooked or less addressed, our study may contribute to a systematic development of a wraparound research agenda and inform activities of programs implementing the wraparound model.

Method

Our initial review of wraparound literature focused upon books, monographs and peer-reviewed publications. Unlike the NIRN review, our literature review was not limited to publications reporting empirically derived outcomes. We were interested in any and all descriptions of wraparound intervention and implementation. Databases searched included EBSCO, ERIC, Google Scholar, JStor, MERLIN, OmniFile V Full Text, Ovid, PsycINFO, Social Services Abstracts, Social Work Abstracts, Sociological Abstracts, and Springer Link. Our first search examined literature published since 2000. References from these publications augmented the next search of the computer-accessed databases, the literature published before the year 2000. A third search reviewed papers published in conference proceedings from the Tampa Systems of Care Research Conference and the Portland Building on Family Strengths Conference, which are key venues for wraparound knowledge dissemination. We also searched websites of

the research and training centers (RTC) associated with sponsors of these conferences, the University of South Florida's Department of Child and Family Studies Louis de la Parte Mental Health Institute, and Portland State University's School of Social Work for research and theoretical publications grounded in the literature. These papers were compared with literature already identified in books, monographs or peer-reviewed publications. To avoid duplication, conference papers or RTC papers that were subsequently published in a journal, monograph, or book were removed from further analysis.

Through each search, the lead author and three research assistants versed in the NIRN study reviewed publications separately to determine which components, stages, or outcomes of the NIRN framework were addressed. Many publications addressed more than one component, stage, or outcome. These separate analyses were compared and differences of placement in the NIRN framework were discussed until there was agreement. This analysis was then shared with the NWI research and evaluation group who recommended additional literature, and reviewed and helped resolve placement of literature in the NIRN framework. Finally, our review was shared with NIRN's co-director, Dean Fixsen, who recommended specific language for the core components, the order of their presentation, and differentiating between intervention outcomes and implementation outcomes.

Results

Our review yielded a total of 118 publications spanning the years 1987–2008. Distribution by type of publication is represented in Table 3. Initially described in monographs or newsletters (Burchard et al. 1993; VanDenBerg and Minton 1987), the wraparound model has increasingly been presented and evaluated in peer reviewed publications, dissertations, and conference proceedings. Publications could and often did address more than a single element of the NIRN framework. Publications addressing intervention components ($n = 61$), implementation components ($n = 61$), stages of implementation ($n = 27$), and intervention or implementation outcomes ($n = 63$) comprised the basis for further analysis and recommendations.

Table 3 Non-duplicated wraparound literature count 1987–2008 ($N = 118$)

Type of literature	Publications
Journals	59
Conference proceedings	39
Other	20

Core Intervention Components

Sixty-one of the 118 (52%) publications included in the review addressed one of the NIRN core intervention components. Distribution of publications within these components is presented in Table 4. As shown, 23 of these publications (38%) were focused on definition of the wraparound model, with the other components accounting for 6 publications (theory base; 10%) to 13 publications (target population; 21%).

Model Definition

Many publications described and defined the wraparound model (*n* = 23). Initial model definition emerged through the mid-1990s, including an entire edition of this journal (Clark and Clarke 1996) that was devoted to wraparound definition and intervention outcomes. Publications typically described specific program sites and how wraparound's value-based principles guided service delivery (e.g., Burchard and Clarke 1990; Eber et al. 1996). More recently, NWI has produced a series of monographs and papers clarifying and expanding these early definitions (Bruns et al. 2004b; Miles et al. 2006; Walker et al. 2004).

Target Population

NIRN suggests that identification of the target or client population is an important core intervention component that should have an empirical basis. Wraparound publications of the early 1990s asserted that the target population

was families with children who displayed severe emotional or behavioral disturbance for whom more traditional programs and services seemed less effective, particularly at maintaining youth with their families or in their home communities (Burchard and Clarke 1990). For example, with the support of the state governor, the Alaska Youth Initiative was funded by diverting dollars from more restrictive mental health services to provide a wraparound approach with this population (Burchard et al. 1993). Our review of publications found that this approach to funding wraparound programs for this population has continued (Shirk 2003).

Later publications described efforts to address children and adolescents with social, emotional, or behavioral disorders in child welfare (Clark et al. 1996), education (Eber and Nelson 1997), and juvenile justice (Kamradt 2000; Kerbs et al. 2004) and sometimes used the word *population* to describe the system or systems from which children were referred or in which wraparound was implemented. No studies were found that systematically examined how wraparound addressed specific characteristics of these children, their families or communities.

Alternative or Typical Models Used

Of the ten publications that addressed this component, five offered distinct and extensive model comparisons. One discussed family-centered intensive case management services, its similarities and differences with aspects of wraparound (Evans et al. 1996). An early longitudinal study compared outcomes from a wraparound process to

Table 4 Publications addressing NIRN components	Journals	Conference proceedings	Other
Core intervention components			
Model definition	14	0	9
Target population	7	2	4
Alternative or typical models used	9	1	0
Theory base	5	1	0
Theory of change	3	5	1
Core implementation components			
Organizational context	7	1	0
Organizational readiness	5	1	0
Facilitative administration (structure and practice)	1	4	1
Organizational fidelity assessment	2	3	0
Systems level interventions to support direct services	3	1	1
Model fidelity	5	14	1
Supervision or coaching	2	6	0
Staff selection	0	0	1
Staff training	1	1	0
Purveyor selection	0	0	0

Publications may address more than a single component or stage

outcomes for a control group of children receiving traditional foster care service delivery (Clark et al. 1996). Another article discussed drug abuse treatment services, wraparound and three different treatment orientations (Grella et al. 2007). A frequently cited article (Burns et al. 2000) directly compared elements of wraparound with Multisystemic Therapy (MST), while a another study directly examined service use and outcomes between wraparound, MST, and a combination of wraparound and MST service approaches (Stambaugh et al. 2007). Most recently, Suter and Bruns (2008) reviewed studies in peer reviewed literature that compared outcomes achieved through the wraparound process to those achieved through more traditional services. However, most publications in their literature review did not offer extensive examinations between wraparound and the comparison conditions (usually case management, more traditional mental health services, or services as usual).

