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Nonparental care and infant health: Do number of hours and number of concurrent arrangements matter?

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ABSTRACT

Objectives: Previous research found that centre-based childcare is related to more illnesses early in life. The goal of this longitudinal study is to determine whether infant health in the first year of life is also related to the amount of time spent in non-parental care and the number of concurrent non-parental care arrangements.
Methods: Information on infant health and non-parental care was obtained through monthly maternal interviews across the first year of life. The occurences of respiratory, digestive, general, and skin illnesses and complaints were used as dependent variables, while the number of hours and the number of arrangements per week were used as predictors. Analyses were done separately in infants for whom centre-based childcare is included in their arrangements ($n=107$), and for those which it is not ($n=61$).
Results: Infants spending more hours in non-parental care had more respiratory and general illnesses. Infants who were cared for in more concurrent arrangements had fewer respiratory and general, but more skin illnesses. These results only applied to infants that included centre-based childcare in their arrangements. In the group of infants that did not attend centre-based childcare, health was not related to either the number of hours or the number of arrangements.
Conclusions: Number of hours and number of arrangements do matter in relation to infant health early in life, but only for infants who attend centre-based childcare. While more hours were related to more illnesses, more arrangements were related to both fewer and more illnesses, depending on the type of illnesses.

1. Introduction

Previous research consistently found that children who attend centre-based childcare experience more communicable illnesses, like respiratory illnesses, otitis media and diarrhea [1–16]. These differences in morbidity are particularly large in children under 2 years of age [5–8,10,17,18]. However, studies about the influence of the amount of time spent in non-parental care on children's illnesses have been few and less consistent. While some studies found that the likelihood of acquiring illnesses increases with the number of hours spent in non-parental childcare [19,20], the large NICHD study found little evidence that the number of hours of childcare per week resulted in an increased illness rate [3]. However, this finding may have emerged because there was little variability in hours of attendance, as the majority of children in this study spent more than 20 h per week in childcare [3].

Furthermore, research looking at whether children's health status is affected by the number of concurrent care arrangements is lacking. Number of concurrent care arrangements, also known as arrangement multiplicity, is the number of separate non-parental care arrangements a child regularly experiences during a single day or week. Prior research already showed that children attending more concurrent arrangements have more behavioral problems [22–24], but it is also important to understand the role of number of non-parental care arrangements in infant health, especially since a considerable number of infants experience these changes in arrangements day by day [24]. The number of concurrent care arrangements is often confounded with the number of changes in care arrangements over time, also known as long-term stability of care arrangements [24]. Extensive research related long-term stability to negative developmental outcomes, including behavior and health problems [24,25]. For instance, the risk of acute respiratory infections was shown to be the highest within the first period of enrollment into a new childcare arrangement, and increased again with a shift to a new childcare facility [18].

The present study focuses on the number of regular concurrent care arrangements. Moving among different settings exposes an infant to different environments with varied household products and chemicals, which in turn may lead to respiratory illnesses and allergies [26,27]. In addition, moving among different settings may be a stressful experience for children. Unpredictable, irregular transitions may be especially stressful, but even if regular daily or weekly transitions between arrangements can quickly become routine for parents and caregivers, moving among care settings

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could be burdening for infants. Frequent transitions may delay or prevent the adjustment to the different care situations and the formation of dietary and sleep routines, which in turn could contribute to increased health problems [21].

Transitions between different care settings can be particularly burdening if these settings differ in group size, routine and physical setting [24]. While some non-parental care arrangements resemble the home-setting more (for instance care by grandparents), centre-based childcare is characterized by larger group sizes, higher levels of noise, multiple caregivers, and very different routines and physical settings. Previous research has already shown that infants exhibit higher levels of the stress hormone cortisol on days when they are at centre-based childcare compared with days when they are at home [29–32]. This could be indicating that centre-based childcare constitutes a possible challenge for infants. Therefore, and also because it is well-known that centre-based childcare is related to more illnesses early in life [1–18], the number of hours and the number of concurrent care arrangements could potentially have different effects for infants attending centre-based childcare in comparison to infants not attending centre-based childcare. Therefore, the group of infants for whom centre-based childcare is included in their 'package' of care arrangements was examined separately from the group of infants for whom centre-based childcare is not included.

