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Determinants of Exclusive and Mixed Breastfeeding Durations and Risk of Recurrent Illnesses in Toddlers Attending Day Care Programs Across Lebanon

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ABSTRACT

Purpose: Breastfeeding rates continue to decrease in Lebanon. Studies addressing the relationship between breastfeeding duration and health outcomes in Middle Eastern countries are scarce.
This study is the first in Lebanon to have investigated the determinants of both exclusive and mixed breastfeeding durations and the relationship with health in infants and toddlers.
Design and methods: Our sample of 1051 toddlers is nationwide and representative of all toddlers enrolled in daycare centers, and aged between 12 and 36 months.
Results: Median of exclusive breastfeeding duration was 15 days and mean age of formula introduction was 2.03 (±3.22) months. Exclusive breastfeeding was initiated at a mean age of 10.56 (±27.12) hours and half of the toddlers (51.6%) were exposed to formula milk since day one following birth. Determinants of both exclusive and total breastfeeding durations were related to several parents' socio-demographic and behavioral factors. A longer duration of exclusive breastfeeding was associated with a lower frequency of pediatrician visits, antibiotic prescriptions, absence from daycare, and a lower risk of otitis, colic and UTI occurrence, after adjusting for cofounders. Similarly, a longer duration of total breastfeeding was associated with less antibiotic prescriptions and a lower risk of otitis.
Conclusions: Our study highlights the health benefits of extending exclusive breastfeeding duration. It is urgent to address alarmingly low breastfeeding rates in Lebanon. Policy implementation and enforcement along with raising awareness and creating a supportive environment for breastfeeding mothers should involve the various stakeholders in order to succeed in increasing breastfeeding rates and duration.

Introduction

Breastfeeding (BF) rates continue to decrease dramatically in Lebanon (Batal, Boulghourjian, & Akik, 2010; Nabulsi et al., 2014). The Ministry of Health has developed various policies in an attempt to address the disappointingly low rates; however numerous barriers to implementation and enforcement of those BF protection policies have been recently identified (Akik, Ghattas, Filteau, & Knai, 2017). In fact, despite the benefits of BF on infants, toddlers, mothers and the community at large, Batal and Boulghaurjian (2005) report that newborns are being given either glucose-water or formula, instead of breast milk as the initial feeding practice, thus delaying BF initiation post-delivery, with 61.2% of mothers starting BF after six hours. (Batal & Boulghaurjian, 2005). A national survey conducted in 2004 reported that only 18% of mothers breastfed within the recommended 30 min after delivery (Hamade, Chaaya, Saliba, Chaaban, & Osman, 2013). Research has revealed that 83% of hospitals and 90% of maternity clinics in Lebanon did not allow the mother to spend the first 24 h with her newborn, potentially contributing to the delay in BF initiation (Batal & Boulghaurjian, 2005). Furthermore, while up to 89% of infants were ever breastfed, only 24% of infants below four months were exclusively breastfed (Tetulian, Khayyat, & Abdel Monem, 2007), and 14.8% were exclusively breastfed up to six months (United Nations International Children's Emergency Fund, 2013). It should be noted that these studies might not have accounted for fluids intake like water while BF and thus those figures on exclusive BF durations in Lebanon might have been incorrectly reported. Yet inflated, those figures still highlight the

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alarmingly low rates at the recommended 6 months of exclusive BF (World Health Organization, 2009), when compared to the estimated average exclusive BF rate of 30% at 6 months for infants around the globe, in the same country income group (middle-income), as Lebanon (Victoria et al., 2016). Current literature lacks nationwide studies addressing the determinants of BF duration and its possible relationship with health outcomes in infants and toddlers in a developing country, while strictly applying the WHO definition of exclusive BF (World Health Organization, 2009).

Moreover, the Middle-East region has been largely underrepresented in BF-related research until recent years, and findings from studies conducted in high-income and low-income countries on the determinants of BF duration and the relationship with health outcomes may not be applicable to a middle-income country like Lebanon. Studies on BF in Lebanon were mostly descriptive and have reported data on BF initiation (Batal & Boulghaurjian, 2005; Hamade et al., 2013; Osman, El Zein, & Wick, 2009), duration (Batal & Boulghaurjian, 2005), determining factors (Al-Sahab et al., 2008; Hamade et al., 2013; Nabulsi, 2011), weaning age as well as the sequence of foods introduced during the complementary feeding phase (Batal et al., 2010; Batal & Boulghaurjian, 2005).

The aim of this study was to investigate the determinants of both exclusive and mixed BF durations and the relationship with health outcomes in a representative sample of infants and toddlers, aged between 12 and 36 months, attending day care programs across Lebanon.

Methods

Study design

The following study has a retrospective and cross-sectional design. Data were collected between February 2016 and April 2016, using a survey that was administered to mothers of toddlers enrolled in daycare centers across all Lebanese regions. This nationwide sample was representative of all toddlers, aged between 12 and 36 months, attending day care programs in Lebanon.

Ethical considerations

The Lebanese University Institutional Review Board (IRB) waived the need for an approval since it is an observational study that respected anonymity and confidentiality of its participants. Each participant received a full disclosure of the nature and purpose of the study, was reassured of the confidentiality and anonymity of the data, and was given the opportunity to ask questions. A written informed consent was signed by each participant willing to participate in the study.

Survey design

Questionnaires were self-administered and preceded by a cover letter and a consent form to be signed by the mother responsible of filling the questionnaire. The survey questionnaire was developed by one Professor in Nutrition epidemiology, two dieticians and a breastfeeding counsellor and specialist and was based on previous similar studies undergone in Lebanon (Al-Sahab et al., 2008; Batal, Boulghourjian, Abdallah, & Afifi, 2006; Hamade et al., 2013). It had already been administered, tested and validated in a pilot study on a sample of 222 mothers who had attended at least one educational session on breastfeeding with a breastfeeding counsellor and specialist in Lebanon between the years 2011 and 2014, in Beirut, Lebanon (unpublished work). The questionnaire included five sections. The first was about the toddler (i.e. gender, date of birth, weight and height at birth, type of delivery, delivery week and order of the baby). The second included socio-demographic characteristics of each parent (i.e. place of residence, education, religion, income per person and employment status). The third gathered information about unhealthy behaviour during pregnancy and lactation (i.e. smoking, alcohol intake and caffeine intake) and about the time of BF initiation, duration of exclusive BF and total duration of BF. This section also inquired about the source of help in BF for the mother (i.e. pediatrician, midwife, nurse BF counsellor, family or friend). Section four was about complementary feeding practices (i.e. timing and types of fluids (including formula) and foods first introduced). Section five was about toddler's health from birth until 36 months: frequency of pediatrician visits, antibiotic prescriptions, absence from day-care, and frequency of recurrent health complaints in infants and toddlers (i.e. digestive problems, respiratory tract infections, otitis, urinary tract infections-UTI and thrush).