Theory Base

Wraparound evolved over time in practice settings, and was initially defined through values. There has been limited discussion or systematic examination of its theory base ($n = 6$). From its inception wraparound publications have emphasized an ecological approach to team composition, to strengths and needs assessment, as well as for interventions, leading some to suggest ecological theory as its theory base (Burns et al. 2000). Some authors suggest that wraparound is consistent with systems theory and social learning theory (Burchard et al. 2002). Based upon initial exploratory studies, other authors specifically suggest that wraparound shares the same theory base as MST, ecological systems theory, as well as a theory base in team development that should ground training and supervision to support model adherence (Bertram and Bertram 2004; Malysiak 1997, 1998; Malysiak-Bertram et al. 2000). The recent description of wraparound's initial theory of change (Walker 2008) also suggests that wraparound shares a base in that systems theory of social ecology, as well as theory on teamwork.

Theory of Change

An initial description of a theory of change for wraparound has only recently been published (Walker 2008). Based on support from basic research in areas such as teamwork, social support, and the use of data to guide implementation, this seminal work offered the first comprehensive description of how change is proposed to occur in the wraparound process. Despite support in the basic research literature for these elements contributing to change, Walker (2008) asserts that they require further examination. In fact,

some elements discussed in Walker's theory of change were previously studied. The use of flexible funds to meet basic family needs was examined in a large sample study that compared outcomes for families who received flexible funds with those who did not (Resendez 2002). Another promising study examined social network intervention as an integral component of community-based, collaborative, family-focused practice (Cox 2005). Integrating responses by different systems serving the same family had been identified as a necessary part of wraparound team development and planning in several publications (Miles et al. 2006; Walker et al. 2004) and was also included in Walker's wraparound theory of change.

Core Implementation Components

A variety of organizational factors influence whether a promising intervention model can be replicated with success. These factors include an agency's climate and culture (Glisson 2006) which are influenced by its resources, policies, and procedures, its workforce selection and development, and its use of consultants, as well as how data are used to evaluate fidelity of implementation and intervention outcomes. The NIRN monograph (Fixen et al. 2005) was not the first study to identify organizational context as a critical factor in the implementation with fidelity of a mental health or social service program that achieves improved outcomes (Glisson and Hemmelgarn 1998; Schoenwald et al. 2003). The wraparound process was itself the focus of a broad yet detailed exploration of implementation relationships across the wraparound team, organizational, and systems levels (Walker et al. 2003).

Overall, 61 of the 118 publications reviewed (52%) were found to address one or more of the NIRN core implementation components. Distribution of publications by these components is presented in Table 4. As shown, nearly one-third ($n = 20$) of these publications were focused on model fidelity assessment. Many implementation components were examined by a limited number of publications, some of which did address multiple NIRN components. These included organizational context, organizational readiness, facilitative administration, organizational fidelity assessment, systems level interventions to support direct service, and supervision or coaching which were addressed by 5–8 publications. Two publications were found that addressed staff training, and one that addressed staff selection, while no publications addressed purveyor selection. Where numbers of publications were small, we have combined NIRN components into sub-headings for easier review.

Organizational Context and Organizational Readiness

Organizations must be prepared to make adjustments in their policies, procedures, and use of resources so they are
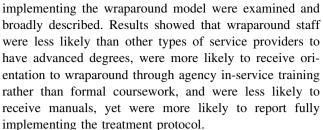
congruent with and support the adaptation of new practice models. Publications that preceded the NIRN monograph presented broad organizational issues that were considered when integrating wraparound into different settings such as schools (Eber and Nelson 1997; Scott and Eber 2003) or mental health clinics (Adkins et al. 1998). Other publications presented general guidelines for structuring organizations and systems to implement wraparound (Burns and Goldman 1999; VanDenBerg and Grealish 1996). The most comprehensive initial examination of organizational context and organizational readiness emphasized mutual accountability across wraparound team, organizational and systems levels and in the process identified, but did not systematically test, specific organizational factors such as caseload size, salary, willingness to collaborate with other agencies, and other factors (Walker et al. 2003).

Since the 2005 publication of the NIRN monograph, three ($n = 3$) wraparound publications have presented initial empirical examinations of organizational factors and focused upon multiple NIRN implementation components. Bruns et al. (2006) presented a data-informed effort to reform a child welfare system that emerged with implementation of a wraparound pilot program. In an exploratory study that examined associations between fidelity of intervention with program implementation components, Bruns et al. (2006) highlighted the importance of organizational and systems supports such as maintaining low caseloads, providing ongoing model training and staff support, and establishing systems level collaboration to achieve high degrees of model adherence. Finally, in a qualitative study using grounded theory methods, Walker and Koroloff (2007) explored the implementation context for wraparound to identify organizational and system variables that must change to support the model.

