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Relationship-based Intervention with Young Children with Autism in Saudi Arabia: Impediments and Consequences of Parenting Stress and Depression

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ABSTRACT

This investigation examined the consequences and effects of the severity of mothers psychosocial functioning as assessed by measures parenting stress and depression in a randomised control trial of a Relationship-based Intervention (RBI) called Responsive Teaching (RT). The sample included 28 parents and preschool aged children with Autism from Saudi Arabia. RT subjects received weekly parent–child intervention sessions for 4 months. Dependent variables were mothers' style of interaction as assessed by the PICCOLO at post intervention as well as pre- and post-measures of parenting stress and depression. There were three findings from this study. First, mothers who participated in this study had extremely high levels of psychosocial dysfunction. Nearly all reported clinical levels of parenting stress and more than 40% reported clinical levels of depressive symptoms. Second, high levels of psychosocial dysfunction did not prevent mothers from participating in RT as indicated by their ability to integrate RT strategies into their interactions with their children. Third, RT was associated with substantial improvements in mother's parenting stress and depression. Implication for early intervention practice are discussed.

KEYWORDS

Early intervention; relationship based intervention; parental responsiveness; parenting stress; parental depression

Introduction

Relationship-based intervention (RBI) is a parent-implemented approach to intervention that is designed to promote and support the development and social emotional functioning of young children with developmental risks and disabilities. RBI evolved from descriptive research conducted in the United States and Western Europe which indicated that parental responsiveness is highly associated with variability in the development and social emotional functioning of preschool aged children with disabilities, including children with autism (Mahoney & Nam, 2011). It is predicated on the assumption that intervention can enhance children's developmental trajectory both by helping parents learn how to engage in highly responsive interactions (RIs) and by encouraging

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them to use this style of interaction in each of their routine interactions with their children

Responsive Teaching (RT) is a fully manualised RBI curriculum that was designed specifically for use in early intervention programmes for children with autism and other developmental disabilities (Mahoney & MacDonald, 2007). It provides detailed descriptions of 63 RI strategies and 120 discussion topics that professionals can use to teach parents how to promote their children' cognitive, communication and social emotional functioning. Six studies involving more than 200 children with developmental risks and disabilities and their parents have been published indicating that RT is effective at both enhancing the quality of parents' interactions and improving the developmental and social emotional functioning of preschool aged children with autism and other disabilities (Mahoney, Nam, & Perales, 2014; Mahoney & Perales, 2003, 2005; Mahoney, Wiggers, Nam, & Kralovic, 2014). While the majority of these studies were conducted with parents and children from the United States, two that were conducted with Turkish mothers and children (Karaaslan, Diken, & Mahoney, 2013; Karaaslan & Mahoney, 2013) produced similar results related to parent interaction and child development, pointing to the viability of this intervention with non-Western, Muslim parents and their children.

Recently, Alquraini, Al-Adaib, Al-Dhalaan, Merza, & Mahoney, in press reported results from a pilot randomised control trial of RT conducted with 28 Saudi Arabian mothers and their preschool aged children with ASD. Similar to the investigations reported above, mothers who participated in RT made significantly greater improvements in their style of interacting with their children, particularly as associated with their level of responsiveness and affect than did mothers in the No-RT control group. In addition, there were also significant group differences in pre- and post-measures of children's language, social and fine motor development scores. Compared to Control children, RT children improved their rate of social development during intervention by a factor of 5; their language development by a factor of 4; and their fine motor development by a factor of 3.

Psychosocial Functioning of Parents of Children with ASD and Other Disabilities

Over the past 40 years a major focus of disability research has been on the impact that young children with ASD and other developmental disabilities have on parents' stress and depression. (c.f., Watson, Hayes, & Radford-Paz, 2011). Parenting stress is a common condition that results from child care demands exceeding the expected and actual resources available to parents. It is often manifested by parents feeling overwhelmed and burned out, which is frequently accompanied by irritability and anxiety as well as difficulty carrying out daily childcare responsibilities.