Sampling and data collection

The target population was toddlers aged between 12 and 36 months attending day care programs across Lebanon, a country divided into six districts. A representative sample of 79 daycares (25%) was randomly selected from the updated list of all licensed daycares ($n = 314$) across all the Lebanese regions imported from the Lebanese Ministry of Public Health's website. Among the 79 selected daycares, the seven that were closed and the two that refused to participate were replaced by the next daycare on the list. Interviews were conducted by two dieticians, one midwife and one nurse trained in standard data collection techniques and they ensured that all sections of the questionnaires were completed. Interviewers met one of the parents (mother or father) or the caregiver either in the morning while dropping off their toddlers or in the afternoon while picking them up. They explained the study and its aims, then distributed the questionnaires and asked parents or caregivers to have them completed by the mother, and returned to the daycare coordinator a week later. The parents were free to contact the investigators anytime for more information or not to participate in the study. Interviewers also made sure that all the toddlers aged between 12 and 36 months and attending a given day care program received the questionnaire, thus ensuring representativeness of the sample for all toddlers attending day care programs in Lebanon. The selected daycares had a total of 1830 toddlers aged between 12 and 36 months. Among them, only 19 parents refused to participate. A total of 1226 questionnaires were returned out of the 1811 originally distributed, which represented a participation rate of 67%. After excluding siblings and twins as well as children who did not meet the age inclusion criterion, among the returned questionnaires, 1051 participants were included in the study.

Variables

Exclusive breastfeeding is defined by the World Health Organization (WHO) as “no other food or drink, not even water, except breast milk” (World Health Organization, 2001). Therefore, the duration of *exclusive breastfeeding* (BF) was obtained by comparing between the ages of introduction of formula, first fluids (i.e. water, herbal teas, orange blossom water, sweetened water), and first solids, and using the minimum age of all these introductions. Duration of *total breastfeeding* (BF) is the total period while the toddler received breast milk, including before, during and after the introduction of formula, first fluids, and first solids.

The frequency of the different health indicators and recurrent illnesses was obtained by calculating the total number of occurrences across all age brackets (i.e. 0 to 3 months, 4 to 6 months, 7 to 12 months, 13 to 18 months, 19 to 24 months, 25 to 30 months, 31 to 36 months) and dividing it by the toddler's age in months to obtain the following frequencies: pediatrician visits (excluding vaccinations) antibiotic prescriptions, digestive affections (i.e. vomiting, constipation, diarrhea and colic), respiratory tract infections (i.e. tonsillitis, rhinitis, pharyngitis, bronchitis, and pneumonia), and other recurrent health complaints in infants and toddlers (i.e. otitis, UTI and thrush). The

frequency of absence from day-care was calculated by dividing the total number of hours of absence from day-care by the total number of hours spent at day-care from birth until 36 months.

All health indicators variables were tested for normality. Then, frequency of antibiotic prescriptions, pediatrician visits and absence from daycare were dichotomised according to their medians, while recurrent illnesses variables were dichotomised according to whether they were reported to have occurred at least once in the first 36 months of life or not.

Statistical analysis

Analysis was performed using SPSS (v. 21.0). Descriptive analysis was used to summarize the study variables and to check for outliers. Categorical variables were described using frequencies and percentages, while means and standard deviations were used for continuous variables. In the univariate analysis, independent *t*-tests were used to compare means, Pearson correlations to find associations between continuous dependent and independent variables, and chi-square tests to compare percentages of dichotomous variables.

Multivariate regression analysis was performed with each health indicator or recurrent illness as a dependent variable and the duration of exclusive or total BF as an independent variable in separate logistic regression models. All independent variables with $p < 0.2$ were entered as potential confounders, when the number of cases allowed it (Bouyer et al., 1995). A p-value of <0.05 was considered significant.

Results

Socio-demographic and behavioral characteristics of study participants and their parents

One thousand and fifty-one surveys were collected representative of toddlers between the ages of 12 to 36 months attending day care programs across Lebanon. The mean age of toddlers was 26.93 (±6.18) months, almost equally distributed between boys (52.1%) and girls (47.9%) with almost half of them (48.2%) being the eldest. Delivery was by Cesarean section in as much as 47.6% of women, and only 13.8% of babies were born preterm. Concerning the mothers, their mean age was 31.93 (±4.76) years. The majority of the mothers and fathers had a university level of education (79.0% and 63.8% respectively), with only a minority in a health-related field (18.7% for mothers and 8.3% for fathers). More than half of the sample (52.7%) resided in Mount Lebanon and 26% in Beirut and its suburbs with 56.2% of mothers being Christian and 33.6% being Muslim. Household monthly income exceeded $1000 (1,500,000LBP) for 61.8% of the sample. Only 3.3% of mothers smoked cigarettes during pregnancy and 3% during lactation, 4.6% smoked a waterpipe during pregnancy and lactation, 1.6% consumed alcohol during pregnancy and 1% during lactation, and 52.6% consumed caffeine during pregnancy and 49.3% during lactation. Only 6.6% of mothers received counseling from a lactation consultant, 24.7% did not receive any help. Detailed socio-demographic and behavioral characteristics of the sample are presented in Table 1.

Formula feeding practices and exclusive and total breastfeeding rates and durations

This representative survey of toddlers attending day care programs all over Lebanon shows that the mean age of formula introduction was 2.03 (±3.22) months, and that half of the toddlers (51.6%) were exposed to formula milk the first day after birth, with 6.76% who ended up being never breastfed. Only a minority (3.4%) never received formula, while it was already introduced to more than the half (55.7%) during the first 30 days of life (data not shown). The median of exclusive BF duration was 0.5 months (15 days) and coincided with the median age of formula milk introduction. Exclusive BF was initiated at a mean age of 10.56 (±27.12) hours with a median of 1.92 h post-delivery (data not shown). The mean duration of total BF was 4.97 (±5.08) months with a median of 3 months, and that of exclusive BF was 1.53 (±1.88) months with a median of 0.5 months (15 days). Table 2 summarizes exclusive and total BF rates and durations.