Staff Selection and Staff Training

Staff selection and training should be congruent with core intervention components. Based upon model definition and characteristics of its target population, as well as upon the model's theory base and theory of change, an innovative model such as wraparound should systematically identify and evaluate the educational and experiential background, as well as knowledge and skills that direct service staff and supervisory staff should command to support model adherence and improved outcomes (Fixen et al. 2005).

In our review of wraparound publications there was limited systematic examination of staff selection or staff training in relation to NIRN core intervention components. In one article, case manager characteristics were described in an evaluation of a congressionally mandated demonstration project (Bickman et al. 2003). In a more recent study (Bruns et al. 2007), characteristics of staff

implementing the wraparound model were examined and broadly described. Results showed that wraparound staff were less likely than other types of service providers to have advanced degrees, were more likely to receive orientation to wraparound through agency in-service training rather than formal coursework, and were less likely to receive manuals, yet were more likely to report fully implementing the treatment protocol.

Training content and methods, staff knowledge and skills, factors that impact training, and experimental research on training outcomes and methods, were all emphasized in the NIRN monograph (Fixen et al. 2005). Our review of wraparound literature identified one conference paper that addressed theory-based wraparound supervision that suggested necessary staff knowledge and skills (Malysiak 1999), and one publication that described a training method for finding family strengths (VanDenBerg and Grealish 1997). Another conference paper presented tools for evaluating performance of trained staff relative to wraparound values and process but did not present information on reliability or validity (Rast and VanDenBerg 2004). Walker et al. (2003) provided the most detailed description and tools for evaluating the context of wraparound implementation across team, organizational and system levels. Through literature review, interviews and team observations their study explicated team process and broadly discussed related knowledge and skills as well as necessary supports that included ongoing training and coaching of staff. However, we found no empirical study that examined the relationships between staff educational and experiential backgrounds and the use of specific training content or methods, to develop specific knowledge and skills.

Supervision or Coaching

The focus and methods of supervision or coaching should be model congruent and should enhance staff knowledge and abilities to implement that model efficiently with both fidelity and improved intervention outcomes (Fixen et al. 2005; Henggeler et al. 2009). This NIRN core implementation component is only beginning to receive attention in wraparound literature. Most publications that examined this topic were conference papers. While there has been little empirical study of the approaches presented, all publications ($n = 8$) acknowledged the limitations of training to support model adherence. The use of more direct methods to support integration of training content into practice settings, and the use of data-informed methods for coaching or supervision were emphasized (Bruns et al. 2006; Castillo and Padilla 2007; Malysiak 1999, Malysiak-Bertram 2001; Walker and Koroloff 2007). One study found a relationship between the provision of skill-based coaching and increases in measured implementation fidelity (Bruns et al. 2006).

Model Fidelity Assessment

Simply stated, model fidelity means that the model is implemented as defined. In the latter half of the 1990s, concerns about model fidelity began to be expressed and an initial measure, the Wraparound Observation Form, emerged that defined fidelity as adherence to wraparound's value-based principles (Epstein et al. 1998). A separate thread of inquiry raised in limited case studies suggested that ecological systems theory and team development theory anchor fidelity to wraparound's value-based principles, and were useful in developing staff knowledge and skills, in clarifying training content and methods, and in selecting supervisory models to enhance model adherence. However, theory-based tools used in these studies were not validated (Bertram and Bertram 2004; Malysiak 1997, 1998; Malysiak et al. 1998; Malysiak-Bertram et al. 2000). Subsequent literature related to model fidelity has focused upon development, validation, and use of tools to measure adherence to wraparound principles including publications on development and use of the Wraparound Observation Form (Epstein et al. 2003) and the Wraparound Fidelity Index (Bruns et al. 2004a; Bruns et al. 2005; Bruns et al. 2008).

Facilitative Administration and Organizational Fidelity Assessment

These related core implementation components specify and evaluate administrative structure and practice that directly support model adherence and improved outcomes. Walker et al. monograph (2003) used several qualitative studies to identify and broadly describe a framework of organizational and systems level factors that support wraparound team efforts, and offered tools for organizational evaluation. As described earlier, Bruns et al. (2006) examined a number of these factors and their relationship to model fidelity as measured by the Wraparound Fidelity Index (WFI). This initial empirical test conducted across eight sites using the WFI and a program administrator interview provided preliminary support for the Walker et al. framework (2003), as more organizational and systems level factors from that framework were associated with greater model fidelity. Bruns et al. (2006) also described a series of evaluation activities and program development efforts used to reform the Nevada child welfare system to support expansion of a wraparound pilot program.

Systems Level Interventions in Support of Direct Service

Multiple service systems are often engaged with a family referred to a wraparound program. The policies, procedures, and expectations of these systems may not complement a wraparound process, yet must be addressed. Our review of wraparound literature found the same few articles describing or measuring this complexity at the system level (Bruns et al. 2006a, b; Walker et al. 2003; Walker and Koroloff 2007).

Purveyor Selection

According to NIRN, purveyors are individuals or groups representing a program or practice model who systematically work to implement it with fidelity and good effect. Having a group of purveyors who accumulate, share, and learn from knowledge of implementation across multiple sites over time is desirable. It should be noted that wraparound was specifically mentioned in the NIRN monograph as having many consultants who produced multiple definitions and points of emphasis, and that NWI was formed to integrate lessons learned and to produce common definitions of the wraparound model and process (Fixen et al. 2005). Nevertheless, despite a growing number of wraparound trainers and providers, our review found no publications focused upon purveyor selection.

