AN INVESTIGATION OF COMPLIANCE TO A HOME-BASED PHYSIOTHERAPY PROGRAM AND EMOTIONAL INTELLIGENCE OF MOTHERS OF INFANTS AT RISK

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Purpose: Rehabilitation programs are widely prescribed, compliance with these programs can be a problem for caregivers. Emotional intelligence plays an essential role in coping with problems. This study investigated emotional intelligence and compliance with a home-based physiotherapy program (HBPP) among mothers of infants at risk.

Methods: The study included 138 mothers of infants at risk followed in the Developmental and Early Physiotherapy Unit of Hacettepe University. Data were collected using a demographic information form and the Schutte Emotional Intelligence Scale (SEIS).

Results: Mothers who were not working and had low education level showed higher HBPP compliance and lower scores in the optimism/mood regulation dimension of the SEIS ($p<0.05$). Optimism/mood regulation also weakly correlated with the time mothers spent with the infants at risk per day ($r=0.185$, $p<0.05$).

Conclusion: Mothers' employment status and education level may be associated with their emotional intelligence and HBPP compliance. When prescribing HBPP for infants at risk, physiotherapists should also consider caregivers' working status and education level, and interventions to improve emotional intelligence can be provided.

Keywords: Compliance, emotional intelligence, home-based physiotherapy program, infants at risk, mothers

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Introduction

Children with a history of risk factors such as prematurity, very low birth weight, or neonatal encephalopathy in the antenatal, perinatal, or postnatal period are called "infants at risk" or "high-risk infants", as they have a higher risk of cerebral palsy, intellectual impairment, and behavior and learning problems than typical developing infants (Asbury, McKhann, McDonald, Goadsby, & McArthur, 2002; Gallo, Breitmayer, Knafl, & Zoeller, 1991). Infants at risk might require more attention, care, supervision, or medical care, and morbidities such as bronchopulmonary dysplasia (BPD), intraventricular hemorrhage (IVH), and sepsis are more common in these children during hospitalization (Koc et al., 2019). Doyle et al. reported that infants at risk need more attention and medical care, even after being discharged from the hospital (Doyle, Ford, & Davis, 2003).

The families of children with chronic illness or developmental disorders should apply medical and exercise interventions with their children at home (Medina-Mirapeix et al., 2017). Although rehabilitation programs are widely prescribed, compliance with these programs can be a problem for caregivers (Lillo-Navarro et al., 2015; Medina-Mirapeix et al., 2017). Improvement of mobility and other functional abilities is mostly the primary goal of rehabilitation programs for children with developmental disabilities. It is well known that the physical therapy including home-based physiotherapy programs (HBPP) for children with disabilities is beneficial (Lillo-Navarro et al., 2019; Rone-Adams, Stern, & Walker, 2004). Regular and appropriate home exercise programs, and participation of the caregiver are crucial for the rehabilitation (Başaran, Karadavut, Üneri, Balbaloğlu, & Atasoy, 2014). Therefore, compliance to HBPP of caregivers and determining the factors affecting this compliance are important for the achieving of rehabilitation programs for children with developmental disabilities.

Emotional intelligence is defined as a skill that can be acquired and developed (Kumar & Thomas, 2016; Nelis, Quoidbach, Mikolajczak, & Hansenne, 2009), and many experimental studies have shown that emotional intelligence plays an essential role in determining personal and professional success (Kumar & Thomas, 2016). By enabling us to understand both our own emotions and those of others, emotional intelligence fosters empathy and logical communication and interaction (Kumar & Thomas, 2016). It also allows emotional regulation, which is important for reducing stress, coping with life's difficulties, and being resilient (Manicacci, Bouteyre, Despax, & Bréjard, 2019; Omori & Yoshıoka, 2016). Improving emotional intelligence is reported to be an indispensable strategy for maintaining mental health as well as increasing the endurance of families of children with disabilities and coping with chronic distress (Omori & Yoshıoka, 2016). From this point of view, investigating the emotional intelligence of mothers of high-risk infants and its determining factors gains importance both in terms of providing the support that mothers need and increasing the effectiveness of interventions that their infants need.

To the best of our knowledge, there have been no studies on the association between maternal emotional intelligence and compliance to the HBPP which infants at risk need. This study aimed to (i) examine the

emotional intelligence of mothers of infants at risk, (ii) investigate the association between mothers' emotional intelligence and their sociodemographic characteristics, and (iii) determine the relationship between emotional intelligence and compliance to the HBPP.