Prevalence of recurrent illnesses from birth until 36 months

Recurrent illnesses that have occurred at least once between birth and 36 months were reported. The most reported digestive complaints were diarrhea in 60.6% of toddlers ($n = 637$) and colic in 53.8% of toddlers ($n = 565$) followed by vomiting in 52.7% of toddlers ($n = 554$) and constipation in 38.9% of toddlers ($n = 409$). As of infections, up to 36.7% of mothers reported otitis ($n = 386$) to have occurred at least once between birth and 36 months, 31.7% for tonsilitis ($n = 333$) and only 7.5% for UTI ($n = 79$).

Determinants of both exclusive and total breastfeeding durations

Longer durations of exclusive and total BF were significantly associated with several socio-demographic and behavioral factors of parents that are summarized in Table 3. Birth-related conditions like natural delivery (1.81 ± 1.94), pre-term birth (1.81 ± 1.94), and being the eldest (1.72 ± 1.94) were associated with a longer duration of exclusive BF than delivery by C-section or induced labor (1.31 ± 1.80) ($p < 0.0001$), being born at term (1.31 ± 1.80) ($p < 0.0001$) and not being the eldest (1.33 ± 1.79) ($p = 0.001$), respectively. Socio-demographic determinants of a longer duration of exclusive BF included a university degree level for the father (1.62 ± 1.90) and a health-related degree field for the mother (1.85 ± 2.07) vs.no university degree for the father (1.36 ± 1.83) ($p = 0.036$) and a non-health related degree field for the mother (1.48 ± 1.84) ($p = 0.030$), respectively. Socio-demographic determinants of a longer duration of total BF included not residing in Mount-Lebanon (5.35 ± 5.53) and being Muslim (6.04 ± 5.69) vs. residing in Mount-Lebanon (4.62 ± 4.60) and being Christian (4.05 ± 4.15), respectively ($p < 0.0001$). Cigarette smoking during pregnancy and lactation determined shorter durations of both exclusive and total BF. For mothers who smoked during pregnancy, they had shorter durations of both exclusive (0.74 ± 1.15) and total BF (2.91 ± 2.50) than those who did not smoke (1.56 ± 1.89) ($p = 0.001$) and (5.04 ± 5.13) ($p < 0.0001$), respectively. Same applies to those who smoked during lactation, with shorter durations of both exclusive (0.94 ± 1.30) and total breastfeeding (2.99 ± 2.45) ($p < 0.0001$) than those who did not smoke (1.55 ± 1.89) ($p = 0.020$) and (5.03 ± 5.13) ($p < 0.0001$), respectively. Interestingly, mothers who consumed alcohol exclusively breastfed for longer periods (2.66 ± 1.71) than those who did not consume alcohol during lactation (1.52 ± 1.88) ($p = 0.045$), whereas those who consumed caffeine during pregnancy, exclusively breastfed for shorter periods. (1.37 ± 1.83) than those who did not (1.71 ± 1.92) ($p = 0.006$). A longer duration of total BF was determined by both water pipe smoking (6.60 ± 6.35) and caffeine consumption (5.32 ± 5.66) vs. no water pipe smoking (4.89 ± 5.00) ($p = 0.027$) and no caffeine consumption during lactation (4.62 ± 4.38) ($p = 0.031$), respectively. On one hand, getting help with BF from a lactation consultant determined a longer duration of both exclusive (2.58 ± 2.36) and total BF (7.06 ± 6.24). Mothers who did not get help with BF from a lactation consultant had shorter durations of both exclusive (1.45 ± 1.81) ($p < 0.0001$) and total BF (4.82 ± 4.95) ($p = 0.005$). Getting help from a pediatrician (7.14 ± 5.80) or a friend (10.48 ± 8.58) determined a longer duration of total BF than not getting help from neither a pediatrician (4.67 ± 4.90) ($p < 0.0001$) nor a friend (4.85 ± 4.91) ($p = 0.006$), respectively. On the other hand, getting help from a nurse determined shorter durations of both exclusive BF (1.33 ± 1.75) and total BF (3.90 ± 3.88) vs. not getting help from a nurse (1.62 ± 1.93) and (5.47 ± 5.47) ($p < 0.0001$), respectively. Also getting help from a family member determined a shorter duration of total BF (1.26 ± 1.68) vs. not getting

Table 1
Socio-demographic and behavioral characteristics of participants and their parents.

Variables (continuous)	Mean	SD[a]	Minimum	Maximum
Baby's age (months)	26.93	6.18	12.09	35.94
Baby's weight at birth (kg)	3.16	0.45	1.25	5.80
Baby's height at birth (cm)	50.19	2.69	32.00	62.00
Mother's age (years)	31.93	4.76	17.72	51.89
Maternity leave (days)	59.72	45.52	2	730
People number in household	3.75	0.852	1	7
Income per person (LBP)	926,006.55	493,108.65	45,000.00	5,000,000.00