Stages of Implementation

Fixen et al. (2005) described implementation as a 2–4 year process. Implementation unfolds in a complex socio-economic and political context across stages of exploration and adoption, program installation, initial implementation, full operation, innovation, and sustainability that produce intervention outcomes for program consumers, as well as implementation outcomes within the structure and process of host organizations, and between it and other systems. Through these stages, program implementation should be a data-informed process of knowledge transfer and refinement. In different settings and stages of implementation, specific NIRN intervention components and NIRN implementation components may have greater influence or demand more immediate or sustained attention. Significant events such as altered funding and staff turnover may require programs to re-address earlier stages of implementation (Fixen et al. 2005).

It was very difficult to identify wraparound literature that specifically and primarily addressed NIRN stages of implementation. Many publications spoke about program implementation in a manner that might be interpreted as addressing more than one stage, but the descriptions were very broad. Overall, 23% of the 118 publications we reviewed ($n = 27$) addressed stages of wraparound implementation. As shown in Table 5, the innovation and sustainability stages were each addressed by 6 publications, while no publications were found that addressed the stage of program installation. Only 3 or 4 publications were identified for each of the other four NIRN implementation stages.

Table 5 Publications addressing NIRN stages of implementation

	Journals	Conference proceedings	Other
Stages of implementation			
Socio-economic and political context	3	1	0
Exploration and adoption	4	0	0
Program installation	0	0	0
Initial implementation	3	0	0
Full operation	3	1	0
Innovation	4	2	0
Sustainability	3	2	1
Analysis of outcomes			
Intervention	19	19	10
Implementation	7	8	0

Publications may address more than a single component or stage

Because numbers of publications were small for each stage, we present this literature in a single section for easy review.

In the literature reviewed, several publications presented narratives describing program implementation as moving from exploration and adoption through problem-solving program installation toward full implementation (Bruns et al. 2006a, b; Furman and Jackson 2002; Kamradt and Pina 1998; Walker and Koroloff 2007). However, these discussions were rarely stage-explicit. An appreciation for social policy antecedents was evident regarding exploration and adoption of a wraparound program (Furman and Jackson 2002), as well as for the shortcomings of more traditional organizational and practice models (Walker and Koroloff 2007). Attempts to innovate wraparound included the integration of functional assessment and planning for positive behavioral supports (Clark and Hienemann 1999; Scott and Eber 2003), as well as innovations in team development (Bertram 2008; Bertram and Bertram 2004; Walker and Schutte 2004). Sustainability of wraparound was explicitly described in publications about the Wraparound Milwaukee program (Kamradt 2000). However, no publications were found that were specific to the stage of program installation.

Intervention and Implementation Outcomes

Finally, a substantial proportion (41%) of publications in our review presented data on intervention outcomes (*n* = 48). About one-third of these publications (*n* = 15) simultaneously discussed both intervention and implementation outcomes, with most focused upon model fidelity and intervention outcomes. Because of the volume of these publications, because they have recently been reviewed elsewhere (Bruns and Suter 2008), and because

this article has focused on wraparound's implementation research base, we have foregone a detailed presentation of literature on wraparound outcomes.

Discussion

Using a framework derived from an analysis of implementation research across diverse fields of endeavor (Fixen et al. 2005), our review of wraparound literature identified core intervention components, core implementation components, and stages of implementation that have received the most attention in wraparound literature. The majority of the 118 publications reviewed addressed model definition (*n* = 23), model fidelity (*n* = 20), and/or intervention outcomes (*n* = 48). In the remainder of this review, we will discuss intervention and implementation components that warrant attention in future wraparound research. We will focus our discussion on closely related components that could contribute significantly to improving the wraparound implementation research base.

Core Intervention Components

Target Population

Wraparound's target population has been asserted rather than systematically studied. This oversight may be due to how early wraparound efforts were funded as an alternative to more restrictive and costly categorical responses to serving youth with serious and complex emotional and behavioral disturbance, a convention that continues to this day (Burchard et al. 1993; Shirk 2003). The active integration of wraparound within the systems of care framework (Burns and Goldman 1999; Pires 2002) that focuses upon systems-level change to improve outcomes for this broadly defined population has reinforced this convention. In addition, use of the term *population* to describe wraparound implementation with clients from a particular service system has constrained systematic study of its asserted target population. But what are the specific characteristics of families whose children display serious or complex emotional or behavioral disturbance, and what elements of the wraparound process address these characteristics? There is a rich literature tapped by MST for assessment and interventions with this population (Henggeler et al. 2009) that wraparound purveyors, researchers and programs should consider.

Before 2008 there was no published, comprehensive theory of change for wraparound. Systematic examination of characteristics of wraparound's asserted target population through the lens of this theory of change (Walker 2008) may help us to consider other populations for which wraparound may be an appropriate intervention model, as

well as the populations for whom specific adaptations may be attempted. For example, Walker's theory of change (2008) asserted that the wraparound model opens a pathway to improved outcomes and quality of life through development of social supports for families who are often isolated or who have limited supports as they respond to their children's serious and complex emotional and behavioral disturbance. Others have described this as re-weaving the fabric of these families and their community (Bertram and Bertram 2004). But could the compromised social networks and limited economic supports might also be problematic for those who have aged out of the workforce and lack reliable extended family or community supports? If so, could wraparound also be an innovative model for working with adults nearing the end of their lives? A similar use of wraparound to support more successful integration of adult prisoners into the community post-release has begun to emerge (Bednar 2001).