Numerous descriptive research studies indicate that one of the primary psychosocial consequences of having a child with disabilities is chronically high levels of parenting stress (c.f. Watson et al., 2011). In addition, parents of children with ASD not only experience higher levels of stress than parents of children with other disabilities (e.g. Estes et al., 2009), but their level of stress is often in the clinical range (Dale, Johoda, & Knott, 2006). Their stress is not only associated with their children's diagnoses (Taylor & Warren, 2012), but also is associated with difficulties parents have interacting with their

children (Davis & Carter, 2008) and managing their children's behaviour problems (Beck, Hastings, Daley, & Stevenson, 2004).

Depression is a psychosocial condition that is related to, and often triggered by, high levels of parenting stress. Depression has many of the same characteristics as stress, but is complicated by additional mood disorders such as: feeling sad and hopeless; lack of energy and enthusiasm; feeling bad or guilty; and thoughts of suicide. For mothers of preschool aged children, depression is reported to have a negative influence on their ability to interact with their children, not only making it more difficult to engage them (NICHD Early Child Care Research Network, 1999) but also interfering with their capacity to interact sensitively and responsively (Kurstjens & Wolke, 2001). In addition, highly depressed mothers tend to over-react to their children's crying or acting out behaviours (Field, 2002), thereby exacerbating their children's distress.

While depression is reported to be high among parents of children with disabilities, it is an even a greater problem for parents of children with ASD. Mothers of children with ASD experience higher levels of depression than either mothers of typically developing children or mothers of children with other disabilities (e.g. Abbeduto et al., 2004; Singer, 2006). In addition, for mothers of children with ASD depression appears to be a problem that persists over time. A longitudinal study of 143 mothers of toddlers with autism (Carter, Martinez-Pedraza, De, & Gray, 2009) reported that 35% displayed clinical levels of depressive symptoms when their children were less than 3 years of age, and 42% displayed clinical depressive symptoms two years later.

Parental Psychosocial Functioning and Parent-Mediated Intervention

Because so many mothers of children with disabilities, especially mothers of children with autism, experience high levels of psychosocial dysfunction, there has been legitimate concern about encouraging these parents to take on the added responsibilities associated with parent-mediated interventions such as RT or other RBIs for at least two reasons (Turnbull, Blue-Banning, Turbiville, & Park, 1999; Winton, Sloop, & Rodriguez, 1999). One is the belief that parents who are experiencing high levels of psychosocial dysfunction may have extreme difficulty learning and implementing intervention strategies, thus undermining the potential effectiveness of intervention. Another is the fear that the added responsibilities associated with parent-mediated interventions might have the unintended consequence of aggravating parents' psychosocial distress.

For the most part the consequences and effects of adverse psychosocial functioning among parents of children with autism on parent-mediated intervention have not been adequately evaluated. However, a study reported by Osborne, Osborne, McHugh, Saunders, & Reed, 2007) reported that high levels of parenting stress impeded parents from implementing an intensive behavioural intervention with their preschool aged children. In contrast, an evaluation of RT reported by Alquraini and Mahoney (2014) reported that parents of preschool children with ASD and other disabilities who had high levels of parenting stress were actually more effective at learning and implementing RI strategies than parents with lower levels of parenting stress, and thereby enhanced the developmental outcomes their children attained. In addition, Solomon, Van Egeren, Mahoney, Quon-Huber, and Zimmerman (2014) reported that parent involvement in an RBI called the Play Project resulted in a significant reduction in parents'

depressive symptoms. This effect was primarily attributable to the reduction in depressive symptoms reported by parents who had clinical, as opposed to non-clinical, levels of depressive symptoms at the start of intervention (Mahoney & Solomon, In Review).

The purpose of this investigation was to conduct secondary analyses of Alquraini et al., In Press to address two research questions. First, did mothers' psychosocial functioning affect their ability to participate in RT; and second, did participation in RT impact mothers' psychosocial functioning over the course of intervention? Based upon results from previous evaluations of RBIs we hypothesised that mothers' success at using RI strategies to modify their interactions with their children would be positively associated with the severity of their psychosocial functioning at the start of intervention. We also hypothesised that participation in 'responsive teaching' would be associated with improvements in mothers' level of stress and depression.

