Cognitive correlates of sleepiness and fatigue in sleep-disrupted mothers of children aged under five years

Alison Wadeley - School of Society, Enterprise and Environment - Bath Spa University

Background

Sleep disruption in mothers due to their babies and young children is commonplace and could have serious deleterious consequences for everyday functioning, including cognition. A clearer understanding of how parents are affected by this could lead to more effective support for them, but there is very little systematic research in this area. Thematic analysis of Mumsnet Talk online discussion strings (Wadeley, 2014: Poster #511) revealed perceived effects on sleep disruption on cognition, e.g. deficits in everyday attention, memory, co-ordination and executive functioning. Some of these are potentially measurable and are suggestive of underlying neuropsychological mechanisms, such as:

- prefrontal cortex vulnerability to sleep disruption (Horne, 1993, 2012)
- sleep-related changes in attentional asymmetry or 'pseudoneglect' (Bowers and Heilman, 1980; Manly et al., 2005; Nicholls et al., 2007, 2008; Schmitz et al., 2011)

Research aims and predictions

Two studies aimed to explore correlations between sleep disruption and subjectively and objectively measurable aspects of everyday cognitive functioning in a community of Mumsnetters.

Predictions

**Study 1**
- Mothers' self-reported everyday attention, memory and executive functioning are associated with sleep disruption, sleepiness, fatigue and mood.
- Sleep disturbance, sleepiness and fatigue are associated with increases in clumsiness.

**Study 2**
- Detrimental effects of sleep disturbance, sleepiness and fatigue are greater in objective, cognitive tests demanding higher levels of executive functioning.

Methods

**Participants**

- Study 1: 163 healthy mothers (M, SD age = 34.47, 5.27 years) with at least one healthy child aged under 5 years recruited via Mumsnet, Netmums and local advertisements. Mothers and children had no formally diagnosed sleep problems and had spent the preceding week living together in their usual home. Several other inclusion/exclusion criteria were applied.

- Study 2: 20 advertised for and snowball-sampled mothers of under 5s, selected for being strongly right-handed and having successfully completed the Wisconsin Card Sorting Test (WCST).

**Measures**

- **Questionnaire survey** (Subjective measures)
  - 163 healthy mothers (M, SD age = 34.47, 5.27 years) with at least one healthy child aged under 5 years recruited via Mumsnet, Netmums and local advertisements. Mothers and children had no formally diagnosed sleep problems and had spent the preceding week living together in their usual home. Several other inclusion/exclusion criteria were applied.

- **Neuropsychological tests** (Objective measures)
  - Study 1: Online questionnaire on demographics, sleep needs and preferences and sleep experiences in the preceding week.
  - Study 2: Epworth Sleepiness Scale (ESS), Fatigue Assessment Scale (FAS), Fatigue Depression Distress inventory (ADDI).

**Results**

Sleep disruption and subjective self-report measures

- Mothers reported parenting-associated detrimental changes to their preferred sleep patterns in all respects except bedtime and ease of getting to sleep during the previous week.
- 80% were disturbed by under 5s as well as other family members (usually partners) 66% were disturbed by under 5s on 4–7 nights 55% were disturbed by under 5s alone (but some mothers only had under 5s)
- 16% had no sleep disturbance

Self-reported fatigue, sleepiness and disturbance were present in mothers in different combinations and had common and unique variance

Comparisons of mothers low vs. high on all three variables revealed significant increases in FAS, ESS, DIS, ARCES, MFS, DEX, ADDlgd, ADDIsa and ADDIpa, Anxiety Depression Distress Inventory general distress, somatic anxiety and positive affect.

Scores on Attention Related Cognitive Errors Scale (ARCES) and Memory Failures Scale (MFS) means (95% CI)

- Increased fatigue with mood predicted executive functioning problems
- Greater detrimental effects as cognitive tasks increase in executive complexity

Discourse and conclusions

Study 1 and 2

Mothers' perceptions of the cognitive effects of sleep disruption due to their children were corroborated by both subjective and objective measures

Fatigue, sleepiness and mood were strongly implicated in these effects

The effects suggest sleep-disruption-related changes in lateralised visual attention and greater detrimental effects as cognitive tasks increase in executive complexity

With thanks to Dr Alison Lee, Mumsnet, Netmums and all other participating Mums.

For further information contact a.wadeley@bathspa.ac.uk

References