We suggest that studies are needed that seek to pinpoint how wraparound team composition, development, process, assessments, and interventions address specific characteristics of a program's target population. Such studies will contribute to our knowledge about how wraparound opens pathways to change for a specific population and may suggest other populations for which wraparound may also be effective, while simultaneously establishing a scientific basis for pursuit of other funding.

Theory of Change and Theory Base

Further research is needed to confirm and refine wraparound's initial theory of change (Walker 2008). Such studies may also clarify a theory base for wraparound team process, assessments, and interventions. For example, is wraparound more efficient and effective when team assessments and interventions focus on a broad ecology of needs in family life (ecological theory), or when the focus is on behavioral patterns of interaction that influence addressing those needs both in the family and between family members and those with important roles in the family ecology (systems theory of social ecology)? These questions are not an exercise in semantics. Clarity of theory base will influence the focus of team assessments, the design of interventions, and the selection of formal services (Henggeler et al. 2009).

We must consider that published attempts to innovate wraparound have addressed both theory of team development and team process (Bertram 2008; Bertram and Bertram 2004; Walker 2008; Walker and Schutte 2004), as well as theory-based means of assessment to provide greater clarity and contextual relevance in designing interventions (Clark and Hienemann 1999; Scott and Eber 2003). However, though wraparound is defined as a strengths-based model, we found no studies that examined what pragmatic strengths in families or their natural, informal supports are most often identified in wraparound team assessments. Nor were there studies that examined how strengths are actually applied in wraparound service plan interventions, and there were no studies that systematically examined the influence of wraparound team composition and structure and the phases of wraparound team process.

We suggest that systematic studies regarding wraparound team composition, structure, and process, team assessments and interventions, will clarify wraparound's theory base and theory of change. Studies that more deeply examine elements within wraparound's initial theory of change (Walker 2008) will also contribute to knowledge regarding staff selection and development, while studies that examine step-by-step, theory-based models to structure team process could diminish the time and cost of wraparound team building and planning efforts. Systematic examination of these elements would contribute to clarification of wraparound's theory base and theory of change. Such contributions would also establish a scientific basis for decisions on less examined program implementation components related to workforce selection and development, and would provide a basis for addressing implementation stages of program installation and sustainability.

Core Implementation Components

The NIRN monograph emphasized that program implementation is driven by core implementation components such as training, coaching, and providing feedback on performance in light of model fidelity and intervention outcome data. At the same time, organizational factors such as selecting appropriate staff, as well as providing appropriate financing and administrative structure and practice establish a basis for successful program implementation (Fixen et al. 2005). What data and tools should be used to evaluate staff and organizational performance in support of wraparound implementation? How do factors such as caseload, the ratio of staff to supervisor/coach, resource and flex fund availability, staff salaries and turnover, paperwork or other factors support or compromise implementing wraparound with fidelity and improved outcomes? Such questions have only recently received initial examination and certainly merit further systematic attention. However, workforce selection and development may be the most fruitful focus for research.

Staff Selection and Training, Supervision or Coaching, and Purveyor Selection

In our literature review, model fidelity assessment received the most attention of the NIRN core implementation

components ($n = 20$). Given this emphasis on model adherence, perhaps the most notable finding from our review was the lack of systematic attention in the literature to the components of staff selection, staff training, supervision or coaching, and purveyor selection that influence model fidelity. Based upon years of study in multiple settings MST closely controls these drivers of implementation (Henggeler et al. 2009). Wraparound consultants and researchers have left these decisions to local programs and communities while not systematically examining what approaches to these drivers of implementation yield the best program quality, efficiency, and youth and family outcomes.

Though there are numerous consultants on wraparound hired by programs around the world, there has been no discussion in the literature of what training curriculum and methods or purveyor qualities produce what outcomes with what staff in what organizational contexts. This is an important gap in our knowledge base for wraparound implementation. By comparison, using carefully selected purveyors, MST works with a similar population (Burns et al. 2000; Stambaugh et al. 2007) but specifically selects master's level clinicians, often with social work degrees, and provides a specific rationale for such selection that includes target population characteristics, community factors, as well as the MST theory base and theory of change. MST purveyors provide several days of manual-supported training that is reinforced through model pertinent data-informed supervision and consultation that focuses upon fidelity, efficiency, and outcomes in the process of assessment and in the design and implementation of short and intermediate term interventions (Henggeler et al. 2009).

There was consensus in the wraparound literature we reviewed that transferring skills and knowledge developed in expert models of practice and the development and application of new knowledge or skills for wraparound required more than training. However, guidance from the literature on wraparound supervision or coaching is limited. Data-informed feedback on model fidelity, and direct observation and coaching of wraparound team facilitators have been suggested but not systematically examined in longitudinal studies in diverse organizational contexts.

We believe that studies are needed that examine the format, structure and focus of different supervisory or coaching models. For example, should supervision or coaching be provided in individual or group formats? Should methods used include direct observation or review of audiotape or videotape? Should a supervisor or coach review all cases with each staff member or only specific cases? What data regarding team composition and structure, team assessment, planning, and interventions should be reviewed and how frequently? Should efforts of the

supervisor or coach also be regularly subject to similar model pertinent reviews and how should these reviews be structured and focused? Do answers to such questions change depending upon staff knowledge and skills and within different organizational contexts? Studies examining these questions would also contribute to our knowledge of organizational factors such as caseload, policies, and procedures that should be adjusted to support implementation of wraparound with fidelity and improved outcomes. Finally, just as we can learn from MST regarding workforce selection and development, Glisson's (2006) definitions and measures for examining organizational climate and culture may inform studies of staff selection and development in different organizational settings.