Methods

Subjects

Twenty-eight children with autism and their parents were the subjects for this investigation. As indicated on Table 1, children ranged in age from 3 to 5 years at the start of intervention. According to standard procedures, all children received a diagnosis of autism from their local health department. Diagnoses were confirmed by results from the Autism Diagnostic Observation Scale (modules 1 and 2) that was administered by a certified ADOS examiner.

Table 1. Demographic characteristics of mothers and children at start of intervention.

	RT (n = 13)		Control (n = 15)		Total *sample* (n = 28)		
Variables	M	SD	M	SD	M	SD	Statistics
Mothers' characteristics							
Age (years)	38.5	3.9	37.3	4.3	37.9	4.0	0.35[b]
Education level							1.76[2]
Elementary	23%		7%		14%		
High school	15%		27%		21%		
Bachelors	62%		67%		64%		
Marital status (% married)	100%		87%		93%		1.87[2]
Number of children in family	4.2	2.3	3.7	1.6	3.9	1.8	0.64[b]
Children`s characteristics							
Age (years)	3.5	0.5	3.9	0.9	3.7	0.8	1.30[b]
% Males	84.6%		73.3%		78.6%		0.54[2]
% Developmental delay [a]							
Social	70%	9	68%	15	69%	13	0.11[b]
Language	72%	19	76%	12	74%	15	0.36[b]
Fine motor	65%	11	59%	15	62%	14	0.15[b]
Gross motor	28%	13	31%	16	29%	13	0.29[b]
Mothers' psychosocial functioning							
Parenting stress index	278.7	12.2	270.2	31.0	273.7	25.1	0.67[b]
% Clinically stressed	100%		87%		93%		0.48[2]
Beck depression index	40.5	11.7	22.0	14.4	30.6	16.0	13.56[b***]
% Clinically depressed	76.8%		13.3%		42.8%		24.3[2***]

[a] Denver developmental age/Chronological age
[b] = ANOVA; [2] = Chi-square * $p < .05$; ** $p < .01$; *** $p < .001$.

Subject Selection Criteria

In addition to a confirmed diagnosis of autism, subjects needed to meet the following criteria to participate in this study. Children: (1) could not have any known health or physical problems that might interfere with their participating in this project; and (2) could not be enrolled any type of intensive behavioural early intervention programmes. In addition, parents were required to agree with two other conditions: (1) participate in all required child or parent intervention activities for the Group to which they were assigned; and (2) participate in all of required assessments, including child and psychosocial assessments as well as observations of parent-child interaction. Subjects were excluded if they had been, or were currently, participating in any other parent mediated intervention programmes.

To assure that the sample would be representative of the range of children diagnosed with autism, every parent-child dyad who met the criteria specified above were eligible to participate regardless of their children's level of developmental functioning.

Subject Consent

Prior to recruiting subjects, this project received approval from the Institutional Review Board of King Faisal Hospital. Parents interested in participating contacted the project coordinator for additional information. Research staff described the study and discussed the benefits and risks, the tasks involved, and parents' rights to refuse or discontinue participation without any negative consequences. Project staff determined whether the child and parents met the eligibility criteria to participate. Parents who were eligible were asked to sign an informed consent letter before beginning to participate.

Subject Recruitment

Subjects were recruited from the special education and private centres for autism in Riyadh, Saudi Arabia. The main research site was Prince Nasser Center. This site had access and connection with state sponsored and private special education centres throughout Riyadh and received applications from these centres for services. Of the 60 dyads that met subject selection criteria, 32 agreed to participate, including 7 girls and 25 boys. All of the children met the ADOS criteria for autism.

Parents who met eligibility criteria but refused to participate reported that they either did not have the time required to participate or did not have adequate transportation. Of the 32 subjects who participated in the study, one dropped out from the control group and four dropped from the RT Treatment group. Subjects who dropped out of the RT group included: one family who moved to another city; one mother who developed a serious health problem; and two mothers who refused to stay and participate in RT intervention sessions.

As indicated on Table 1, the average age of the mothers who participated in this study was 38 years; 64% had completed college; most were married (93%) and the average number of children per family was 4. Ninety-three per cent of the mothers reported clinical levels of parenting stress symptoms, and 42% reported clinical levels of depression symptoms. Most of the parents were not receiving any other

intervention services for their children or themselves, but were on waiting lists for services in other centres.