Material and Method

This prospective study was conducted in Hacettepe University, Faculty of Physical Therapy and Rehabilitation, Developmental and Early Physiotherapy Unit after obtaining Ethics Committee approval from Muş Alparslan University (date: 06/11/2019, number: E.14543-9-3). G*Power version 3.1.9.4 software (Heinrich-Heine-Universität Düsseldorf, Germany) was used to determine the sample size for the study (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size calculated based on similar articles was determined for 90% power and 5% error.

Participants

This study comprised 138 mothers who cared for high-risk infants aged 1–24 months with risk factors such as prematurity, low birth weight, intrauterine growth retardation (IUGR), BPD, IVH, hypoxic-ischemic encephalopathy (HIE), and periventricular leukomalacia (PVL). All of the infants were followed up in the Developmental and Early Physiotherapy Unit with a HBPP (specific age-adequate early intervention including positioning, stimulation techniques… to increase daily motor movement for two hours per day) after discharge from the hospital. Mothers who did not want to participate in the study were excluded. All mothers who participated in the study gave written informed consent.

Data regarding the mother's age, employment status, education level, marital status, number of children at home, monthly income, place of residence, time spent with the high-risk infant per day (hours), and whether they performed the HBPP (hours/per week) were collected, then the Schutte Emotional Intelligence Scale (SEIS) was applied.

Home-Based Physiotherapy Program

After infants were discharged from the hospital, we started to apply follow-up assessments for their developmental functioning. We determined the frequency of assessments and HBPP according to various reasons, such as the infants' risk factors, clinical status, or developmental status. HBPP were based on developmental milestones from infancy to childhood, and the aims of this program are age-specific. The aimed include to promote symmetrical body postures, increase control of the head and trunk muscles, strengthen the muscles, increase balance, and provide righting reactions (Medina-Mirapeix et al., 2017; Rone-Adams et al., 2004).

Schutte Emotional Intelligence Scale

The SEIS is a valid and reliable scale developed by Schutte et al. (Schutte et al., 1998), revised by Austin et al. (Austin, Saklofske, Huang, & McKenney, 2004), and adapted to Turkish by Tatar et al. (Tatar, Tok, & Saltukoglu, 2011). The scale consists of 41 items rated on a 5-point Likert scale (1=Strongly disagree to 5=Strongly agree) in 3 subscales: optimism/mood regulation, utilization of emotions, and appraisal of emotions. Total score ranges between 41 and 205, with higher scores indicating higher level of emotional intelligence (Tatar et al., 2011). In our study, the Cronbach's alpha reliability coefficient of the SEIS was determined as 0.84 ($p<0.01$).

Statistical Analysis

Statistical analysis was performed using SPSS version 24.0 (IBM Corp., Armonk, NY) software. The variables were investigated using visual (histograms, probability plots) and analytical methods (Kolmogorov–Smirnov test) to determine whether the data were normally distributed. Descriptive analyses were presented using means and standard deviations for normally distributed variables and numbers and percentages for non-normally distributed variables. Student's t-test was used to compare two independent groups, while one-way analysis of variance (ANOVA) was used to compare three groups for normally distributed data. Pearson's correlation test was used to calculate the correlation between variables with normally distributed data. Cronbach's alpha coefficient was used for reliability analysis. Results with a p-value less than 0.05 were considered statistical significance.

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Findings

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The descriptive characteristics of the mothers of infants at risk included in our study are shown in Table 1.

Table 1. Descriptive characteristics of mothers who care for infants at risk

		Mean ± SD (n=138)	Min-Max
Mother's age (years)		30.59 ± 4.85	19-40
Monthly income (TL)		3372.46 ± 3845.58	400-15000
Age of infant at risk (months)		9.71 ± 6.20	1-24
Number of children in the house		1.82 ± 0.97	1-8
Time spent with the infant at risk (hours/day)		12.86 ± 6.36	2-24
Compliance to HBPP (hours/week)		5.93 ± 4.53	0-14
Emotional Intelligence	Optimism/Mood regulation	79.49 ± 13.34	23-104
	Appraisal of emotions	28.77 ± 8.58	13-61
	Utilization of emotions	19.14 ± 4.81	8-32
	Total SEIS score	127.48 ± 16.34	51-173
			n (%)

Employment status	Working	54 (39.1)
	Not working	84 (60.9)
Education level	Primary school	33 (23.9)
	High school	50 (36.2)
	Under-/Postgraduate	55 (39.9)
Place of residence	Rural	51 (37)
	City	87 (63)
Marital status	Married	136 (98.6)
	Divorced	2 (1.4)

TL: Turkish Lira, SD: Standard deviation, HBPP: Home-based physiotherapy program, SEIS: Schutte Emotional Intelligence Scale

There was a statistically significant difference in HBPP compliance based on the mothers' employment status ($p < 0.01$). Non-working mothers spent significantly more time per week implementing the HBPP compared to working mothers. When the mothers' emotional intelligence parameters were compared according to employment status, working mothers had significantly higher scores in the optimism/mood regulation subscale than non-working mothers ($p = 0.046$). No significant differences were observed between the groups in the other emotional intelligence subscales ($p > 0.05$) (Table 2).