Stages of Implementation

Program Installation

Notable in its absence from reviewed publications were descriptions or studies of program installation. During this stage of implementation resources are consumed as a program prepares to implement an evidence-based practice. Funding streams, human resources and policies must be re-arranged to support a different practice. Staff must be selected, trained, or re-assigned based upon what best supports the innovative model (Fixen et al. 2005). Perhaps the limited wraparound literature addressing purveyor selection, staff selection, and training, and supervision or coaching somewhat account for the absence of literature addressing program installation. This is a major gap in the wraparound implementation knowledge base that may influence fidelity, outcomes, and program sustainability.

Limitations

It is important to consider the findings from our review in light of its limitations. First, the choice to use the NIRN framework for understanding implementation was considered useful as a means of organizing the results of this review, and connecting wraparound to the larger literature on implementation. However, most of the literature we reviewed was published before the 2005 NIRN monograph. Addressing the NIRN framework was not the primary concern of most publications. This challenge to our review was addressed by requiring that multiple reviewers in different roles and settings reach agreement on placement of publications within the NIRN framework. While considerable efforts were made to develop an unbiased review process, other research groups could interpret the publications differently and perhaps reach different conclusions. Finally, our review followed a narrative format that

analyzed a wide range of publications, both empirical and theoretical. Although it may have been useful, it was beyond the scope of this review to provide a quantitative analysis of the empirical findings, and we reviewed only published reports of wraparound implementation that were grounded in the literature. It is left to a second phase of this review to examine field-based reports or other literature that may speak more directly to some core implementation components and stages of implementation.

Conclusions

Using a well-respected implementation framework we have identified where wraparound literature has overlooked or incompletely addressed intervention and implementation components and stages of implementation. Future funding for wraparound implementation should support examination of these components and stages, and provide opportunities for conducting research that may address these gaps in understanding wraparound implementation. By doing so, the knowledge base for wraparound will expand, and we may build bridges and learn from other models and research as we improve the science of implementing innovative models capable of addressing the complex needs of youth and their families, and perhaps other populations, in community settings.

References

Adkins, S. L., Safier, E. J., & Parker, N. N. (1998). Evolution of wraparound services at the Menninger Clinic. *Bulletin of the Menninger Clinic, 62*, 243–255.

Bednar, S. G. (2001). Reuniting families and breaking the cycle: A research note. *Marriage and Family Review, 33*(4), 107–112.

Bertram, R. M. (2008). Establishing a basis for multi-system collaboration: Systemic team development. *Journal of Sociology and Social Welfare, 35*(4), 9–27.

Bertram, R. M., & Bertram, B. (2004). Inside wraparound's black box: Ecological systems theory and theory of team development. W*raparound Solutions, 2*(1). Archived at: http://www.wraparound solutions.com/contact/news-vol2-iss1/newsletterpg1.htm#inside.

Bickman, L., Smith, C., Lambert, E. W., & Andrade, A. R. (2003). Evaluation of a congressionally mandated wraparound demonstration. *Journal of Child and Family Studies, 12*, 135–156.

Bruns, E. J., Burchard, J. D., Suter, J. C., Force, M. D., & Leverentz-Brady, K. (2004a). Assessing fidelity to a community-based treatment for youth: The Wraparound Fidelity Index. *Journal of Emotional and Behavioral Disorders, 12*, 69–79.

Bruns, E. J., Rast, J., Peterson, C., Walker, J., & Bosworth, J. (2006a). Spreadsheets, service providers, and the statehouse: Using data and the wraparound process to reform systems for children and families. *American Journal of Community Psychology, 38*, 201–212.

Bruns, E. J., Suter, J. C., Force, M. M., & Burchard, J. D. (2005). Fidelity to the wraparound process and its association with child and family outcomes. *Journal of Child and Family Studies, 14*, 521–534.

Bruns, E. J., Suter, J. C., & Leverentz-Brady, K. M. (2006b). Relations between program and system variables and fidelity to the wraparound process for children and families. *Psychiatric Services, 57*, 1586–1593.

Bruns, E. J., Walker, J. S., Adams, J., Miles, P., Osher, T. W., Rast, J., et al. (2004b). *Ten principles of the wraparound process*. Portland, OR: National Wraparound Initiative, Research and Training Center on Family Support and Children's Mental Health, Portland State University.

Bruns, E. J., Walrath, C. M., & Sheehan, A. K. (2007). Who administers wraparound? *Journal of Emotional and Behavioral Disorders, 15*, 156–168.

Burchard, J., Bruns, E. J., & Burchard, S. N. (2002). The Wraparound Approach. In B. Burns & K. Hoagwood (Eds.), *Community treatment for youth: Evidence-based treatment for severe emotional and behavioral disorders*. New York, NY: Oxford University Press, Inc.

Burchard, J. D., Burchard, S. M., Sewell, R., & VanDenBerg, J. (1993). *One kid at a time: Evaluative case studies and descriptions of the Alaska Youth Initiative demonstration project*. Washington, DC: SAMHSA Center for Mental Health Services.

Burchard, J. D., & Clarke, R. T. (1990). The role of individualized care in a service delivery system for children and adolescents with severe maladjusted behavior. *The Journal of Mental Health Administration, 17*, 48–60.

Burns, B. J., & Goldman, S. K. (Eds.). (1999). *Systems of care: Promising practices in children's mental health, 1998 series: Volume IV. Promising practices in wraparound for children with severe emotional disorders and their families*. Washington, DC: Center for Effective Collaboration and Practice, American Institutes for Research.