The mean age of the children who participated in the study was 3.7 years and 79% were males. On average, children had moderate to severe delays in social, language and fine motor development, but only mild delays in gross motor development.

Randomisation Procedures

Randomisation was conducted with the complete sample of 32 eligible subjects. Each subject was assigned a unique identification number and the Project Coordinator used a table of random numbers to assign subjects to the RT Treatment or Control groups. As reported on Table 1, RT/Control group comparisons indicated no significant differences in the demographic characteristics of mothers and children. However, although there were no group differences in the percentage of mothers reporting clinical levels of parenting stress, there were significant differences in the percentage of mothers reporting clinical levels of depression ($p < .001$). Seventy-seven per cent of the RT mothers reported clinical levels of depression symptoms versus 13% of the Control mothers.

Intervention Procedures

Responsive Teaching

Weekly RT sessions were conducted at a centre-based setting for a 4-month period of time. Interventionists conducted intervention sessions lasting approximately one hour in which they worked with the parent and child together. Following the procedures prescribed in the RT manual (Mahoney & MacDonald, 2007) each session addressed one pivotal behaviour intervention objective that was related to the child's developmental concerns. The interventionist explained the objective for the session, and used one to two sets of RT Discussion Points to explain how these objectives were related to the child's developmental concerns. Parents were then taught one to three RI strategies through a process of modelling, coaching and video-feedback. Interventionists: (1) demonstrated how to use a strategy while playing with the child; (2) provided coaching or feedback while parents attempted to use the strategy; and (3) and occasionally used videotaped observations to provide the parent opportunities to observe themselves using a strategy. At the completion of the session, interventionists worked with parents to develop a Family Action Plan that parents could use to follow through with intervention content at home.

Standard Treatment

Parents in the Standard Treatment Control group received no RT sessions but participated in all of the required assessments at the same time as the RT group. The majority of these parents were not receiving any other intervention services for themselves or their child, but were on waiting lists for services in other centres.

Training of Interventionists

Three interventionists provided RT. Interventionists received two weeks of training from one of the developers of RT related to: (1) RT rationale, (2) use of RT strategies, and (3) procedures for working with parents to learn and implement RT strategies. After these training sessions, Dr. Mahoney used the RT Intervention Observation Guide (Mahoney & MacDonald, 2007) to evaluate a series of video recorded practice intervention sessions that were conducted over a period of six months both to provide detailed feedback about interventionists' use RT, and to help interventionists gain the level of proficiency with RT procedures that enabled them become Certified RT providers.

Prior to initiating the treatment phase of this project, interventionists received one additional week of onsite RT practicum training to address any questions or concerns interventionists had about RT as well as to conduct pre-intervention evaluations of interventionists' fidelity of implementing RT.

During the treatment phase of this project, interventionists were required to implement a structured sequence of RT session plans that had been translated into Arabic. These plans provided detailed instructions for addressing RT intervention objectives, strategies, and discussion topics. This was done to ensure that RT intervention sessions were fully compliant with all procedures specified in the RT curriculum guide.

Data Collection

Data collected for this investigation included standardised assessments of mothers' style of interacting with their children, child development, and mothers' psychosocial status. These data were collected prior to intervention and 1 month after the completion of intervention. The following describes each of the instruments used in this investigation.

Autism Diagnosis

The Arabic version of the ADOS (Lord et al., 2000) was used to confirm children's diagnoses of autism. The ADOS assesses social and communication behaviours that are typically observed among children with autism spectrum disorders. Two modules of the ADOS were used for this investigation. Module 1 was used for children who used little or no phrase speech, and Module 2, used for children who used phrase speech but do not speak fluently. The ADOS was administered by a Psychological Services assessor who had been certified by WPS and had 6 years of experience with the ADOS.

