Mother-child bed-sharing trajectories and psychiatric disorders at the age of 6 years

Iná S. Santos[a],[*], Aluísio JD Barros[a], Fernando C. Barros[a], Tiago N. Munhoz[a], Bianca Del Ponte Da Silva[a], Alicia Matijasevich[a],[b]

[a] Programa de Pós-graduação em Epidemiologia, Universidade Federal de Pelotas, Pelotas, RS, Brazil
[b] Departamento de Medicina Preventiva, Universidade de São Paulo, São Paulo, SP, Brazil

ABSTRACT

Background: Little is known about the effect of bed-sharing with the mother over the child mental health.
Methods: Population-based birth cohort conducted in Pelotas, Brazil. Children were enrolled at birth (n=4231) and followed-up at 3 months and at 1, 2, 4, and 6 years of age. Bed-sharing was defined as "habitual sharing of the bed between the child and the mother, for sleeping, for part of the night or the whole night". Trajectories of bed sharing between 3 months and 6 years of age were calculated. Mental health was assessed at the age of 6 years using the Development and Well-Being Assessment instrument that generates psychiatric diagnosis according to ICD-10 and DSM-IV criteria. Odds ratios (OR) with 95% confidence intervals were obtained by multivariate logistic regression.
Results: 3583 children were analyzed. Four trajectories were identified: non bed-sharers (44.4%), early-only (36.2%), late-onset (12.0%), and persistent bed-sharers (7.4%). In the adjusted analyses persistent bed-sharers were at increased odds of presenting any psychiatric disorder (OR=1.7; 1.2–2.5) and internalizing problems (OR=2.1; 1.4–3.1), as compared to non bed-sharers. Among the early-only bed-sharers OR for any psychiatric disorder was 1.4 (1.1–1.8) and for internalizing problems 1.6 (1.2–2.1).
Limitations: Although the effect of bed-sharing was adjusted for several covariates including the family socio-economic status, maternal mental health and excessive crying, there was no information on maternal personal reasons for bed-sharing. Mothers that bed-share intentionally and those that bed-share in reaction to a child sleep problem may have a different interpretation of their children behavior that may bias the study results.
Conclusion: Bed-sharing is a common practice in our setting and is associated with impaired child mental health at the age of six years.

1. Introduction

Sharing parents' bed in infancy and childhood is a common caring practice in several cultures (Mindell et al., 2010). Among the most widely reported factors associated with a greater prevalence of bed-sharing are socioeconomic factors like lower family income, lower maternal age, lower maternal education, and non-white skin color (Colson et al., 2013, Blair et al., 2010). Bed-sharing can be intentional or reactive. Intentional bed sharing refers to parents who intended to bed share and do so from early infancy onward (Cassels, 2013). Parents may bed-share with the child intentionally due to cultural beliefs, breastfeeding facilitation, parental ideology, parental own sleep experiences, convenience, anxiety, child safety, parent and child emotional needs, better infant sleep, unavailability of other beds, enjoyment, physical proximity to the infant, and better caregiving (Mileva-Seitz

et al., 2016). On the other hand, bed-sharing can be reactive in which the parent starts to bring the child to bed after the age of one year in response to problematic circumstances typically in response to bad sleeping patterns by the child (Mileva-Seitz et al., 2016, Cassels, 2013).

Systematic reviews focusing on harms and benefits of bed-sharing (Horsley et al., 2007, Das et al., 2014) reported a positive association between bed-sharing and increased duration of breastfeeding although the issue of causality (whether bed sharing promotes breastfeeding or whether breastfeeding promotes bed-sharing) remains unclear. Also, infants who bed-share have an increased number of awakenings when compared with solitary-sleeping infants, and individual awakenings are shorter in the bed-sharers than in the solitary sleepers (Horsley et al., 2007), suggesting an infant's ability to rouse that may be protective against sudden infant death syndrome. On the other hand, there may be association between bed-sharing and sudden infant death syndrome

among smokers (Horsley et al., 2007). The findings from two large case-control studies showed that bed-sharing is inappropriate if parents consume alcohol, take drugs or smoke, or if the infant is pre-term (Blair et al., 2014).

Studies reporting other harms or benefits of bed-sharing, like the risk of hospitalizations (Ngale et al., 2013), cognitive and behavioral problems (Barajas et al., 2011; Okami et al., 2002; Madansky and Edelbrock, 1990), psychiatric symptoms (Kaymaz et al., 2014), and psychosexual development (Jain et al., 2011) in offspring are scarce at the literature. This study aimed to describe bed-sharing trajectories from 3 months to 6 years of age and to investigate the association between bed-sharing trajectories and mental health at the age of 6 years among children from a population-based birth cohort. The primary hypothesis was that bed-sharing was associated with increased prevalence of mental symptoms at the age of 6 years.

2. Methods

This study was carried out in Pelotas, the third most populous city in the southern state of Rio Grande do Sul, located 270 km from Porto Alegre, the capital city of the state, and 130 km from the Uruguayan border. With an estimated population in 2015 of 342,873 inhabitants, the major economic activities of the municipality are agriculture, trade and services. The city has five universities, three private and two public (Prefeitura Municipal de Pelotas, 2016). Economically, when compared to the state of Rio Grande do Sul, the Pelotas region is relatively poorer. In 2012, its per capita GDP was equivalent to 65% of the state average (IBGE - Instituto Brasileiro de Geografia e Estatística, 2016b; SEPLAN - Secretaria do Planejamento, 2016). In terms of health, in 2013, the infant mortality rate in the state of Rio Grande do Sul and in Pelotas was 10.5 and 9.9 per thousand live births, respectively (IBGE - Instituto Brasileiro de Geografia e Estatística, 2016a, Secretaria Estadual da Saúde, 2016).

