

Commentary: Adherence Matters

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In the late 1970s when I was contemplating a topic for my dissertation, I wanted to choose a line of research that could benefit young people with chronic diseases (and their families) and help my medical colleagues succeed in improving the health and quality of life of these young people. I happened upon a now classic volume, *Compliance in Health Care* (Haynes, Taylor, and Sackett, 1979), which provided the conceptual and methodological inspiration for my now decades of research on the topic of adherence to pediatric medical regimens (Rapoff, 2010).

We now have two meta-analyses (Graves, Roberts, Rapoff, & Boyer, 2010; Kahana, Drotar, & Frazier, 2008) showing that our interventions for enhancing adherence produce mean effects sizes ranging from small ($d = 0.34$) to medium ($d = 0.58$) for group design studies and large ($d = 1.53$) for single subject design studies. In addition, one of the meta-analyses reported on 31 intervention studies that produced a mean effect size from small to medium ($d = 0.40$) for health outcomes, such as pulmonary function testing (Graves, Roberts, Rapoff, & Boyer, 2010). Simply said, adherence matters and therefore the focus of this special issue is on studies that report on the measurement, prediction, and enhancement of adherence to pediatric medical regimens for chronic diseases. My intention is to review and critique these studies and offer some suggestions for future research on adherence.

Wu, Rohan, Martin, Hommel, Greenley, Loiselle, Ambrosino, & Fredericks; “Pediatric psychologist use of adherence assessments and interventions”

The study reported on an anonymous online survey of 113 members of the Society of Pediatric Psychology (SPP), which was done by a subcommittee of the SPP Adherence Special Interest Group. Those surveyed

included graduate students, interns, post-doctoral fellows, and faculty. They were asked about their use of adherence assessment and intervention strategies, theories used to guide their clinical approach, information sources about strategies, and barriers, facilitators, and resources related to adoption of adherence assessments and interventions. Respondents reported that the most common adherence assessment strategy was interviews with patients and the most common intervention strategies were problem solving, education, and parent training. The most common theories used to guide clinical practice included the Health Belief Model, the Transtheoretical Model of Change, and Social Cognitive Theory. The most common information sources about adherence were journal articles, peer consultations, and books. The top barriers to implementing assessment and intervention strategies included time limitations, logistical challenges, and not being familiar with available strategies to assess and enhance adherence for a specific population. The top facilitators were adherence being the primary referral question, the medical team valuing the role of adherence in treatment, and the availability of specific assessments and interventions for select populations. Strengths of this study include a focus on what pediatric psychologists do to assess and enhance adherence in clinical practice and the theories that guide their clinical approach. Limitations include those of any survey study, namely the representativeness of the sample and how closely self-reports match what people actually do in their practice.

Modi, Guilfoyle, & Rausch; “Preliminary feasibility, acceptability, and efficacy of an innovative adherence intervention for children with new diagnosed epilepsy”

This study piloted an intervention (feedback of electronically monitored adherence data, problem solving, and

addressing barriers) for medication adherence with eight youth who were newly diagnosed with epilepsy and who, during a 30-day run in period, had adherence rates <90%. The adherence intervention was rated feasible and acceptable, and the mean change in adherence from baseline to post-treatment was 31.5% for the intervention group and 9.3% for the treatment as usual group. Strengths of this study include use of an objective measure of adherence (electronic monitor), using the electronically monitored data to give feedback to parents and patients and address barriers, and only offering intervention to those who needed it (adherence rates <90% during the run in period). Limitations include a very small sample size and only one investigational site, which limits generalizability of the results.