Mothers' Style of Interaction

While all of the mothers had signed subject consent forms that indicated they agreed be video-recorded with their children, after the study began the majority expressed extreme reluctance to participate in this aspect of the study for cultural reasons. As a result, the PICCOLO developed by Roggman, Cook, Innocenti, Jump Norman, and Christiansen (2013a) was used to rate live observations of mother child play in their homes at post-intervention. The PICCOLO was developed and standardised for use with 2000 parents of at-risk and typically developing children from the United States who were between 12 and 36 months of age. It measures 29 developmentally supportive parenting behaviours in four domains – Affection, Responsiveness, Encouragement, and

Teaching. Internal consistency within each of the four subscales as indicated by Cronbach's alpha averages .78, ranging from .75 to .80. Estimates of inter-rater reliability are reported to average *r = 74* across all four subscales (Roggman, Cook, Innocenti, Jump Norman, & Christiansen, 2013b).

This assessment was administered by a research associate who used the PICCOLO training DVD, which includes 14 clips of parent–child interactions to establish inter-rater reliability. Mothers' style of interaction was rated immediately after a 20-min live observation of unstructured parent–child play, which was conducted in the home.

Parent Psychosocial Functioning

Self-report assessments of parental stress and depression were administered at the beginning and completion of intervention to assess mothers' psychosocial functioning.

Parenting Stress

The Parenting Stress Inventory (Abidin, 1995) is a parent-report questionnaire which assesses the effects of children on parents and families. The Arabic translation of the Parenting Stress Inventory (Alabalwi, 1988) that was used in this study is a 101-item test that measures two sources of stress: stress related to parent–child interaction; and stress related to child difficulty.

Depression

Beck Depression Inventory-II (BDI-II) (Beck, Steer, & Brown, 1996) is a 21-question multiple-choice self-report inventory. It is one of the most widely used psychometric tests for measuring the severity of depression according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM–IV). The BDI-II is designed for individuals aged 13 and over, and is composed of items relating to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex. Participants are asked to rate the severity with which they experienced each symptom on a four-point Likert rating scale. The Arabic version of the BDI-II used in this study was standardised by Dr. Gharib Abdel Fattah from Egypt. Test–retest reliability is $r = .90$.

Results

Analyses were conducted to examine intervention effects on both mother' style interacting with their children as well as on mothers' psychosocial functioning.

Mothers' Style of Interaction

As indicated on Table 1, 100% of the mothers in the RT group reported clinical levels of parenting stress symptoms and 77% reported clinical levels of depressive symptoms. Table 2 reports mothers' ratings for each of the four subscales of the PICCOLO at post-intervention. A MANOVA was used to assess group differences in mothers' style of interaction at post-test as measured by the PICCOLO. Results indicated that RT was highly effective at encouraging mothers to modify their style of interacting with their

Table 2. Post-intervention ratings on PICCOLO by group.

	RT (*N* = 13)	Control (*N* = 15)	
PICCOLO	M (SD)	M (SD)	F (Group)
			14.03***[a]
Responsive	10.8 (3.5)	3.4 (3.0)	28.80***[2]
Affect	9.8 (4.6)	5.4 (4.6)	5.93*[2]
Encourage	9.7 (4.6)	3.1 (3.3)	18.51***[2]
Teach	7.7 (3.9)	1.6 (2.3)	25.11***[2]

[a] = MANOVA; [2] = ANOVA; * $p < .05$; ** $p < .01$; *** $p < .001$

children ($p < .000$) despite their high levels of stress and depression. Univariate analyses of PICCOLO subscales indicated that RT mothers had significantly higher ratings on Responsive ($p < .001$) and Affect ($p < .05$) as well as Encourage and Teach ($p < .001$) than control mothers.

Mother's Psychosocial Functioning

Table 3 reports mothers PSI and BDI scores at pre- and post-intervention. Results from a within subjects MANOVA indicated that mothers in the RT group made significantly greater improvements in their psychosocial functioning than did control group mothers ($p < .001$). Univariate analyses indicated that group differences were significant for both the PSI and BDI ($p < .001$). As in indicated on Figure 1, changes in PSI scores resulted in a 69% reduction in the percentage of RT parents reporting clinical levels of parenting stress symptoms compared with no changes in the percentage of control parents. Similarly, as indicated on Figure 2, BDI changes resulted inan 80% reduction in the percentage of RT parents reporting clinicallevels of depression symptoms compared with no changes in thepercentage of Control parents.