In 2004, a birth cohort study attempted to enroll all births to mothers resident in the urban area of Pelotas. Eligible mothers – those living in the urban area of Pelotas municipality and in the Jardim América neighborhood – were interviewed using a standardized, pre-coded questionnaire. Mothers were interviewed at the hospital (there were five hospitals with maternity ward in 2004 at the city) soon after delivery regarding demographic, socio-economic, behavioral and bio-logical characteristics, reproductive history, and health care services utilization. Non-hospital deliveries were also included in the cohort, since mothers normally sought a maternity ward after delivery, and were thus recruited to the study at this stage. The non-response rate at recruitment was below 1%. A total of 4231 live births were enrolled in the cohort. Follow-ups including the entire cohort sample were done at home at mean ages 3.0 ± 0.1, 11.9 ± 0.2, 23.9 ± 0.4 and 49.5 ± 1.7 months, and at a research clinic at 6.8 ± 0.3 years, with follow-up rates between 90% and 96%. Such a high retention rates are the result of concerted effort to collect contact information data from families, a process that was facilitated by the large expansion of telephone services, especially mobile phones in the country in the last years. A detailed description of the Pelotas 2004 Birth Cohort Study methodol-ogy is given elsewhere (Santos et al., 2014).

Bed-sharing was defined as 'habitual sharing of the bed between the child and the mother, for sleeping, for part of the night or the whole night'. A semi-parametric, group-based approach (a specialized form of finite mixture modelling designed to identify rather than assume groups or clusters of individuals following similarly developmental trajectories) (Nagin, 2005, Nagin and Tremblay, 1999) was used to identify the different patterns of bed-sharing reported by mothers from 3-month until the 6-year follow-up. A polynomial function was used to model the relationship between bed-sharing and age (Nagin and Tremblay, 1999, Nagin, 2005, Nagin and Odgers, 2010). The models were estimated with the Stata procedure "traj" (Jones and Nagin, 2012). A logistic model was fitted to the data. The choice of the number

and shape of trajectories was based not only on the best fit of the model (maximum Bayesian information criteria - BIC) but also on the interpretability of the trajectories obtained (Nagin, 2005).

Multinomial logit models were estimated, relating maternal group membership to predictor variables (maternal socio-demographic and behavioral variables and child´s characteristics), so that the para-meters defining the trajectories and the probabilities of trajectory membership were estimated jointly (Nagin, 2005). Individuals with missing information were not excluded from the model due to the ability of group-based trajectory modelling of handling missing data using maximum likelihood estimation (Nagin, 2005).

At the six-year follow-up children were assessed using the Development and Well-Being Assessment (DAWBA) (Goodman et al., 2000), an instrument designed to generate psychiatric diagnosis according to ICD-10 (World Health Organization, 1993) and DSM-IV (American Psychiatric Association, 1994) criteria for ages 5–17 years. The instrument was validated in the Brazilian population (Fleitlich-Bilyk and Goodman, 2004). Trained psychologists administered the DAWBA to mothers or caregivers. The test applied included 12 full sections: separation anxiety disorder, specific phobia, social phobia, generalized anxiety disorder, posttraumatic stress disorder, panic disorder and agoraphobia, obsessive-compulsive disorder, attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder, conduct disorder, eating disorders, and tic disorders. In addition, five screening questions of a previous version of the DAWBA development section were utilized. If any of those were positive, the open questions about development were also asked. Two experienced child psychia-trists reviewed the questionnaires for each child (including free text comments made by respondents) and decided whether to accept or overturn the computer-generated diagnoses. Externalizing disorders included oppositional defiant disorder, conduct disorder and any ADHD, including hyperactive, inattentive and combined sub-types and ADHD not otherwise specified. Internalizing disorders included diagnoses of anxiety and depression.

Family income in the month prior to delivery was collected as a continuous variable in Brazilian Real (BRL). Maternal schooling at the time of delivery was recorded as the number of completed school years of formal education. Maternal age was recorded in complete years. Women who were single, widowed, divorced, or lived without a partner were classified as single mothers. Mother's skin color was self-reported and categorized as white or black/mixed. Parity was defined as the number of previous viable pregnancies and categorized as < 2 and ≥2. Maternal depression during pregnancy was defined as "present" if the mother answered positively to question *"During pregnancy, did you feel depressed or have any nervous condition? "*. Maternal smoking behavior during pregnancy was assessed retrospectively at birth and was self-reported. Regular smokers were those women who smoked at least one cigarette per day on an everyday basis in any trimester of pregnancy. Type of delivery was classified as vaginal or caesarean section.

Birth weight was measured by hospital staff with 10-g precision pediatric scales that were regularly calibrated by the research team. Births below 2500 g were classified as low birthweight. Estimates of gestational age were based on the last menstrual period (LMP) providing they were consistent with predicted birth weight, length, and head circumference, based on the normal curves for these parameters for each week of gestational age (Fenton, 2003). If LMP-based gestational age was unknown or inconsistent, the clinical maturity estimate based on the Dubowitz method (Dubowitz et al., 1970), which was performed on almost all newborns, was adopted. Births before the 37th week of pregnancy were classified as preterm. The type of hospital admission for the newborn after birth was classified as "together with the mother" and "intermediate or intensive care". At the 3-month follow-up, information on current pattern of breast feeding was collected: exclusive breast feeding, predominant breast feeding (breast milk and herbal teas or water), partial breast