Variables (discontinuous)	Frequency (%)	95% CI[b]
Baby's gender (n = 1051)		
Boy	548 (52.1)	(49.1; 55.2)
Girl	503 (47.9)	(49.1; 55.2)
Delivery type (n = 1050)		
Normal delivery	467 (44.5)	(41.5; 47.5)
Caesarian section	500 (47.6)	(44.6; 50.6)
Induced labor	83 (7.9)	(6.3; 9.5)
Delivery week (n = 1034)		
Week 36 or before	143 (13.8)	(11.7; 15.9)
Week 37 or 38	551 (53.3)	(50.2; 56.3)
Week 39 or more	340 (32.9)	(30.0; 35.7)
Multiple births (n = 1035)		
Yes	64 (6.2)	(4.7; 7.7)
No	971 (93.8)	(92.3; 95.3)
Baby's order (n = 1046)		
First	504 (48.2)	(45.2; 51.2)
Second	411 (39.3)	(36.3; 42.3)
Third or more	131 (12.5)	(10.5; 14.5)
Place of residence (n = 1049)		
Beirut	170 (16.2)	(14.0; 18.4)
Beirut suburbs	103 (9.8)	(8.0; 11.6)
Mount Lebanon	553 (52.7)	(49.7; 55.7)
North Lebanon	101 (9.6)	(7.8; 11.4)
Beqaa	58 (5.5)	(4.1; 6.9)
South Lebanon	61 (5.8)	(4.4; 7.2)
Other	3 (0.3)	(0; 0.83)
Marital status (n = 1049)		
Single	4 (0.4)	(0; 0.97)
Married	1032 (98.4)	(97.6; 99.1)
Divorced	7 (0.7)	(0; 1.3)
Separated	1 (0.1)	(0; 0.53)
Widowed	2 (0.2)	(0; 0.69)
Prefer not to answer	3 (0.3)	(0; 0.83)
Mother's education level (n = 1050)		
Illiterate	0 (0)	(0; 0.35)
Complementary[c]	16 (1.5)	(0.8; 2.3)
Secondary[d]	102 (9.7)	(7.9; 11.5)
University level	829 (79.0)	(76.5; 81.4)
Technical degree	103 (9.8)	(8.0; 11.6)
Father's education level (n = 1046)		
Illiterate	4 (0.4)	(0; 0.98)
Complementary[c]	73 (7.0)	(5.4; 8.5)
Secondary[d]	139 (13.3)	(11.2; 15.3)
University level	667 (63.8)	(60.9; 66.7)
Technical degree	163 (15.6)	(13.4; 17.8)
Mother's degree field (n = 1004)		
Health-related degree	188 (18.7)	(16.3; 21.1)
Non health-related degree	612 (61.0)	(57.9; 64.0)
Not applicable	204 (20.3)	(17.8; 22.8)
Father's degree field (n = 998)		
Health-related degree	83 (8.3)	(6.6; 10.0)
Non health-related degree	663 (66.4)	(63.5; 69.4)
Not applicable	252 (25.3)	(22.6; 27.9)
Mother's nationality (n = 1050)		
Lebanese	1003 (95.5)	(94.3; 96.8)
Non-Lebanese	47 (4.5)	(3.2; 5.7)
Father's nationality (n = 1048)		
Lebanese	1014 (96.8)	(95.7; 97.8)
Non-Lebanese	34 (3.2)	(2.2; 4.3)
Mother's employment status (n = 1050)		
Currently studying	22 (2.1)	(1.2; 3.0)
Part-time	215 (20.5)	(18.0; 22.9)
Full-time	545 (51.9)	(48.9; 54.9)
Self-employed	103 (9.8)	(8.0; 11.6)
Housewife	165 (15.7)	(13.5; 17.9)

(continued on next page)

Table 1 (*continued*)

Variables (discontinuous)	Frequency (%)	95% CI[b]
Father's employment status ($n = 1045$)		
Currently studying	2 (0.2)	(0; 0.69)
Part-time	30 (2.9)	(1.9; 3.9)
Full-time	684 (65.5)	(62.6; 68.3)
Self-employed	324 (31.0)	(28.2; 33.8)
Unemployed	5 (0.5)	(0; 1.11)
Mother's religion ($n = 1047$)		
Christian	593 (56.6)	(53.6; 59.6)
Druze	39 (3.7)	(2.6; 4.9)
Muslim	352 (33.6)	(30.8; 36.5)
Prefer not to answer	62 (5.9)	(4.5; 7.4)
Other	1 (0.1)	(0; 0.53)
Father's religion ($n = 1044$)		
Christian	587 (56.2)	(53.2; 59.2)
Druze	39 (3.7)	(2.6; 4.9)
Muslim	356 (34.1)	(21.9; 27.1)
Prefer not to answer	61 (5.8)	(4.4; 7.3)
Other	1 (0.1)	(0; 0.53)
Monthly household income ($n = 1042$)		
< 550,000LBP	6 (0.6)	(0; 1.25)
560,000–900,000LBP	15 (1.4)	(0.7; 2.2)
1,000,000–1,500,000LBP	104 (10.0)	(8.2; 11.8)
1,600,000–3,000,000LBP	226 (21.7)	(19.2; 24.2)
3,100,000–5,000,000LBP	229 (22.0)	(19.5; 24.5)
> 5,000,000LBP	189 (18.1)	(15.8; 20.5)
Prefer not to answer	273 (26.2)	(23.5; 28.9)

Variables (unhealthy behavior)	Frequency (%)	95% CI[b]
Cigarette smoking-pregnancy (n = 1050)		
Yes	35 (3.3)	(2.2; 4.4)
No	1015 (96.7)	(95.6; 97.8)
Cigarette smoking-lactation (n = 1049)		
Yes	31 (3.0)	(1.9; 4.0)
No	1018 (97.0)	(96.0; 98.1)
Waterpipe smoking-pregnancy (n = 1051)		
Yes	30 (2.9)	(1.8; 3.9)
No	1021 (97.1)	(96.1; 98.2)
Waterpipe smoking-lactation (n = 1051)		
Yes	48 (4.6)	(3.3; 5.8)
No	1003 (95.4)	(94.2; 96.7)
Alcohol consumption-pregnancy(n = 1051)		
Yes	17 (1.6)	(0.9; 2.4)
No	1034 (98.4)	(97.6; 99.1)
Alcohol consumption-lactation ($n = 1051$)		
Yes	11 (1.0)	(1; 1.86)
No	1040 (99.0)	(98.3; 99.6)
Caffeine consumption-pregnancy(n = 1051)		
Yes	553 (52.6)	(49.6; 55.6)
No	498 (47.4)	(44.4; 50.4)
Caffeine consumption-lactation (n = 1048)		
Yes	517 (49.3)	(46.3; 52.4)
No	531 (50.7)	(47.6; 53.7)

Variables (information sources)	Frequency (%)	95% CI[b]
Source of information (n = 1051)		
Lactation consultant	61 (6.6)	(4.4; 7.2)
Midwife	65 (6.2)	(4.7; 7.6)
Nurse	303 (18.8)	(26.1; 31.6)
Pediatrician	123 (11.7)	(9.8; 13.6)
Family member	342 (32.5)	(29.7; 35.4)
Friend	23 (2.2)	(1.3; 3.1)
No help	260 (24.7)	(22.1; 27.3)
Not applicable	93 (8.8)	(7.1; 10.6)

[a] Standard Deviation.
[b] Confidence Interval.
[c] Until grade 10.
[d] Highschool.

help from a family member (1.67 ± 1.96) ($p = 0.001$). Interestingly, mothers who did not get help with BF, from any of the above mentioned sources, had longer durations of both exclusive (1.75 ± 2.04) and total BF (5.93 ± 5.78) than those who got help and thus shorter durations of both exclusive (1.45 ± 1.81) ($p = 0.036$) and total BF (4.63 ± 4.76) ($p = 0.001$), respectively. Finally, income per person (in LBP) was negatively associated with the total duration of breastfeeding ($r = -0.090$; $p = 0.017$), whereas maternity leave (in days), mother's age (years) and toddler's age (in months) was not significantly associated with breastfeeding duration.