Correlations were computed to examine how RT mothers' psychosocial functioning as assessed by PSI and BDI scores pre-intervention scores were associated with both post-intervention measures of their style of interaction with their children as well with changes in PSI and BDI scores that occurred during intervention. As indicated on Table 4 there were moderate negative correlations (-.34 to -.43) between mothers' pre-intervention PSI scores with all four PICCOLO subscales. There were also similar patterns of correlations of mothers' pre-intervention BDI scores with two PICCOLO subscales, Responsive (-.40) and Teach (-.45). Because of the small '*n*' used for this

Table 3. Pre- and post-ratings on mother's psychosocial status by group.

	RT (*N* = 13)		Control (*N* = 15)			
Variables	Time 1	Time 2	Time 1	Time 2	F (Time)	F (Time × Group)
Psychosocial functioning					40.27***[a]	25.42***[a]
Parenting Stress Inventory	277.7 (12.2)	230.7 (35.6)	270.2 (31.0)	267.1 (27.9)	35.05***[2]	26.99***[2]
Beck Depression Inventory	40.5 (11.7)	24.3 (7.6)	22.0 (14.4)	21.6 (8.8)	37.98***[2]	19.18***[2]

[a] = MANOVA; [2] = ANOVA; * $p < .05$; ** $p < .01$; *** $p < .001$.

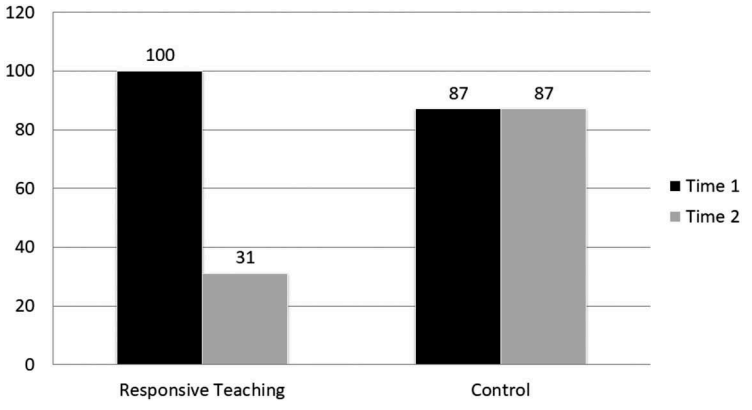

Figure 1. Percentage of mothers reporting clinical levels of PSI parenting stress symptoms.

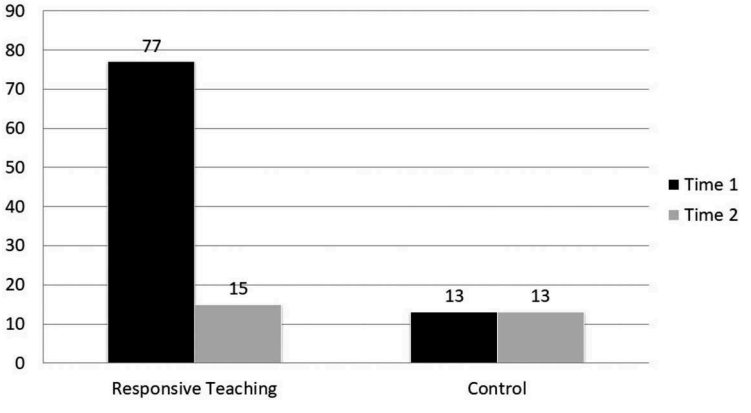

Figure 2. Percentage of mothers reporting clinical levels of BDI depressive symptoms.

Table 4. Correlations of maternal psychosocial functioning with post-intervention parenting style of interaction and intervention changes in psychosocial functioning.

Variables	Responsive	Affect	Encourage	Teach	PSI change	BDI change
Parenting Stress Index	−.43	−.37	−.34	−.36	.23	.07
Beck Depression Index	−.40	−.18	−.15	−.45	.00	.77**

* $p < .05$; ** $p < .01$; *** $p < .001$.

analyses, none of these correlations were significant. Yet they suggest that within the RT group, mothers who attained the highest parenting style ratings at the end of intervention were those who had the lowest scores on either the PSI and/or BDI at the beginning of intervention.

