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Original Article

Quality of Mother-Infant Interactions in Maternal Emotional Disturbance: A Pilot Study

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Abstract

Aim: The present study aimed to examine the quality of mother-infant interactions in emotionally disturbed (ED) mothers. **Method:** 20 mothers with or without ED and their infants (12-24 months) participated in the study, which involved the mothers interacting with their infants with a toy in a structured play situation. These interactions were video-recorded and a coding scheme was developed to code the quality of maternal, infant, and interaction behaviours. **Results:** Significant differences were obtained on all the behaviour scales between both the groups. Mothers with ED and their infants displayed more negative or neutral interaction as compared to control mothers and their infants. The interactions of the mother-infant dyads were also less positive in mothers with ED than in control mothers. **Conclusions:** The study suggest that the presence of ED in mothers is associated with overall less optimal mother-infant interactions than is evident in demographically similar mothers without ED. This study helped confirm previous findings but also demonstrated impact of maternal emotional disturbance on mother-infant interactions not detailed in literature.

Keywords: Mother-infant interaction, maternal emotional disturbance.

Introduction

Infant-caregiver interaction

During the very first months of the infant's life, infant-caregiver interaction is the most powerful source for organising the infant's experience. Developmental risks or vulnerabilities may arise from the infant's genetic or biological characteristics, or from the psychosocial context. However, good infant-caregiver interactions may moderate the impact of these risks on child development.

Through interactions with the caregiver the infant encounters the world around him, and if the relationship between the infant and the caregiver fails to be appropriately established, the development of the child is compromised, no matter what the reason for the failure is—acute or chronic illness of the child, parental psychopathology, mother's preoccupation with her worries because of life adversities, or poor parenting, to name some examples [1].

Given that in most cultures the infant's primary environment is largely constituted by the mother, an important question is what kind of deviations in early mother-infant interaction would impact on the child. Determinants of maternal behaviour other than maternal psychopathology have not been sufficiently studied in the Indian context.

How early is early mother-infant interaction?

The first three years of a child's life form a period of rapid and complex developmental changes. This period is often regarded as a time when the cornerstones for later development are laid. Major developmental shifts occur during the first three years [2].

These bio-behavioural shifts are characterised by qualitative reorganisation of

functioning and acquisition of qualitatively new skills in biological, motor coordination, perceptual, cognitive, emotional, communicative, and social domains [3].

In this paper early mother-infant interaction refers to mother-infant interaction between one and two years of the infant's age, that is, around the third bio-behavioural shift. The rationale for this age range is that by the end of the first year of life the infant is capable of evaluating events and stimuli using the emotional responses of others.

Aspects of the dyad in early mother-infant interaction

Since the unique characteristics and the ways of acting of both the mother and the infant mould the nature of the mother-infant interaction, both the mother and the infant contribute to the quality of the dyadic interaction. Traditionally, more importance has been given to the mother's role, but there is evidence suggesting that infants also have an important role in maintaining or improving the quality of the interaction, for example by eliciting better responses from the mother [4].

Features such as mutuality, reciprocity, engagement, joint activity and affective sharing are often proposed as important aspects of good mother-infant interaction [5, 6]. To operationalise the assessment of mother-infant interaction, maternal behaviour and infant behaviour are usually assessed separately. However, the behaviour of one partner should always be judged in relation to the behaviour of the other. For example, a mother's sensitivity can be estimated only by observing the mother's behaviour in the context of the child behaviour. Also, if only the behaviour of one partner is observed without considering the behaviour in the context of the dyad, important aspects may be

overlooked: smiles may be seen but without observing the behaviour of the other partner and the dyad mistiming or non-reciprocity are missed.

What affects the quality of early mother-infant interaction—Role of Maternal Psychopathology

The effect of maternal psychopathology on the quality of mother-infant interaction has been a focus of intense research in recent decades. Parental psychopathology has been recognised as a risk factor for poor infant outcomes [7], and mother-infant interaction has been studied as one of the potential mediators of the influence of parental psychiatric illness [8, 9].