Table 2
Total and exclusive breastfeeding rates and durations.

Duration (months)	Total breastfeeding ($n = 980$)		Exclusive breastfeeding ($n = 979$)	
	N (%)[a]		N (%)[a]	
≤1	239 (24.38)		609 (62.2)	
2–3	261 (26.62)		204 (20.83)	
4–6	235 (23.97)		162 (16.54)	
7–12	174 (17.74)		4 (0.40)	
>12	71 (7.24)		0 (0)	
Total	980 (100)		979 (100)	
	Mean (SD)	Median	Mean (SD)	Median
Total duration	4.97 (5.08)	3.00	1.53 (1.88)	0.50

[a] Valid percent.

Relationship between breastfeeding durations and recurrent illnesses

Results of the multiple logistic regressions for the association between each health indicator and recurrent illness (separate models for each) and the total duration of breastfeeding are presented in Table 4. Results showed that every additional month of total BF decreased the occurrence of otitis by 4.4%. In addition, a longer duration of total BF was significantly associated with a lower frequency of antibiotic prescriptions.

Results of the multiple logistic regressions for the association between each health indicator and recurrent illness (separate models for each) and the duration of exclusive breastfeeding are presented in Table 5. Results showed that every additional month of exclusive BF decreased the occurrence of otitis by 8.3%. In addition, a longer duration of exclusive BF was significantly associated with a lower frequency of antibiotic prescriptions, pediatrician visits and absence from daycare. Finally, every additional month of exclusive BF was associated with 11% less occurrence of colic and 18.2% less UTI.

Discussion

In this study, the association between a longer duration of both exclusive and total BF and positive health outcomes was evaluated after adjusting for socio-demographic and behavioral determinants. Unlike previous studies on BF, we have strictly abided by the WHO definition of exclusive BF in determining its duration and rate (World Health Organization, 2001). In addition, indirect health indicators (such as absence from daycare, frequency of pediatrician visits and antibiotic prescriptions) and recurrent health complaints in infants and toddlers were often used in the literature but either individually or as subgroups but never all combined in the same analysis. This study was the first to be representative of all toddlers attending daycare and aged between 12 and 36 months and in a developing country.

Breastfeeding rates

In our study, only 46.5% of infants were still exclusively breastfed at one month, 26.16% at 3 months and 6.5% at six months of age (results not shown). Our sample showed a lower commitment to BF as compared to a study performed by Al-Sahab et al. (2008) in Beirut (56.3% at one month, 24.7% at four months and 18.8% at 6 months of age) (Al-Sahab et al., 2008), given the less strict definition of "full-breastfeeding" that was used in that study. Similarly, the short duration of exclusive BF (mean = 1.53 ± 1.88 months) with a median of 0.5 months (15 days) in our sample was due to the fact that we strictly abided by the definition of the WHO (World Health Organization, 2001).

Our study also showed a lower commitment to BF as compared to a national survey by Batal et al. (2006), where the proportion of exclusively breast-fed infants was 52.4%, at one month of age gradually declining to 23.4% at four months and 10.1% at six months (Batal et al., 2006). This is probably due to the fact that, in our study, mothers of toddlers enrolled in daycare centers are working mothers, and represent primarily middle to high-income families, as attendance fees can exceed the minimum wage in Lebanon. Similarly, Hamade et al. (2013) showed that the prevalence of mothers with a high income who exclusively breastfed was lower than those with a lower income, and that working mothers were much less likely to exclusively breastfeed when compared with their non-working counterparts (Hamade et al., 2013; Saade, Barbour, & Salameh, 2010).

More than a half of our sample (51.6%) was exposed to formula milk the first day after birth, and 50.1% was initiated to formula feeding before the age of 30 days, knowing that 6.76% ended up being never breastfed (results not shown). Similarly, Batal and Boulghaurjian (2005) found that 20.7% of babies were given water or glucose water and 28.1% were given formula as their first food (Batal & Boulghaurjian, 2005). Chantry, Dewey, Wagner, and Nommsen-Rivers (2014) and Sharp and Entwistle (2015) actually showed that shorter BF duration was associated with formula supplementation in the first days of life (Chantry et al., 2014; Sharp & Entwistle, 2015).

Determinants of a longer duration of both exclusive and total breastfeeding

A number of parents' socio-demographic factors were associated with longer durations of exclusive and total BF; mainly Muslim religion, father's higher education level and mother's degree field when health-related. In a study determining BF predictors in Lebanon, it was found that religion played a significant role in the continuation of BF until four months of age, with Muslim mothers twice as likely to breastfeed as compared to Christian mothers (Al-Sahab et al., 2008). As of the father's role in encouraging BF, Mannion, Hobbs, McDonald, and Tough (2013) found that mothers whose partner was supportive reported feeling more capable and competent in BF decisions and challenges (Mannion et al., 2013). Similarly, a recent meta-analysis highlighted the importance of targeting fathers in BF promotion to increase the rate of exclusive BF at 6 months (Mahesh et al., 2018). Furthermore, being born preterm (before 36 weeks) and natural delivery was positively linked with the duration of both exclusive and total BF. In line with our results, in the United Arab Emirates (UAE), mothers who had delivered by Cesarean section were significantly less likely to initiate BF within an hour than mothers who had a normal delivery (Radwan, 2013). In our study, babies who were firstborn were breastfed for longer periods than babies that were born second or more as previous short breastfeeding duration and unsatisfactory experience might have negatively affected subsequent breastfeeding initiation and duration (Huang, Ouyang, & Redding, 2018). However, unlike our study results, multiparous mothers in the UAE breastfed their infants for a significantly longer period than did primiparous mothers (Radwan, 2013). This was also previously observed by Al-Sahab et al. (2008), in Lebanon (Al-Sahab et al., 2008). In our study and unlike similar studies (Saade et al., 2010), maternity leave was not found to have a significant association with breastfeeding duration, probably because breastfeeding rates were already low in our sample with half of the mothers having exclusively breastfed for <15 days and with formula

Notes to Table 1:
[a] Student's t-test.
[b] $p \leq 0.05$.
[c] Beirut, Beirut suburbs, North Lebanon, Bekaa and South Lebanon.
[d] Druze, prefer not to answer, atheist.
[e] Pearson's correlation.