The goal of the present longitudinal study is to determine whether more hours spent in non-parental care, and more concurrent care arrangements, are related to more infant illnesses and health complaints during the first year of life. The infants in the present study were followed monthly, from birth until the age of 12 months. This has the advantage of making it possible to obtain a full array of arrangements and hours, and to obtain robust measures of infant health during the first months in non-parental care. Moreover, our study focused on a broad spectrum of infant illnesses and health complaints, including respiratory, digestive, general, and skin illnesses and complaints.

2. Methods

2.1. Participants

This study is part of an ongoing prospective longitudinal project that investigates the influences of maternal and caregiving factors on the behavioral development and physical health of children during their first years of life. The subjects were healthy infants living in the Netherlands, whose mothers were recruited during pregnancy through midwife practices in the cities of Nijmegen, Arnhem and surrounding areas. The study was approved by the faculty ethical committee and informed consent was obtained from each mother before starting. Of the 220 women that enrolled in the study, 8 were excluded because of medical reasons, such as major birth complications. Of the remaining 212 mothers, a further 19 discontinued the study during the first 3 postpartum months, due to lack of time or other personal circumstances. This resulted in a final sample of 193 infants. No differences in demographic data were found between participating mothers and those that dropped out ($n = 19$).

Most women lived with their partner, either in wedlock or unmarried (96.9%), and were born in the Netherlands (95.8%). Furthermore, 60% of the mothers professed the Christian religion while 40% were non-religious. All mothers had normal, uncomplicated pregnancies and term deliveries (>37 weeks). The infants had normal 5-min. Apgar scores ($M = 9.6$, $SD = 0.6$, $min = 7$, $max = 10$), and none of the infants experienced major birth complications.

2.2. Procedure

In the first year of life, information on the frequency of infant illnesses and health complaints was obtained through monthly maternal interviews (3 in person, 9 by phone). These maternal interviews also provided information about the type of non-parental care used, the amount of time the child spent in non-parental care, the number of concurrent arrangements, and the type of feeding (bottle or breast). Additional information on mother and infant was obtained with questionnaires filled in during the last trimester of pregnancy, immediately after birth or postnatally at 3, 6 and 9 months.

2.3. Infant health

Mothers reported on their infant's health during the previous month in semi-structured interviews conducted at monthly intervals. With the aim of aiding their memory and of increasing the objectivity of the scoring, the interview also contained a checklist consisting of 24 yes-or-no items listing common infant illnesses and health complaints. Subsequently, the infant health data were coded with the International Classification of Primary Care (ICPC [32]). The ICPC is an ordering principle labeling illnesses and health complaints in classes according to established criteria, and is widely used both in daily family practice and in research [33]. Finally, the occurrence of illnesses and complaints were summed up per month. Because of low incidence of ear- and eye-related illnesses and complaints, these were added to general illnesses and complaints. The following variables were used as dependent variables: respiratory, digestive, general and skin illnesses and complaints.

2.4. Non-parental care predictors

During the semi-structured interviews, mothers were also asked to list the concurrent non-parental care arrangements and the hours per week the child spent in each arrangement. Non-parental care was defined as any type of care by caregivers other than the parents for at least 4 h per week, and lasting for at least one month. This criterion was chosen because we aimed to assess the more regular non-parental care arrangements; fewer hours and/or a shorter period of care could be due to incidental care by others. Nine types of non-parental care arrangements were distinguished: centre-based childcare, care in the child's home by a non-relative, care by a non-relative elsewhere (i.e., a child care home), four types of care by grandparents (care by maternal grandparents in the child's home, care by maternal grandparents elsewhere, care by paternal grandparents in the child's home, care by paternal grandparents elsewhere), and two types of care by a relative other than the grandparents (care by relative in the child's home, care by relative elsewhere). For each month, the total hours per week, and the number of non-parental care arrangements per week, were summed up.

2.5. Potential covariates

Adjustments were made for the following covariates: maternal educational level, maternal native country, maternal religion, pregnancy smoking (yes or no), alcohol ingestion during pregnancy (yes or no), birth weight, sex, breastfeeding and number of siblings. Furthermore, to control for maternal postnatal depression and maternal daily hassles, the Edinburgh Postnatal Depression Scale (EPDS [34]) and the Everyday Problem Checklist (EPCL [35]) were assessed at 3-months, 6-months and 12-months postpartum. Because of strong inter-correlations (r's ranging from .52 to .62, and from .51-.61 respectively, all p-values <0.01), mean depression and daily hassles scores were calculated. Finally, a covariate was included to control for the number of trimesters an infant attended centre-based childcare.