Maternal psychopathology seems to have an impairing effect on the mother's capability for good mother-infant interaction, regardless of the diagnosis, and the infants of affected mothers have also been reported to exhibit abnormal interactive behaviours. However, studies concerning early mother-infant interaction are rare and their findings controversial. For example, in studies on postnatal depression and mother-infant interaction with 2-3 month old infants, the most distinct findings were from samples from lower socio-economic class and living in adverse conditions [10,11,12], while differences in the quality of mother-infant interaction of depressed mothers from upper/middle class families have been more difficult to demonstrate.

Regarding other disorders, samples recruited at psychiatric hospitals [13, 14, 15] have restricted the generalisation of findings to involve normal or non-clinical population. Therefore, more research on the association between maternal psychopathology and early mother-infant interaction in community samples is clearly needed.

Moreover, it has been found that parenting difficulties may not be as specific to clinical disorders as assumed. For example, the symptoms of depression across studies assessing mother-infant interactions do not adequately predict the behavioural excesses (e.g., hostility, criticism) that appear to be associated with depressed moods. Rather, it is necessary to evoke associated features, such as irritability, to account for these behaviours. This suggests that parenting difficulties may reflect general psychological distress rather than depression *per se* and the effects of depression may occur below diagnostic threshold.

Thus, research is needed on the subclinical manifestations of psychological disturbances, particularly depression and anxiety, those that reflect the general psychological distress which are more prevalent in the community and have been overlooked in research, especially in the Indian context.

The Present Study

Objectives

The study aimed to examine the quality of mother-infant interactions in mothers with and without emotional disturbance (ED). In line with this, the objectives of the study were to examine the following in the context of maternal emotional disturbance: quality of maternal behaviour, quality of infant behaviour, and the quality of mother-infant interactional behaviour.

Sample

This was a part of a larger study which is currently underway. The pilot study involved mothers who had children in the age range of 12-24 months. Of these, the index group

constituted of mothers with ED and the control group constituted of mothers free of emotional disturbance.

Inclusion criteria for both index and control groups were: (a) Hindi or English speaking women, (b) married and stably cohabiting with their husbands, and (c) residents of Delhi.

Women with past history of or current diagnosed psychiatric illness, women who had sought psychiatric treatment for any psychiatric problems, those whose infants were born with a gross congenital abnormality, and those whose infants required hospital admission after birth were excluded from the study.

Of the 45 women screened, 40 gave their written informed consent to participate in the study. 3 women had to be excluded due to the presence of depressive and/or anxiety disorder. Of the remaining women, 32 could be contacted telephonically, of which 29 agreed for further follow-up. The rest (n=3) cited reasons such as unavailability and not getting permission to participate from their husbands. Of those who agreed for follow-up, 6 women did not turn up at the pre-decided time for the recording (after which it was decided to give the women an option for home visit). The sample consisted of 23 women, of which 20 were used for the final analysis.

Hypotheses

To test the objectives the following hypotheses were formulated

Hypothesis 1

There would be a significant difference between mothers with ED on maternal behavioural scales as compared to mothers without ED

Hypothesis 2

There would be a significant difference between infants of mothers with ED on infant behavioural scales as compared to infants of mothers without ED

Hypothesis 3

There would be a significant difference between behaviour of mother-infant dyads in index group on interaction scales as compared to mother-infant dyads in control group

Measures

At recruitment all women were administered the General Health Questionnaire (GHQ), a 12-item measure of overall psychological health [16]. For some participants, the Hindi version [17] of the questionnaire was used. For the present study, a cut-off score of ≥ 4 was determined to detect emotional disturbance, using the ‘GHQ scoring’ (p.19).

A semi-structured interview was constructed to elicit data regarding the following domains (in order to match the index and control mothers):

1. Socio-demographic factors (age, education level, employment, family income group, and family set-up)
2. Medical and psychiatric history (previous abortions/miscarriages, past infertility, and history of major medical illnesses)
3. Infant factor (whether this child was planned or not)

A structured play situation was also used. The child was given two plastic toys (a bright yellow toy giraffe with wheels and a toy car) chosen as simple toys likely to interest the child only briefly and require substantial effort by the mother to sustain the child’s interest. The mothers were asked to play with their children as they usually would, and to

avoid looking at the camera. This situation was chosen in order to assess how the mother and child deals with it, for example, how the child approaches the toy, how the mother maintains the child's interest and deals with any difficulties.