Table 3
Association between socio-demographic variables and duration of exclusive and total breastfeeding (BF).

Socio-demographic variables	Duration of exclusive BF (months)			Total duration of BF (months)		
	Mean	SD	P[a]	Mean	SD	P[a]
Baby's Gender						
Boy	1.55	1.91	0.721	5.06	5.14	0.583
Girl	1.51	1.84		4.88	5.01	
Delivery type						
C-section or induced labor	1.31	1.80	<**0.0001**[b]	4.79	5.07	0.236
Natural delivery	1.81	1.94		5.18	5.08	
Delivery weeks						
36 weeks or less	1.81	1.94	<**0.0001**[b]	5.18	5.08	0.236
37 weeks and more	1.31	1.80		4.79	5.07	
Baby's order						
Firstborn	1.72	1.94	**0.001**[b]	4.80	5.19	0.299
Second or more	1.33	1.79		5.14	4.97	
Place of residence						
Mount Lebanon	1.52	1.85	0.846	4.62	4.60	**0.027**[b]
Other[c]	1.54	1.91		5.35	5.53	
Father's education level						
University	1.62	1.90	**0.036**[b]	5.20	5.00	0.071
Illiterate, school, and technical	1.36	1.83		4.59	5.22	
Mother's degree field						
Non health-related	1.48	1.84	**0.030**[b]	4.99	5.18	0.443
Health-related	1.85	2.07		5.31	4.91	
Father's religion						
Christian	1.58	1.91	0.356	4.05	4.15	<**0.0001**[b]
Muslim and other[d]	1.47	1.83		6.04	5.69	
Mother's religion						
Christian	1.59	1.92	0.215	4.07	4.14	<**0.0001**[b]
Muslim and other[d]	1.44	1.82		6.01	5.71	
Cigarette smoking-pregnancy						
Yes	0.74	1.15	**0.001**[b]	2.91	2.50	<**0.0001**[b]
No	1.56	1.89		5.04	5.13	
Cigarette smoking-lactation						
Yes	0.94	1.30	**0.020**[b]	2.99	2.45	<**0.0001**[b]
No	1.55	1.89		5.03	5.13	
Water pipe smoking-lactation						
Yes	1.47	1.75	0.818	6.60	6.35	**0.027**[b]
No	1.53	1.89		4.89	5.00	
Alcohol consumption-lactation						
Yes	2.66	1.71	**0.045**[b]	4.39	3.63	0.701
No	1.52	1.88		4.98	5.10	
Caffeine consumption-pregnancy						
Yes	1.37	1.83	**0.006**[b]	4.92	5.51	0.739
No	1.71	1.92		5.03	4.55	
Caffeine consumption-lactation						
Yes	1.48	1.90	0.438	5.32	5.66	**0.031**[b]
No	1.58	1.86		4.62	4.38	
Help with BF-lactation consultant						
Yes	2.58	2.36	<**0.0001**[b]	7.06	6.24	**0.005**[b]
No	1.45	1.81		4.82	4.95	
Help with BF-midwife						
Yes	1.73	1.85	0.385	4.55	3.81	0.488
No	1.52	1.88		5.00	5.16	
Help with BF-nurse						
Yes	1.33	1.75	**0.021**[b]	3.90	3.88	<**0.0001**[b]
No	1.62	1.93		5.47	5.47	
Help with BF-pediatrician						
Yes	1.80	2.00	0.093	7.14	5.80	<**0.0001**[b]
No	1.49	1.86		4.67	4.90	
Help with BF-family member						
Yes	1.26	1.68	**0.001**[b]	4.69	4.59	0.189
No	1.67	1.96		5.12	5.32	
Help with BF-friend						
Yes	2.66	2.64	0.054	10.48	8.58	**0.006**[b]
No	1.50	1.85		4.85	4.91	
No help with BF						
Yes	1.75	2.04	**0.036**[b]	5.93	5.78	**0.001**[b]
No	1.45	1.81		4.63	4.76	

	Duration of exclusive BF		Total duration of BF	
	Pearson's correlation	*p*-value[e]	Pearson's correlation	*p*-value[e]
Income per person (LBP)	−0.012	0.753	−0.090	**0.017**[b]
Maternity leave (days)	−0.013	0.722	−0.034	0.344
Mother's age (years)	0.058	0.070	0.005	0.870
Toddler's age (months)	0.031	0.330	0.006	0.852

already initiated in half of the sample before the age of 30 days. Weaning is thus taking place much earlier than the end of the maternity leave, which typically ranges between 40 and 70 days in Lebanon.

Our results show a shorter duration of both exclusive and total BF when mothers smoked during pregnancy or lactation. This result is similar in many studies, and research has shown a negative and direct effect of maternal smoking on BF initiation and duration. Smoking has specifically been linked to early weaning (Al-Sahab, Lanes, Feldman, & Tamim, 2010; Bailey & Wright, 2011; Goldade, Nichter, Adrian, Tesler, & Muramoto, 2008). BF durations were longer when mothers consumed caffeine and alcohol; this might be explained by the fact that these behaviors gave a certain feel of freedom and comfort to BF mothers, and boosted their mood to breastfeed for longer periods.