Duncan, Hogan, Tien, Graves, Chroney, Zettler, Koven, Wilson, Kinakar, & Portnoy; “Efficacy of a parent–youth teamwork intervention to promote adherence to pediatric asthma”

This randomized clinical trial was conducted with 48 youth with asthma who were randomized to a teamwork intervention (TI), asthma education (AE), or standard care control group (SC). The TI involved teaching patients and their parents to share responsibility for monitoring adherence to medications using a tiered approach, with the frequency of monitoring tied to specific adherence levels (e.g., monitor every 3 days with an adherence goal of 80% for 9 days). The AE group received the same amount of time as the TI group but received only asthma education. The results showed significantly higher adherence rates for the TI group (means = 81% for TI, 34% for AE, and 37% for SC at 20 weeks) and significantly fewer asthma symptoms for the TI group. Strengths of this study include use of an objective adherence measure (electronic monitor for inhaled corticosteroids), assessing and reporting health outcomes, and a tiered approach to the intensity of parental monitoring. Limitations include a brief follow-up period, lack of adherence baseline data, and the limited size and diversity of the sample.

Stanger, Ryan, Delhey, Thrailkill, Li, & Budney; “A multicomponent motivational intervention to improve adherence among adolescents with poorly controlled type 1 diabetes: A pilot study”

This pilot study tested the effects of a multicomponent intervention (motivational interviewing, contingency

management, and cognitive–behavior therapy) with 17 adolescents diagnosed with type 1 diabetes (12 of whom completed the study). Using a one group pre–posttest design, results showed a significant increase in blood glucose monitoring and a significant improvement in glycemic control as measured by HbA1c. Strengths of this study include use of an objective measure of adherence (blood glucose monitoring data), measuring glycemic control, and the unique use of monetary incentives to reinforce parents for adhering to monitoring and rewarding their children for adhering. Limitations include the lack of a control group, the small sample size, not monitoring other regimen components, such as insulin use, and not reaching the American Diabetes Association target of a HbA1c level of 7.5% (the level was 9.11 at posttest).

Naar-King, Outlaw, Sarr, Parsons, Belzer, MacDonell, Tanney, Ondersma, & The Adolescent Medicine Network for HIV/AIDS Interventions; “Motivational enhancement system for adherence (MESA): Pilot randomized trial of a brief computer-delivered prevention intervention for youth initiating antiretroviral treatment”

This pilot study randomized 76 patients with HIV who were starting an antiretroviral medication regimen to receive a motivational interviewing intervention (MESA) or a motivation enhancement education intervention (MESH). Both interventions were web-based and included two 30-min sessions. Results showed lower nonadherence and viral load for those in the MESA group. Strengths include delivery of a technology-based intervention (via the web), using a brief, but effective, intervention that improved adherence and viral counts, and enrolling patients in eight different sites. Limitations included using a less than objective measure of adherence (patient report), a small sample size that was underpowered for significance testing, and not reporting satisfaction ratings from participants.

Cortina, Somers, Rohan, & Drotar; “Clinical effectiveness of comprehensive psychological intervention for nonadherence to medical treatment: A case series”

This case study reported on six patients with various chronic diseases who received cognitive–behavioral treatment services for nonadherence to medications. The main finding was that adherence improved from baseline to

treatment for all but one patient, with percent increases in adherence ranging from -8% to 45% (mean = 17%). However, adherence dropped after treatment was discontinued for all but one patient. Strengths of this study include use of an objective adherence measure (electronic monitor), use of evidence-based interventions delivered in a clinical service setting, and combining visual inspection of graphed data with time series data analysis. Limitations of the study include not reporting on the effects of interventions on health outcomes and the lack of maintenance of changes in adherence after treatment was discontinued.

Naar-King, Montepiedra, Garvie, Kammerer, Malee, Sirois, Aaron, & Nichols; “Social ecological predictors of longitudinal HIV treatment adherence in youth with perinatally acquired HIV”

This longitudinal prediction study assessed adherence to antiretroviral therapy for 138 youth with perinatally acquired HIV at baseline and 6 and 12 months by caregiver report. Results showed that nonadherence rates were not significantly different across time (36% at baseline, 39% at 6 months, and 29% at 12 months). Child knowledge of HIV status, lower caregiver well-being, and a poorer relationship with parents were significant predictors of nonadherence. Strengths of this study are that it was longitudinal, theory driven (social ecological model), and focused on patient and caregiver predictors of nonadherence. Limitations include using a less than objective adherence measure (caregiver report), no statistical correction for multiple comparisons, and again, the usual limitation of correlational studies not being able to confirm causation.