Procedure

The women were recruited from the immunization clinic of a government hospital in Delhi. Mothers with children in the age range of 12-24 months were approached and given information about the study. Those who expressed their willingness to participate were interviewed; their written consent was obtained on a form and they were administered the semi-structured interview and questionnaire. Those who received scores above the cut-off point on the questionnaire were screened for presence of depression and anxiety disorders using the ICD-10 criteria; those found having a psychiatric disorder were excluded from the study and referred for appropriate professional consultation. For the remaining mothers, at the end of the interview, a time for video-taping the mother-infant interaction was scheduled. At this time, these mothers were observed with their children at play in a structured situation lasting 15 minutes, of which the latter 10 minutes of the play were used for coding.

The video-recording took place either at home (n=13) or at the Play Therapy room in the Child & Adolescent ward of IHBAS. The decision as to where the video-recording should take place was made by the mothers, depending on their convenience.

The interactions were video-taped using a camcorder kept at a higher point in the room, out of reach of the children. 23 interactions were recorded, of which 2 were used for training and 1 had to be discarded due to poor quality.

Development of Coding Scheme

For the purpose of this study, a coding scheme was developed to assess mother-infant interactions in mothers with emotional disturbance. Since the variable under study (emotional disturbance) precluded use of a symptom-based approach to understanding the behaviours of these mothers, their parenting difficulties were framed in terms of positive and negative affect. This offered advantage in that it allowed prediction regarding the interaction behaviour to extend across a range of mood disturbances of varying severity. Moreover, it allowed description of individual differences in the general population as well as in population experiencing psychological distress.

With the help of this coding scheme, the study aimed to investigate differences in specific maternal behaviours in relation to maternal psychopathology status. It was expected that mothers with more negative affect (that is, those with emotional disturbance) and their infants would display greater negative interaction behaviours than control mothers and their infants.

Based on previous research and on repeated viewing of the tapes containing mother-child interactions, the behaviour scales were developed for the coding scheme. Both mother and child behaviours were included in the coding scheme. For each behavioural scale, a definition of what constitutes that behaviour, along with instances, was specified. Non-verbal gestures (such as instances of body language or posture) along with tonality of voice were also included.

All the scales were 5-point Likert-type and from 5 to 1 define the positive to negative dimension, with frequency counts of number of behaviours or the proportion of time for

which a particular behaviour is engaged in. A fine grained classification was attempted by including neutral behaviours.

Furthermore, scales were made continuous by specifying frequency of behaviours and/or time-limits for each point on the scale. This was also done so as to ensure objectivity, accuracy, and therefore reliability. Following are the three scales and the sub-scales that constitute them:

Maternal Scales*

1. Non-intrusive Behaviour - Intrusive Behaviour
2. Non-demanding - Demanding
3. Responsive - Unresponsive
4. Much Effort - No Effort

Infant Scales*

1. Active Positive Communication - No Active Positive Communication
2. Happy - Distressed
3. Non-fretful - Fretful
4. Lively – Inert

Interaction Scales*

1. Much Engagement - No engagement
2. Smooth/Easy - Difficult
3. Fun- Serious
4. Mutually Satisfying- Unsatisfying

*Operational definitions of these scales, along with the detailed coding scheme, is available with the authors

Inter-rater Reliability

All the tapes were coded by the principal investigator who, along with the second coder, was blind to the maternal diagnoses so as not to bias the interpretation of behaviour. The

second coder, a post-graduate student with one year of clinical experience, was trained to code the tapes using the coding scheme. To achieve a sufficient level of agreement approximately 5 hr of training was needed which included watching tapes together by the two coders, explaining to the second coder with examples what do and do not constitute particular behaviours, and how to record in cases of uncertainty.

Then one tape was coded independently by the two coders. These scores were compared, the disagreements were discussed and the aspects of the coding scheme considered vague or fuzzy were clarified. After this, the coders coded a different tape separately and came back again to review their scores. At this stage, aspects of the behaviours were made even more clear and specific. After agreement was found, 25% of the tapes (n=5) were coded by both the coders.

Results

Socio-demographic characteristics

The mean ages of mothers with ED (index group) and the mothers without ED (control group) was 25.7 (S.D. 2.98) and 26.7 (S.D. 3.74) years respectively.