Table 2. Comparison of HBPP compliance and emotional intelligence according to the mothers' employment status.

		Employment status		
		Working n=54 Mean±SD	Not working n=84 Mean±SD	**p**
Compliance to the HBPP (hours/week)		4.31±4.52	6.97±4.24	0.001**
Emotional Intelligence	Total SEIS score	129.18±11.40	126.38±18.82	0.327
	Optimism/Mood Regulation	82.11±10.31	77.80±14.78	0.046*
	Appraisal of emotions	27.98±9.84	29.27±7.67	0.390
	Utilizations of emotions	18.90±4.41	19.29±5.06	0.644

Student's t test, *$p < 0.05$, **$p < 0.01$; SD: Standard deviation, HBPP: Home-based physiotherapy program, SEIS: Schutte Emotional Intelligence Scale

Comparisons based on the mothers' education level revealed statistically significant differences in weekly compliance to the HBPP ($p = 0.030$) and the optimism/mood regulation subscale of emotional intelligence ($p = 0.008$). Mothers with primary school education spent significantly more hours per week implementing the HBPP but had significantly lower optimism/mood regulation scores in the SEIS compared to mothers with undergraduate/postgraduate degrees. Although higher education level was significantly associated with higher level of optimism/mood regulation, the other SEIS subscales showed a statistically nonsignificant tendency to decrease as education level increased ($p > 0.05$) (Table 3).

5

Table 3. Comparison of compliance to the HBPP and emotional intelligence according to the mothers' education level

		Education Level		p	Post-Hoc
	Primary School[a] n=33 Mean±SD	High School[b] n=50 Mean±SD	Under-/ Postgraduate[c] n=55 Mean±SD		
Compliance to the HBFP (hour/week)	7.12±4.04	6.48±5.12	4.71±3.98	0.030*	a–c
Emotional Intelligence — Total SEIS score	125.51±27.65	129.44±9.49	126.87±11.65	0.532	
Emotional Intelligence — Optimism/Mood Regulation	73.27±20.34	81.48±8.54	81.41±10.44	0.008**	a–c a–b
Emotional Intelligence — Appraisal of emotions	31.48±8.28	28.90±8.03	27.01±8.93	0.059	
Emotional Intelligence — Utilizations of emotions	20.45±5.79	19.06±4.29	18.43±4.53	0.161	

One-way ANOVA, *$p<0.05$, **$p<0.01$, SD: Standard deviation, HBPP: Home-based physiotherapy program, SEIS: Schutte Emotional Intelligence Scale

When correlations between weekly HBPP compliance, emotional intelligence, and the time spent with the infants of parents are examined, the only significant relationship detected was a very weak positive correlation between weekly time spent with the high-risk infant and the appraisal of emotions subscale of emotional intelligence ($r=0.185$, $p=0.030$) (Table 4).

Table 4. Correlation analysis between mothers' HBPP compliance, emotional intelligence, and time spent with the infants at risk

		Compliance to HBPP (hours/week)		Time spent with infants at risk (hours/day)	
		r	p	r	p
Emotional Intelligence	Total SEIS score	0.104	0.225	0.103	0.228
	Optimism/Mood Regulation	0.107	0.212	-0.026	0.763
	Appraisal of emotions	0.018	0.838	0.185	0.030*
	Utilizations of emotions	0.027	0.756	0.044	0.606

Pearson correlation test, *$p<0.05$, **$p<0.01$; HBPP: Home-based physiotherapy program, SEIS: Schutte Emotional Intelligence Scale

Discussion

In this study examining compliance with a HBPP and emotional intelligence among mothers of infants at risk, we showed that the mothers' employment status and education level were associated with their weekly compliance to the HBPP and one dimension of emotional intelligence (optimism/mood regulation). The same dimension of emotional intelligence was also found to be very weakly correlated with the amount of time mothers spent with the infants at risk.