Burns, B., Schoenwald, S., Burchard, J., Faw, L., & Santos, A. (2000). Comprehensive community-based interventions for youth with severe emotional disorders: Multisystemic therapy and the wraparound process. *Journal of Child and Family Studies, 9*, 283–314.

Castillo, E., & Padilla, V. (2007). Wraparound supervisor adherence measure: A pilot. In C. Newman, C. Liberton, K. Kutash, & R. M. Friedman (Eds.), *The 19th annual research conference proceedings: A system of care for children's mental health: Expanding the research base* (pp. 119–122). Tampa: University of South Florida, Louis de la Parte Florida Mental Health Institute, Research and Training Center for Children's Mental Health.

Center for Mental Health Services. (2008). Retrieved December 17, 2008 at http://www.mentalhealth.samhsa.gov/publications/allpubs/KEN95-0016/default.asp#systems.

Clark, H. B., & Clarke, R. T. (1996). Research on the wraparound process and individualized services for children with multi-system needs. *Journal of Child and Family Studies, 5*, 1–5.

Clark, H. B., & Hienemann, M. (1999). Comparing the wraparound process to positive behavior support: What can we learn? *Journal of Positive Behavior Interventions, 1*, 183–186.

Clark, H. P., Lee, B., Prange, M. E., & McDonald, B. A. (1996). Children lost within the foster care system: Can wraparound service strategies improve placement outcomes? *Journal of Child and Family Studies, 5*, 39–54.

Cox, K. F. (2005). Examining the role of social network intervention as an integral component of community-based, family-focused practice. *Journal of Child and Family Studies, 14*, 443–454.

Eber, L., & Nelson, C. M. (1997). School-based wraparound planning: Integrating services for students with emotional and behavioral needs. *American Journal of Orthopsychiatry, 67*, 385–395.

Eber, L., Osuch, R., & Reddit, C. A. (1996). School-based applications of the wraparound process: Early results on service provision and student outcomes. *Journal of Child and Family Studies, 5*, 83–100.

Epstein, M. H., Jayanthi, M., McKelvey, J., Frankenberry, E., Hardy, R., & Dennis, K. (1998). Reliability of the wraparound observation form: An instrument to measure the wraparound process. *Journal of Child and Family Studies, 7*, 161–170.

Epstein, M. H., Nordness, P. D., Kutash, K., Duchnowski, A., Schrepf, S., Benner, G. J., et al. (2003). Assessing the wraparound process during family planning meetings. *Journal of behavioral Health Services and Research, 30*, 352–362.

Evans, M., Armstrong, M. I., & Kuppinger, A. D. (1996). Family-centered intensive case management: A step toward understanding individualized care. *Journal of Child and Family Studies, 5*, 55–66.

Farmer, E. M. Z., Dorsey, S., & Mustillo, S. A. (2004). Intensive home and community interventions. *Child and Adolescent Psychiatric Clinics of North America, 13*, 857–884.

Fixen, D. L., Naoom, S. F., Blasé, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation research: A synthesis of the literature*. Tampa, FL: University of South Florida (FMHI Publication #231). http://www.fpg.unc.edu/nirn/resources/detail.cfm?resourceID=31.

Furman, R., & Jackson, R. (2002). Wraparound services: An analysis of community-based mental health services for children. *Journal of Child and Adolescent Psychiatric Nursing, 15*, 124–131.

Glisson, C. (2006). Assessing and changing the organizational culture and climate for effective services. *Research on Social Work Practice, 17*, 736–747.

Glisson, C., & Hemmelgarn, A. (1998). The effects of organizational climate and interorganizational coordination on the quality and outcomes of children's service systems. *Child Abuse and Neglect, 22*, 401–422.

Grella, C. E., Greenwell, L., Prendergast, M., Farabee, D., Hall, E., Cartier, J., et al. (2007). Organizational characteristics of drug abuse treatment programs for offenders. *Journal of Substance Abuse Treatment, 32*, 291–300.

Henggeler, S. W., Schoenwald, S. K., Borduin, C. M., Rowland, M. D., & Cunningham, P. B. (2009). *Multi-systemic treatment of anti-social behavior in children and adolescents* (2nd ed.). New York, NY: The Guilford Press.

Kamradt, B. (2000). Wraparound Milwaukee: Aiding youth with mental health needs. *Juvenile Justice Bulletin, 7*(1), 14–23.

Kerbs, J., Gaylor, R., Pullmann, M., & Roe, P. (2004). Wraparound and juvenile justice: Making a connection that works. *Focal Point: A National Bulletin on Family Support and Children's Mental Health, 18*(1), 19–22.

Malysiak, R. (1997). Exploring the theory and paradigm base for wraparound. *Journal of Child and Family Studies, 6*, 399–408.

Malysiak, R. (1998). Deciphering the tower of Babel: Examining the theory base for wraparound fidelity. *Journal of Child and Family Studies, 7*, 11–25.

Malysiak, R. (1999). Essential skills and structures for facilitators, teams, and supervisors that support fidelity in wraparound. *The 9th annual conference proceedings, building from family strengths: Research & programs in support of children & their families* (April 1998). Portland, OR: Portland State University, Research & Training Center on Family Support & Children's Mental Health.

Malysiak-Bertram, R. (2001). From risk containment to quality assurance: Transforming supervision with theory-based measures of wraparound fidelity. In C. Newman, C. J. Liberton, K. Kutash, & R. M. Friedman (Eds.), *The 13th annual research conference proceedings, a system of care for children's mental health: Expanding the research base* (pp. 259–272). Tampa, FL: University of South Florida, The Louis de la Parte Florida Mental Health Institute, Research and Training Center for Children's Mental Health.