Table 1 shows the other socio-demographic characteristics of the two groups of mothers.

Table 1: Socio-demographic characteristics of the two groups of mothers

Socio-demographic characteristics	Mothers with ED (n=10) % total sample	Mothers without ED (n=10) % total sample
Education level		
0-10 th standard	10	15
High school-Graduate	35	25

Postgraduate	5	10
Income group (Rs/month)		
Group 1 (≤ 2500)	5	5
Group 2 (2501-5500)	25	15
Group 3 (≥ 5501)	20	30
Family set-up		
Joint/extended	30	45
Nuclear	20	5
Previous abortion/ miscarriage	20	30
History of major medical illness	5	5
Planned pregnancy	35	35

Table 2 shows that the two groups of mothers did not differ on the socio-demographic variables.

Table 2: Comparison of index and control mothers on socio-demographic variables

Socio-demographic variables	Result
Age	$F=.43$ ($p=.517$) ^{ns}
Education level	$\chi^2=.86$ ($p=.648$) ^{ns}
Income group	$\chi^2=.9$ ($p=.638$) ^{ns}
Family set-up	$\chi^2=2.4^{\wedge}$ ($p=.303$) ^{ns}
Previous abortions/miscarriages	$\chi^2=.80^{\wedge}$ ($p=.656$) ^{ns}
History of medical illnesses	$\chi^2=.00^{\wedge}$ ($p=1.0$) ^{ns}
Planned pregnancy	$\chi^2=.00^{\wedge}$ ($p=1.0$) ^{ns}

[^]Fisher's exact: computed for 2X2 tables, * $p \leq .05$, ns- non significant

Reliability of the Coding Scheme

Table 3 shows the inter-rater reliability of each of the behavioural scales between the two raters. The intraclass correlation coefficients ranged from 0.6 to 1.00, i.e., moderate to

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very high agreement, except the maternal scale of 'responsive-unresponsive' that showed low intraclass correlation of 0.53 and was thus dropped from the analyses. All the other behavioural scales were retained.

Table 3: Inter-rater reliability for the behavioural scales

Behavioural Scales		Intraclass Correlation Coefficient
Maternal scales	Non-intrusive-intrusive behaviour	0.867
	Non-demanding-demanding behaviour	0.972
	Responsive-unresponsive	0.533
Infant scales	Much effort-no effort	1.00
	Active positive communication-no active positive communication	0.636
	Happy-distressed	0.869
Interaction scales	Non-fretful-fretful	0.937
	Lively-inert	0.895
	Much engagement-no engagement	0.895
	Smooth/easy-difficult	0.615
	Fun-serious	0.823
	Mutually satisfying-unsatisfying	0.928

When the data was analysed by location, it was seen that there were no significant differences on any of the scales between mothers whose interactions with their infants were recorded at home (n=13) and those who were video-taped in the play room.

Maternal Behaviours

Table 4 shows the comparison of the index and control groups on the maternal behavioural scales.

Table 4: Difference between the two groups on maternal behavioural scales[^]

Maternal Behavioural scale	Mothers with ED (n=10) Mean Ranks	Mothers without ED (n=10) Mean Ranks	Mann-Whitney U Test Asymp. Sig (2-tailed)
Non-intrusive-intrusive behaviour	5.65	15.35	.000***
Non-demanding-demanding behaviour	6.25	14.75	.001***
Much effort-no effort	7.60	13.40	.003**

* p≤ .05

** p≤ .01

*** $p \leq .001$

^Responsive-unresponsive excluded from analysis

Infant Behaviours

Table 5 shows the comparison of the index and control groups on the infant behavioural scales.

Table 5: Difference between the two groups on infant behavioural scales

Infant Behavioural scale	Infants of mothers with ED (n=10) Mean Ranks	Infants of mothers without ED (n=10) Mean Ranks	Mann-Whitney U Test Asymp. Sig (2-tailed)
Active positive communication-no active positive communication	7.45	13.55	.015*
Happy-distressed	6.55	14.45	.002**
Non-fretful-fretful	5.95	15.05	.000***
Lively-inert	8.15	12.85	.055

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Mother-infant interaction behaviours

Table 6 shows the comparison of the index and control groups on the interaction behavioural scales.