Many studies conducted among caregivers of children with developmental disorders and different age groups have reported rates of compliance to HBPPs and the factors affecting this compliance (Başaran et al., 2014; Galil, Carmel, Lubetzky, & Heiman, 2001; Medina-Mirapeix et al., 2017; Rone-Adams et al., 2004). When these factors are examined, few studies have investigated the employment status and education level of the caregivers, which also provides different results. Some studies have indicated that caregivers' employment status and education level have an effect on compliance to the HBPP for children with developmental disorders (Galil et al., 2001), while others suggested that these factors had no effect (Başaran et al., 2014; Lillo-Navarro et al., 2019). In our study, the employment status and education level of the mothers of infants at risk affected their compliance to the prescribed HBPP, with higher compliance among mothers who did not work and had lower education level. The probable reason for this might be that mothers who do not work have less responsibilities and thus allow them to devote more time to their infants at risk, and they regularly carry out weekly compliance to the HBPP. In addition, it might be that mothers with low education levels in our country are generally housewives and spend more time with infants at risk. The lack of a significant relationship between caregiver employment and education level and compliance to HBPP for children with developmental disorders in some studies (Başaran et al., 2014; Lillo-Navarro et al., 2019) may be due to the inclusion of a wide age range of children, different disease groups, and a variety of caregivers (mothers, fathers, others). The limited age range (0–2 years) and inclusion of only the mothers of infants at risk are advantages of the present study.

Emotional intelligence consists of the ability to perceive, recognize, and evaluate feelings in the self and others, and adjust to a situations such as being under pressure or having meet requirements (Van Rooy & Viswesvaran, 2004). People who are aware of their and others' feelings can manage behaviors and achieve success in many sectors more easily (Brackett, Rivers, & Salovey, 2011; Libbrecht, Lievens, Carette, & Côté, 2014; Rezvani et al., 2016). To our knowledge, the literature includes no study investigating the emotional intelligence of mothers and the factors affecting it. Therefore, we examined studies related to the subject of our study that included an analysis of working status and education level, which may affect emotional intelligence. Of the studies investigating emotional intelligence according to working status, Devi and Uma (Uma & Devi, 2005) reported a positive correlation between the employment status of the families of adolescents and their emotional intelligence, whereas Kumar and Thomas (Kumar & Thomas, 2016) showed that non-working women (homemakers) had higher emotional intelligence than working women (teachers). Similar to the results of the study by Devi and Uma, we determined that working mothers had higher emotional intelligence in the area of optimism/mood regulation. The reason for this may be that the mothers in working life have more

knowledge on various issues, and the expansion of their perspectives on life through social interaction has contributed to their emotional intelligence. Kumar and Thomas attributed the lower emotional intelligence of working women to the negative relationship between the stress of working life and emotional intelligence. We believe the type of work and job satisfaction may be other factors that could affect emotional intelligence. More research is needed to clarify this issue.

Studies investigating emotional intelligence in mothers based on their education level suggest that these parameters are related but offer conflicting evidence regarding the nature of this relationship (Harrod & Scheer, 2005; Kumar & Thomas, 2016; Sarıkabak, Eyuboğlu, & Ayrancı, 2018; Uma & Devi, 2005). Some authors reported that mothers' education level positively correlated with their emotional intelligence (Harrod & Scheer, 2005; Uma & Devi, 2005), while others have reported a negative correlation (Kumar & Thomas, 2016; Sarıkabak et al., 2018). The reason for this discrepancy may be that the studies examined families of children with different characteristics (e.g., adolescents, athletes). Our results support previous studies showing that higher education level may be associated with higher emotional intelligence. One possible reason for the higher scores for optimism/mood regulation among highly educated mothers could be that they regard their situation and having an infant at risk as more optimistic and acceptable.

Other interesting results of our study were that although the amount of time mothers spent with their infants at risk during the day was weakly associated with their optimism/mood regulation, there was no correlation with overall emotional intelligence or between weekly compliance to the HBPP and emotional intelligence. This may be because emotional intelligence is dynamic and can be developed like other skills (Kumar & Thomas, 2016; Nelis et al., 2009). Some of the families in our study were followed up for as little as 1 month. This short follow-up period might be early for the development of emotional intelligence in some mothers of infants at risk. Therefore, our study may not have revealed the relationship between mothers' emotional intelligence and HBPP compliance. To test this hypothesis, emotional intelligence should be investigated in mothers of high-risk infants followed up for a long time and those who recently started follow-up.

In conclusion, the employment status and education levels of the mothers in our study were associated with their emotional intelligence and weekly compliance to the HBPP for their infants at risk. Although working mothers had higher emotional intelligence in terms of optimism/mood regulation, weekly compliance to the HBPP was better among mothers who did not work and those with low education level. When prescribing home-based interventions, physiotherapists must consider the working status and education levels of mothers of infants at risk. In addition, mothers of infants at risk who do not work and have a low education level can be supported with interventions that increase emotional intelligence.

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