In our study, getting help with BF had either a positive or negative impact on BF duration depending on the source of support. Getting help from a family member or a nurse was negatively associated with the duration of BF. Indeed, it was pointed out that, in Lebanon, some women were discouraged by their family members, especially their mothers, to even attempt BF (Nabulsi, 2011; Osman et al., 2009). Hamade et al. (2013) also showed that women who did not identify their own mothers as their primary source of emotional support were more likely to exclusively breastfeed (Hamade et al., 2013). As of nurses, it was mentioned by Akik et al. (2017), that receiving help right after birth from a nurse made the new mother breastfeed for a shorter period given the baby-unfriendly approach of hospitals and caregivers in general across Lebanon (Akik et al., 2017). In the same instance, other studies mentioned that the majority of nurses have a tendency to give the baby a pacifier or a bottle with or without informing the mother (Brand, 2011), coupled with a hospital culture where BF is not systematically initiated within the first hour and rooming-in is scarce (Khayat & Campbell, 2000); with only 24.7% of mothers who delivered having the opportunity to room in with their infant (Batal & Boulghaurjian, 2005). In contrast, in our study, getting help from a lactation consultant, pediatrician, friend or getting "no help" (i.e. getting other types of help than family, nurse, lactation consultant, pediatrician, or friend) was associated with a longer duration of BF. Indeed, Bonuck et al. (2014) conducted two randomized controlled trials at urban, prenatal care sites in the Bronx, New York City and found that a combined pre- and postnatal breastfeeding support intervention integrated into routine primary care increased breastfeeding intensity and duration in a diverse, low-income population (Bonuck et al., 2014). In a recent report on: "An exploration of mothers' breastfeeding experiences in Lebanon", some mothers mentioned that: "In hospitals that were deemed more baby and breastfeeding friendly, mothers had a positive impression about their doctors' efforts to encourage breastfeeding." The same report added that: "they had friends in Lebanon or abroad who offered support in a variety of ways like offering encouragement with BF difficulties and sharing advice" (Brand, 2011). In addition, qualitative data from BouDiab and Werle (2018) revealed that the acquisition of prior knowledge about BF was a significant factor in motivating a mother to breastfeed, if mothers had access to reliable sources of information such as lactation specialists and supporting doctors. But, this same study identified "family and friends" as those who discourage the practice of BF, and that their claims or misconceptions could be avoided by taking advice from experts and specialists and then disseminating it as actionable knowledge through one's personal network of relations (BouDiab & Werle, 2018). In the same instance, in our study, mothers who reported not getting help from any of the sources mentioned above have most likely relied on the internet or social media for help. In fact, online mothers-to-mother support groups would comfort the woman that she is not alone and that thousands of other women are also breastfeeding (BouDiab & Werle, 2018).

Breastfeeding and health outcomes

Moreover, our results showed that a longer duration of exclusive and total BF was associated with a lower frequency of antibiotic prescriptions, and a longer duration of only exclusive BF was associated with a lower frequency of pediatrician visits and absence from daycare. To our knowledge, it is the only study that has used 'absence from daycare' as an indicator in assessing the health benefits of exclusive BF. Our results showed that a shorter duration of exclusive BF was negatively associated with absence from daycare, thus indirectly disrupting parents' daily work productivity and routine. On the other hand, only a few studies linked the longer duration of BF to the decreased frequency of pediatrician visits and antibiotic prescriptions. Flores and Fairchok (2004) found a higher use of antibiotics in non-breastfed infants (Flores & Fairchok, 2004). However, they focused mainly on the positive relationship between artificial milk feeding practices and the increase in the frequency of antibiotic use. Various studies have assessed hospitalization or general doctors' visits as a function of BF and have found a negative correlation (Kaur et al., 2016; Stordal et al., 2017).

The negative association between the duration of exclusive BF and the above mentioned health indicators (pediatrician visits, antibiotic use and absence from day-care) comes in line with the overwhelming evidence on cost-effectiveness (Ball & Wright, 1999; Bartick & Reinhold, 2010; Ma, Brewer-Asling, & Magnus, 2013; Riordan, 1997), time efficiency (Ma et al., 2013), improved practicality and better hygiene of BF (Acharya et al., 2018). The cost-saving advantage of BF is of prime importance in low and middle income countries, such as Lebanon where 27.4% of the population can be considered as poor (World Bank, 2012).

In addition, both exclusive and total BF lowered the risk of otitis episodes in infants and toddlers. This is in line with the literature; benefits of BF include decreased incidence of acute otitis media (Jutel & El Banna, 2013) possibly through the transfer of immunoglobulin A (IgA) (Brennan-Jones et al., 2017). Also, exclusively breastfed infants for at least six months (26 weeks, $n = 91$) were less prone than their peers with partial or no BF ($n = 835$) to present infectious episodes such as otitis (Ladomenou, Moschandreas, Kafatos, Tselentis, & Galanakis, 2010). In our study, the occurrence of digestive conditions such as colic was also lowered with a longer duration of exclusive BF. Similarly, Cohen Engler, Hadash, Shehadeh, and Pillar (2012) reported a higher frequency and severity of colic in formula fed infants compared to breastfed infants (Cohen Engler et al., 2012). Comparably, UTI episodes were less frequent in exclusively breastfed children (Hanson, 2004; Marild, Hansson, Jodal, Oden, & Svedberg, 2004).

Possible limitations of the study were lassitude and complaints, which were noted because of the questionnaire's length. Memory biases could also have affected answers' reliability. In addition, the questionnaire was self-administered and parents might have had difficulties understanding some of the questions. The cross-sectional design of the study did not allow for prospective follow-up of illness occurrences. The study sample was representative of toddlers enrolled in daycare centers across Lebanon, but it excluded the ones who did not attend day care programs. Moreover, parents, especially mothers of toddlers attending day care programs may have different characteristics than the other mothers (i.e. working mothers, higher socio-economic status, more educated).

The strength of our study resided in its unique approach of looking at the benefits of breastfeeding by linking its duration to a number of health indicators rarely used all together in one study. The strengths of this study included a large, representative sample of toddlers ($n = 1051$) attending day care programs across all Lebanese regions with a satisfactory participation rate (67%).

Policies implications and strategies to increase breastfeeding duration

Lebanon still faces dramatically low BF rates and is challenged to increase these rates at a national level. Policy makers have a crucial role in this regard, through updating policies, enforcing laws and implementing interventions at the community level. In a recent report, violations of law 47/2008: "Organizing the Marketing of Infant and

Table 4
Multiple logistic regressions for the association between each health indicator or recurrent illness (separate models) and the total duration of breastfeeding.

Health indicator[a]/Recurrent illness[b]	Independent variables	B[e]	P[c]	OR[f]	95% CI
Antibiotic prescription[a,g] (Frequency)	**Total duration of BF[d]**	−0.065	<0.0001	0.937	(0.905; 0.970)
	Toddler's order	0.404	0.013	1.498	(1.090; 2.059)
	Toddler's age	−0.074	<0.0001	0.928	(0.904; 0.953)
Otitis[b,h] (Occurrence)	**Total duration of BF[d]**	−0.045	0.003	0.956	(0.927; 0.985)
	Toddler's Gender	−0.292	0.034	0.747	(0.570; 0.978)
	Mother's age	0.031	0.037	1.032	(1.002; 1.062)

Note: Only significant relationships between health and breastfeeding were reported in the Table. Potential cofounders having a significant association with health were marked in bold in the footnote.