Table 6: Difference between the two groups on interaction behavioural scales

Interaction Behavioural scale	Mothers with ED (n=10) Mean Ranks	Mothers without ED (n=10) Mean Ranks	Mann-Whitney U Test Asymp. Sig (2-tailed)
Much engagement-no engagement	6.45	14.55	.001***
Smooth/easy-difficult	6.15	14.85	.001***
Fun-serious	5.65	15.35	.000***

Mutually satisfying- unsatisfying	5.80	15.20	.000***
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***p ≤ .001

Discussion

Maternal Behaviours

The first objective of the present study was to study the quality of maternal behaviour in the context of maternal emotional disturbance. Examination of maternal behavioural scales revealed that mothers with ED were more *intrusive* and *demanding* than non-disturbed mothers (see Table 4). That is, ED mothers cut across their infants' communications, and intruded upon their infants' space causing the infants distress or causing disruption to their activities. For example, the ED mothers would often try to physically shake the infant (such as to get the infant to kiss her mother) or take the toy from him despite his engaged play. Notably, they did not cease their physical activity despite the infants' obvious discomfort or avoidance.

They also required their infants to behave and/or play in a manner expected by the mothers, without considering the infants' emotional state. For example, a majority of both the index and control mothers demanded their infants to name and show body parts (a skill mastered between 1-2 years), but the difference between the two groups of mothers was largely in terms of *how* these demands were made, and how the infants' responses were in turn responded to (such as with positive reinforcement versus with a further increase in the mother's demands). The difference between the index and control mothers also lay in being consonant to the infant's emotional expressions—with the

mothers with ED largely being unable to respond to their infants' communications with validation. It was seen that women with especially higher scores on ED resorted to even threatening the child to make him comply with their directions (e.g., "I will take your toy away", "Didi will beat you", etc.).

It was also seen that mothers with ED, when faced with infants' noncompliance, alternated between dropping their demands or persisting uncompromisingly. This pattern of coercive interaction resembles that found in studies of parents and their children with behaviour problems, in which parents vacillate between disengagement and angry outbursts. Thus, this pattern of interaction has implications for the infants' future behaviours.

One possible explanation for the difference between index and control group mothers is that perhaps the ED in the mothers may create less sensitivity to their infants' state, due to which they displayed severe behaviours, and persistently so, despite the infants' distress and/or noncompliance. That is, they may not have been able to appropriately perceive the infants' needs and thus did not allow them to play and/or behave as they wanted.

Likewise, mothers with ED made much less *effort* with their infants as compared to control mothers (see Table 4). Effort on part of mothers was operationalised in the present study as actively engaging their infants to maintain their attention and interest in the play. In general, both groups of mothers had a number of ways of engaging their infants, such as playing games, making noises or faces, or making their hands into a third object of focus for the infants. In fact, when the trend of the ratings is analysed, it can be

seen that index mothers were rated in the middle to higher range on this scale. This may be due to the possible tension in mothers' trying to show good performance in the videotaped task or may be due to actual effort put in by the mothers despite their own psychological state. However, overall mothers with ED displayed significantly fewer instances of effortful interaction with their infants, either to engage an avoidant infant or to maintain his interest. It may be that perhaps emotional distress leaves less energy with the mother to expend with her child or exhausts her easily. Or it may be that mothers with ED may put in less effort in interaction owing to their infants' negative behaviours.

Overall, hypothesis 1 stood supported. These results, especially those involving previously researched constructs, are in line with previous findings using clinical samples. For example, Whaley et al.'s behavioural data [18] suggest that anxious mothers are more controlling (similar to the construct of 'demanding' in the current study) in their interactions with their children as compared to non-anxious control mothers. Moreover, Woodruff-Borden et al. [19] also reported anxious parents in their study being significantly less productively engaged, and more withdrawn and disengaged (similar but not identical to the construct of 'no effort' in the present study), in their interactions with their children.

Similarly, studies of clinically depressed mothers have found reduced facilitation, rapport, and affective sharing with their children [20] as well as negative coercive behaviours, such as roughly pulling or poking at the infant [11] and intrusive behaviours [20].