Correlations were also computed to examine the relationship of mothers' psychosocial functioning at the beginning of intervention to the changes in parenting stress and depression that occurred during intervention (see Table 4). All RT mothers improved their PSI scores during intervention, but their PSI changes were not associated with their

level of psychosocial functioning at the beginning of intervention. However, there was a strong negative correlation between pre-intervention BDI scores with the BDI improvements mothers made during intervention ($p < .01$) suggesting that mothers who appeared to be most depressed at the beginning of intervention made the greatest reduction in depressive symptoms during intervention.

Discussion

There are a number of noteworthy findings from this study with regard to the psychosocial functioning of Saudi Arabian (SA) mothers of preschool-aged children with autism.

First, similar to reports with mothers from the United States and Europe, data from this study suggests that SA mothers of young children with autism appear to experience extremely highly levels of psychosocial dysfunction. Nearly all of the mothers appeared to be experiencing clinical levels of parenting stress and more than 40% reported clinical levels of depressive symptoms. Even though this study was conducted with a small, convenience sample and is not representative of the population at large, the similarity of our results to other investigations of parents of children with autism, underscores the likely need for early intervention services in Saudi Arabia that provide the information and supports appropriate for addressing the psychosocial needs of parents. This is a particularly critical consideration as Saudi Arabia continues to transition from a residential to community based service system in which mothers play a more central role in the care of their children.

Second, even though all of the mothers in the RT group had clinical levels of parenting stress symptoms and 70% had clinical levels of depressive symptoms, these psychosocial challenges did not impede them from participating in RT. Since the primary goal of RT is to enhance parents' responsiveness, success with RT can be evaluated in terms of the extent to which parents acquired a more responsive style of interacting with their children. Not only did RT mothers attain significantly higher 'responsive' ratings than control mothers, but 11 of the 13 RT mothers had post-intervention 'responsive' ratings that exceeded the highest ratings that any Control group mothers received. Correlations within the RT group indicated a moderate association between the severity of Parenting Stress with RT effects on 'responsive' as well as the other three PICCOLO subscale ratings. In light of group differences in mother's style of interaction, these correlations suggest that although high levels of psychosocial dysfunction did not impede RT mothers from modifying their interactive style, it nonetheless moderated the magnitude of the changes that mothers attained.

Third, as hypothesised, RT was associated with substantial improvements in mothers' psychosocial functioning as indicated by significant decreases in both parenting stress and depression symptoms. Remarkably, over the course of this 4-month intervention there was an 69% reduction in the percentage of RT mothers reporting clinical levels of parenting stress and a 80% reduction in the percentage of mothers reporting clinical levels of depression symptoms. These effects contrast sharply with the lack of psychosocial improvement observed for Control mothers who had similar levels of parenting stress although substantially lower levels of depression symptoms than RT mothers at the start of intervention. In addition, these results are consistent with findings from two other RBI investigations with parents of children with autism. Alquraini and Mahoney

(2014) reported that 12 months of RT intervention was associated with a 41% reduction in the number of parents reporting clinical levels of parenting stress at the start of intervention; Solomon et al. (2014) reported that the number of parents with clinical levels of depression symptoms decreased by 50% after receiving the PLAY Project intervention for one year.

How can we account for the psychosocial effects observed for RT parents? Clinical levels of parenting stress and depression appear to be related conditions insofar as both are associated with difficulties interacting with children. This problem is accentuated by the tendency of young children with autism to resist or avoid face-to-face contact with their parents (Lord et al., 2000; Schopler, Reichler, DeVellis, & Daly, 1980). However, the reasons parents have difficulty engaging their children appear to be different for these two conditions. High parenting stress is thought to result from parents not knowing how to engage their children; while clinical depression is believed to result from parents lacking the energy and enthusiasm needed to successfully engage their children. We maintain that RT is effective at addressing both of these psychosocial problems at least partly because the RI strategies used in this intervention directly address both of these issues.