Malysiak-Bertram, R., Bertram-Malysiak, B., Rudo, Z., & Duchnowski, A. (2000). What maintains fidelity in the wraparound approach? How can it be measured? In C. Liberton, C. Newman, K. Kutash, & R. Friedman (Eds.), *The 12th annual conference proceedings, a system of care for children's mental health: Expanding the research base* (pp. 197–202). Tampa, FL: University of South Florida, The Louis de la Parte Florida Mental Health Institute, Research & Training Center for Children's Mental Health.

Miles, P., Bruns, E. J., Osher, T., Walker, J., & National Wraparound Initiative Advisory Group. (2006). *The wraparound process user's guide: A handbook for families*. Portland OR: National Wraparound Initiative, Research and Training Center on Family Support and Children's Mental Health, Portland State University.

Pires, S. A. (2002). *Building systems of care: A primer*. Washington, DC: National Technical Assistance Center for Children's Mental Health, Georgetown University Child Development Center.

Malysiak, R. Sharma, J., Woodworth, K., & Gawron, T. (1998). Don't follow leaders, watch your parking meters: Theory-based, data-driven technical assistance to ensure wraparound fidelity. *The 10th annual research conference proceedings, a system of care for children's mental health: Expanding the research base* (pp. 199–206). Tampa, FL: University of South Florida, The Louis de la Parte Florida Mental Health Institute, Research & Training Center for Children's Mental Health.

Rast, J. & VanDenBerg, J. (2004). Certification of facilitators as a method for increasing wraparound fidelity. In C. Newman, C. J. Liberton, K. Kutash, & R. M. Friedman (Eds.), *The 16th annual research conference proceedings, a system of care for children's mental health: Expanding the research base* (pp. 315–320). Tampa, FL: University of South Florida, The Louise de la Parte Florida Mental Health Institute, Research and Training Center for Children's Mental Health.

Resendez, M. (2002). The relationship between flexible wraparound funds and mental health outcomes. In C. Newman, C. J. Liberton, K. Kutash, & R. M. Friedman (Eds.), *The 14th annual research conference proceedings, a system of care for children's mental health: Expanding the research base* (pp. 243–246). Tampa, FL: University of South Florida, The Louis de la Parte Florida Mental Health Institute, Research and Training Center for Children's Mental Health.

Schoenwald, S. K., Halliday-Boykins, C. A., & Henggeler, S. W. (2003). Client-level predictors of adherence to MST in community service settings. *Family Process, 42*, 345–359.

Scott, T. M., & Eber, L. (2003). Functional assessment and wraparound as systemic school processes: Primary, secondary, and tertiary systems examples. *Journal of Positive Behavior Interventions, 5*, 131–143.

Shirk, M. (2003). The gift of wrapping. *Youth Today, 12*(6), 1–4.

Stambaugh, L. F., Mustillo, M. A., Burns, B. J., Stephens, R. L., Baxter, B., Edwards, D., et al. (2007). Outcomes from wraparound and multisystemic therapy in a Center for Mental health Services systems of care demonstration site. *Journal of Emotional and Behavioral Disorders, 15*, 143–155.

Suter, J., & Bruns, E. J. (2008). A narrative review of wraparound outcome studies. In E. J. Bruns & J. S. Walker (Eds.), *The resource guide to wraparound*. Portland, OR: National Wraparound Initiative, Research and Training Center for Family Support and Children's Mental Health, Portland State University.

Suter, J. C., & Bruns, E. J. (2009). Effectiveness of the wraparound process for children with emotional and behavioral disorders: A meta-analysis. *Clinical Child and Family Psychology Review, 12*, 336–351. doi:10.1007/s10567-009-0059-y.

VanDenBerg, J., & Grealish, M. (1996). Individualized services and supports through the wraparound process: Philosophy and procedures. *Journal of Child and Family Studies, 5*, 7–21.

VanDenBerg, J., & Grealish, E. M. (1997). Finding families' strengths: A multiple-choice test. *Reaching Today's Youth: The Community Circle of Caring Journal, 1*(3), 8–12.

VanDenBerg, J., & Minton, B. (1987). Alaska native youth: A new approach to serving emotionally disturbed children and youth. *Children Today, 16*, 5–19.

Walker, J. S. (2008). *How, and why, does wraparound work: A theory of change*. Portland, OR: National Wraparound Initiative, Portland State University.

Walker, J., & Bruns, E. (2006). Building on practice-based evidence: Using expert perspectives to define the wraparound process. *Psychiatric Services, 57*, 1579–1585.

Walker, J. S., Bruns, E. J., Rast, J., VanDenBerg, J. D., Osher, T. W., Koroloff, N., et al. (2004). *Phases and activities of the wraparound process*. Portland OR: National Wraparound Initiative, Research and Training Center on Family Support and Children's Mental Health, Portland State University.

Walker, J. S., & Koroloff, N. (2007). Grounded theory and backward mapping: Exploring the implementation context for wraparound. *Journal of Behavioral Health Services & Research, 34*, 1–15.

Walker, J. S., Koroloff, N., & Schutte, K. (2003). *Implementing high-quality collaborative individualized service/support planning: Necessary conditions*. Portland, OR: Research and Training Center on Family Support and Children's Mental Health, Portland State University.

Walker, J. S., & Schutte, K. (2004). Practice and process in wraparound teamwork. *Journal of Emotional and Behavioral Disorders, 12*(3), 182–192.