That the differences in maternal behaviour persist despite absence of a clinical diagnosis in the present study is noteworthy, considering that ‘emotional disturbance’ as defined in the present study is a heterogeneous construct, one presumed to represent sub-clinical depression and anxiety. That it still appears to have a deleterious effect on a mother’s ability to interact with and respond to her child is significant. It may be that the parenting problems observed among the ED mothers in the present study may be associated with negative affectivity.

Conceptualising the parenting problems of mothers with ED in terms of disturbance in negative affect provides a useful theoretical model from which to interpret the results of the present study. ED (as operationalised using GHQ) is characterised by sad affect, anxiety, irritability, poor concentration, and reduced confidence to face difficulties. These negative affective states may account for the intrusive, demanding, and low effort behaviours the ED mothers displayed toward their infants in the present study.

These findings have implications for the infant’s future development. For example, the inability of emotionally disturbed mothers to provide a validating play environment to their infants has implications for the development of the infants’ sense of self. If an individual’s sense of events is never ‘correct’, such as when the parent is frequently intrusive and demanding, then it may interfere with the individual’s identity development. Infants of intrusive mothers might learn to avoid interactions to protect themselves from intrusion and may not develop capacity for autonomous self-regulation. These findings also have implications for planning interventions for mothers with ED. For example, one line of intervention efforts could be directed at teaching such mothers

how to appropriately elicit their child's attention and encouraging them to follow their child's lead during play.

Infant Behaviours

The second objective of the study was to assess the quality of infant behaviour in the context of maternal emotional disturbance. Despite the relative ability of the 1-2 year olds to initiate positive play interactions, it was found in the present study that infants of ED mothers displayed more negative or neutral interactional behaviours (see Table 5), and thus hypothesis 2 was largely supported. The infants of ED mothers were less *positively communicative* toward their mothers, that is, their interactional expressions (vocalising, making gestures, smiling, etc.) were muted and/or they displayed active communication for a significantly less amount of time as compared to controls, who played a more active role in regulating the ebb and flow of interaction with their mothers.

Infants of mothers with ED were also more *distressed* and much less happy (see Table 5), that is, they displayed significantly fewer positive vocalisations and smiles, and significantly more signs of distress, ranging from slight frown to full blown crying, as compared to infants of control mothers. These infants were also more *fretful*, that is, more likely to be angry and protesting in play interactions with their mothers. These findings resemble those of studies which show how simulated maternal depression (mothers invited to 'look depressed' for a few minutes during face-to-face interactions) immediately leads to disorganised, distressed infant behaviours [21]. The infants looked wary, averted their gaze, and protested (similar to the construct of 'fretful' in the present study) and became distressed.

One caveat of these findings is that due to the cross-sectional nature of the study, one cannot determine causality of the link between maternal psychopathology status and infant interactional behaviours, but its long term effect can be hypothesised. By making more demands of their infants, expecting them to behave in a certain way, and/or threatening them, and thereby preventing them from exploring the environment according to their own interest and interacting according to their own emotional state and needs, emotionally distressed mothers may influence the infants' perception of themselves and the world. If so, over the course of time, this may have an effect on their confidence to be themselves and to do things on their own as well as their approach to situations.

When results from the maternal and infant behavioural scales are analysed together, it is seen that mothers who are more likely to display intrusive and demanding behaviours and less likely to make effortful interactions have infants who display more distressed, fretful, and inert behaviours. For example, a study [1] confirmed that these factors may go hand in hand: maternal intrusiveness may elicit infant's avoidance which, in turn, may increase mother's intrusiveness. Infants of intrusive mothers tend to be classified as avoidantly attached, perhaps in an effort to control their level of arousal or in angry response to their mothers' inappropriate interactions [22]. The literature on mothers' simulated depression [21] and imitative behaviour [23] also shows that infants invariably change their behaviour when the adult's behaviour is modified, as if the infant's behaviour was very much affected by the 'mood state' or the type of behaviour displayed by the adult. Thus, as in the present study, the interactive behaviour of infants of poorly interacting mothers is significantly poorer compared to infants of mothers with good interactive behaviour. It

seems that not only are infants highly receptive to cues and signals from their mothers, they are also affected by them. The findings also highlight that maternal non-verbal behaviours are as important as verbal ones in interaction with their children.