Parental Responsiveness entails a complex set of interactive behaviours including: contingent responding (Paavola, Kunnari, & Moilanen, 2005; Shaw et al., l998); affect or warm sensitivity (Landry, Smith, Swank, Assel, & Vellet, 2001; Stams, Juffer, & Van IJzendoorn, 2002); reciprocity (Beckwith & Rodning, 1996; Poehlmann & Fiese, 2001); stimulation that sustains children's focus of attention (Landry, Smith, Miller-Loncar, & Swank, 1997; Landry, Smith, Swank, & Miller-Loncar, 2000); and stimulation that is matched to children's capabilities (Smeekens, Riksen-Walraven, & Van Bakel, 2008). While highly responsive parents' guide and structure their children's activities, this directiveness is moderate in intensity and neither intrusive (Ispa et al., 2004; Park, Belsky, Putnam, & Crnic, 1997) nor overly controlling (Moore, Saylor, & Boyce, 1998).

Because responsiveness is a multifaceted construct, the RI strategies used in RT are designed to promote five dimensions of parenting style: *reciprocity*; *contingency; affect*; *match*; and *non-directiveness*. Thus, RT parents learn strategies that address the challenges associated with both parenting stress and depression. On the one hand, RT parents gain information about specific strategies to help them interact more effectively with their children; on the other hand, parents are encouraged to use strategies that enhance their animation, warmth and enthusiasm. Consequently, as reported this study as well as all other RT investigations, RT mothers not only attain higher responsive ratings after intervention but also higher affect ratings as well.

Research indicates that RI Strategies are causally related to changes in children's social engagement (Karaaslan & Mahoney, 2015; Mahoney & Solomon, 2016) such that soon after parents use these strategies they experience improvements in their children's interactive engagement. As parents begin to discover the effects of RI strategies on their ability to engage their children, this likely motivates them to continue using RI Strategies to sustain longer episodes of interaction with their children. By reducing parents' challenges of engaging their children, RI strategies directly address one of the main factors associated with both parenting stress and depression.

Conclusion and limitations. Results from this investigation address two practical concerns related to the use of the RT with preschool children with ASD and their parents. First, they address the question as to whether parents who are experiencing high levels of

psychosocial dysfunction are capable of participating in RBIs such as RT in which they assume the responsibility of learning and implementing RI strategies during their routine interactions with their children. Our results indicated that even when parents were experiencing clinical levels of parenting stress and depression they were not only capable of participating in RT, but in almost all instances attained improvements in their interactive style which had a substantial influence on their children's' social and developmental functioning (cf. Alquraini et al., In Press). Second, our results address the question as to whether the additional responsibilities parents assume when they participate in RT might have detrimental effects on their psychosocial functioning, particularly if they are currently experiencing high levels of parenting stress and depression. RT intervention procedures not only improved the quality of mothers' interactions with their children and enhanced children's development and social functioning, it also reduced, rather than aggravated both their parenting stress and depression. These findings highlight the viability of this low cost intervention [i.e. $5000 USD per year (Mahoney & Perales, 2005)] at meeting some of the most critical needs of parents and preschool aged children with autism in Saudi Arabia.

This study is notable, since it is the first to investigate the effects of a RBI with Saudi Arabian mothers and their young children with autism. In some instances, this intervention broached traditional Saudi cultural norms. Mothers who received RT were asked to assume a role in early intervention that is quite novel for parents in this country, and yet they responded very successfully to this intervention. In addition, since RT focuses on modifying mothers' style of interacting with their children, we had hoped to use video recording as a tool for coaching parents as well as for assessing the effects of RT on their interactive style. Yet even though mothers were uncomfortable and refused to participate in this aspect of the intervention, nearly all of the RT mothers were successful at learning and integrating RI strategies into their routine interactions with their children.

Because of some of these obstacles, we encountered significant difficulty in recruiting the size of sample that we had thought would be necessary to evaluate RT. In addition, although we used a valid instrument for assessing parents' interactive style, we recognised that the '*in vivo*' procedures used for this assessment could affect the reliability of our observations. Despite these limitations, results from this study were much more encouraging than we had expected. Yet, it is clear that additional investigations of RT are needed which include larger and more diverse samples of Saudi mothers and children, and which use more reliable tools for assessing parent-child interaction. Should the findings reported in this study be replicated with larger samples and better research designs, we believe that RBIs such as RT may provide a critical, cost effective tool that can play a significant role in expanding the early intervention service system for young children with autism in Saudi Arabia and perhaps other similar Middle Eastern countries.

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