O’Hara & Holmbeck; “Executive functions and parenting behaviors in association with medical adherence and autonomy among youth with spina bifida (SB)”

This cross-sectional study examined predictors of parent-reported adherence to medical management regimens (medications, bowel program, etc.) among 140 youth with SB. Significant predictors of higher adherence included higher levels of gross motor impairment, higher executive functioning, and higher levels of maternal acceptance and behavioral control. Higher levels of executive functioning also predicted higher levels of medical autonomy (youth taking greater responsibility for their medical

regimens). Strengths of this study include obtaining measures from multiple informants (teacher, parents, and patients), direct observations of family interactions, and psychometric testing to assess executive functioning. Limitations include collection of cross-sectional, not longitudinal, data, use of less objective measure of adherence (parent report), and the usual limitation of correlational studies that they cannot establish causation.

Suggestions for future research

1. Longitudinal studies are needed for newly diagnosed patients to determine the trajectories of adherence they display (see Modi, Rausch, & Glauser, 2011, for an excellent example with children newly diagnosed with epilepsy). If early on in their treatment, adherence begins to drop off, we can intervene early to prevent further nonadherence and compromised health outcomes (Rapoff, 2000). Conversely, one could also only enter patients in trials that evidence adherence below a specified threshold (such as the $<90\%$ adherence rate used in the Modi et. al. study).
2. Clearly, a number of studies in this issue point to the importance of parental monitoring and encouragement to help children adhere to their medical regimens. The O’Hara and Holmbeck study illustrates the importance of at least maternal acceptance and control in adherence. This finding reminded me of the literature on parenting style that showed that children function better when their parents adopt an “authoritative” approach, characterized by warmth, acceptance of their children’s feelings, but a willingness to set and enforce rules (Baumrind, 1991). In contrast to an indulgent or authoritarian style, parents who adopt an authoritative style are likely to do better in helping their children follow their medical treatments.
3. It continues to be the case that when treatment stops the effects of interventions wear off, as illustrated by the case series reported by Cortina et al. Long ago, Stokes and Baer (1977) warned that to “train and hope” for maintenance of effects is a weak and often ineffective strategy (or no strategy at all). We need to devote more efforts at finding strategies for maintaining behavior change, such as training other health care team members to implement interventions in clinical settings and over

serial clinic visits (see Rapoff, Belmont, Lindsley, Olson, Morris, & Padur, 2002, for an example of training a regular clinic nurse to implement an adherence intervention).

4. The survey of SPP members by Wu et al., points out the need to widely disseminate evidence-based assessment and intervention strategies through workshops, manuals, and technology-based platforms (CD-ROM, web-based, phone apps). The survey results should also prompt us to identify barriers and facilitators for the adoption of assessment and intervention strategies in our research and clinical settings.
5. The same old methodological issues continue to plague our research on adherence, including small and non-diverse samples, the use of less objective measures of adherence (such as patient or parental reports), and failing to assess and report health and quality of life outcomes. In our research, we need to use more objective measures when feasible, such as electronic monitors. In our clinical practice, this is not usually feasible (though the Cortina et al study would challenge this notion). For clinical purposes, we need to improve the reliability and validity of self-report methods (see Rand, 2000, for some excellent recommendations on how this can be done). In contrast to our behavioral trials, drug trials often have many more sites and therefore adequate numbers to test treatment effects. One approach we could take for funding larger trials is to use the U34 NIH planning grant mechanism to design adequate clinical trials that involve multiple sites and standardized protocols and then apply for R21 or R01 grants to fund these trials. We clearly need to communicate to NIH and other funding sources that we need these larger trials because, adherence matters.

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