The above analysis warrants special attention given the finding that some infants are able to a certain extent to improve the quality of the mother-infant interaction and maternal behaviour by their own actions and even elicit better responses from the mother. This is shown in a study [24] which reported that in studies on postnatal depression a repeated finding has been a group of mothers who in spite of depression were judged as 'good interaction partners'. When these mothers and their infants were examined, it was found that, although the mothers were in many respects (including biochemical and neurophysiological changes) similar to depressed intrusive or depressed withdrawn mothers, the infants had already shown more organised behaviour as neonates, right after birth. The researchers concluded that the more organised behaviour of the newborns may have contributed to the better interaction ratings of their depressed mothers.

However, given the findings of the present study, it may be assumed that keeping up the quality of interaction for an extended period of time is too demanding a task for an infant and in the course of time, unless the mother recovers, the effect of maternal psychological disturbance on maternal and infant behaviour will become evident.

Mother-infant interaction behaviours

A final objective of the study was to assess the quality of mother-infant interaction behaviours in the context of maternal emotional disturbance and based on the findings, hypothesis 3 found support. It was seen that mother-infant dyads in mothers with ED

displayed less or no *engagement* in common focus, as compared to control mother-infant dyads (see Table 6). That is, the index dyad displayed significantly fewer episodes of shared positive feelings and body play (e.g., mother and infant playing with her hands, infant responding with a smile to vocalisation, games, etc.). They also showed fewer episodes of focusing on the same toy by looking at it or acting on it. As compared to the interaction of control dyads, the interaction of dyads of disturbed mothers was also significantly more *serious*, i.e., showing less enjoyment, much less smiling, singing, and playing. They also very rarely achieved positive states together.

These findings are consistent with studies done using depressed mother-infant dyads, in which sharing of positive behaviour states was seen to be less frequent because of the mother's limited contingent responsivity and the dyad's limited mutual attentiveness. For example, a study [11] suggested that depressed mothers and their infants matched negative behaviour states more often and positive behaviour states less often than did the non-depressed dyads. The greater amount of time spent together in negative states (poke/protest/disengaged/look away) by the depressed mothers and their infants suggested a contagion effect of negative mood, and implied that the infants may be mirroring or mimicking their mothers' predominant mood states.

It was also seen in the present study that dyads in mothers with ED displayed interactions that were more *difficult* (with a distressed or avoidant infant whose mother was nervous or insensitive) as compared to dyads of non-disturbed mothers, whose interaction was smooth/easy (happy interaction with lots of communicative engagement). It was seen that the smoothness of interaction depended to a great extent on the mother's response and

level of anxiety, when faced with the infant's negative behaviour. The index mothers were seen to be either unsuccessful in their attempts to engage the infant or as exacerbating the infant's negativity.

Another significant finding obtained in the present study is that of the interaction between index dyads as being mutually *unsatisfying* as compared to that of control dyads (see Table 6). This means that not only were the episodes of engagement between ED mothers and their infants fewer, but they also ended badly. This was perhaps due to the shared negative affect between the dyad, with the infant distressed or avoidant and the mother disappointed or unable to reciprocate positively. This concept finds close association in prior research using clinically anxious samples of mothers, for example, with 'negative interaction' as in the Woodruff-Borden et al. study [18] and with 'general mood/atmosphere of the interaction' as in the Hudson and Rapee [25] study. However, in the present study, this construct was not specifically defined to include mutual discomfort and hostility, but referred to the general negativity in the mother-infant interaction, due to the less severe nature of maternal psychopathology.

Conclusions and Limitations

Overall, the results of this study suggest that the presence of ED in mothers is associated with overall less optimal mother-infant interactions. Presence of ED in mothers is associated with more negative or neutral maternal, infant, and interaction behaviours than in mothers without ED.

A major limitation of the study is its small sample size ($N=20$), though this is a pilot study and efforts for its replication with larger sample size are currently underway.

Assessing mother-infant interaction is difficult and the coding scheme designed for the purpose of this study may not have been sensitive enough to capture all the important aspects of this interaction. Also, infants' temperament and birth order were not considered; these variables could play a part in inducing or aggravating emotional disturbance in the mother.

It is planned that future research would take into consideration additional maternal variables likely to impact the mother-infant interaction, such as the quality of marital relationship, mother's own early experiences, duration of psychopathology, etc.

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