[a] Health indicator: dichotomized according to the median.
[b] Recurrent illness (0 = not reported; 1 = reported to have occurred at least once between birth and 36 months).
[c] Multiple logistic regressions; significant relationships (p-value≤0.05).
[d] Duration in months.
[e] Non-standardized coefficient.
[f] Adjusted odds ratio.
[g] Adjustments were made for **toddler's order** (**0 = other**; **1 = firstborn**), **toddler's age,** delivery week, place of residence, mother's and father's degree field, mother's and father's employment status, mother's and father's religion, cigarette consumption during pregnancy and lactation, waterpipe smoking during pregnancy and lactation, alcohol consumption during lactation, caffeine consumption during pregnancy and lactation, duration of maternity leave, receiving help with breastfeeding from a nurse, a family member, and a friend.
[h] Adjustments were made for **toddler's gender** (**0 = boy**; **1 = girl**), **mother's age**, delivery type, place of residence, mother's nationality, mother's and father's religion, waterpipe smoking during pregnancy and lactation.

Young Child Feeding Products and Tools" were reported and barriers to implementing it were identified (Akik, Ghattas, & El-Jardali, 2015). Among the most highlighted barriers to implementation were lack of law enforcement and poor involvement of the various stakeholders in working together on creating a supportive environment for successful BF.

At the health systems level, hospitals that desire to be recognized as "breastfeeding-friendly" should endorse and enact policies that have been shown to support breastfeeding, like rooming-in, giving breast milk as the baby's first food, not using pacifiers or bottles and encouraging the mother to breastfeed within 30 min after delivery. Educating healthcare providers on the health benefits of breastfeeding and

Table 5
Multiple logistic regressions for the association between each health indicator or recurrent illness (separate models) and the duration of exclusive breastfeeding.

Health indicator[a]/Recurrent illness[b]	Independent variables	B[e]	P[c]	OR[f]	95% Confidence Interval
Antibiotic prescription (Frequency)[a,g]	**Duration of Exclusive BF[d]**	−0.098	0.033	0.907	(0.829; 0.992)
	Toddler's age	−0.054	<0.0001	0.948	(0.922; 0.973)
Pediatrician visits (Frequency)[a,h]	**Duration of Exclusive BF[d]**	−0.147	0.001	0.863	(0.790; 0.943)
	Toddler's order	0.385	0.018	1.470	(1.070; 2.021)
	Toddler's age	−0.073	<0.0001	0.930	(0.906; 0.954)
Absence from daycare (Frequency)[a,i]	**Duration of Exclusive BF[d]**	−0.109	0.014	0.897	(0.822; 0.978)
	Toddler's order	0.427	0.005	1.603	(1.151; 2.233)
	Father's employment	−2.410	0.039	0.090	(0.009; 0.884)
	Toddler's age	−0.029	0.027	0.971	(0.946; 0.997)
	No help with BF	0.461	0.024	1.585	(1.064; 2.362)
Colic[b,j] (Occurrence)	**Duration of Exclusive BF[d]**	−0.117	0.005	0.890	(0.821; 0.965)
	Maternity leave	−0.005	0.019	0.995	(0.991; 0.999)
	Mother's age	−0.083	<0.0001	0.920	(0.887; 0.954)
UTI[b,k] (Occurrence)	**Duration of Exclusive BF[d]**	−0.201	0.028	0.818	(0.683; 0.978)
	Maternity leave	0.006	0.010	1.006	(1.001; 1.010)
	Help with BF-nurse	−0.862	0.019	0.422	(0.206; 0.866)
Otitis[b,l] (Occurrence)	**Duration of Exclusive BF[d]**	−0.087	0.021	0.917	(0.852; 0.987)
	Toddler's gender	−0.289	0.036	0.749	(0.572; 0.981)
	Mother's age	0.033	0.030	1.033	(1.003; 1.064)

Note: Only significant relationships between health and breastfeeding duration were reported in the Table. Potential cofounders having a significant association with health were marked in bold in the footnote.

[a] Health indicator: dichotomized according to the median.
[b] Recurrent illness (0 = not reported; 1 = reported to have occurred at least once between birth and 36 months).
[c] Multiple logistic regressions; significant relationships (p-value≤0.05).
[d] Duration in months.
[e] Non-standardized coefficient.
[f] Adjusted odds ratio.
[g] Adjustments were made for **toddler's age**, delivery type, toddler's order, place of residence; mother's and father's education, mother's and father's nationality, mother's and father's religion, cigarette smoking-pregnancy and lactation, caffeine consumption-pregnancy and lactation, income per person, mother's age, receiving help with BF from a lactation consultant, nurse, pediatrician, and not receiving any help with BF.
[h] Adjustments were made for toddler's age, toddler's order (0 = other; 1 = firstborn), delivery week, place of residence, mother's and father's degree field, mother's and father's employment, mother's and father's religion, cigarette smoking-pregnancy and lactation, waterpipe smoking-pregnancy and lactation, alcohol consumption-lactation, caffeine consumption-pregnancy and lactation, duration of maternity leave, receiving help with BF from a nurse, family member and friend.
[i] Adjustments were made for toddler's order, father's employment status (0 = full-time employee; 1 = currently studying, self-employed, unemployed or part-time employee), toddler's age, receiving no help with BF (0 = Received help; 1 = Did not receive help), delivery type, mother's education, mother's degree field, waterpipe smoking-pregnancy, caffeine consumption-pregnancy, receiving help with BF-nurse, income per person.
[j] Adjustments were made for duration of maternity leave, mother's age, toddler's order, mother's and father's religion, cigarette consumption-pregnancy and lactation, waterpipe smoking-pregnancy and lactation, alcohol consumption-lactation, receiving help with BF-nurse, receiving no help with BF.
[k] Adjustments were made for duration of maternity leave, help with BF-nurse (0 = no; 1 = yes), delivery type, place of residence, mother's and father's religion.
[l] Adjustments were made for toddler's gender (0 = boy; 1 = girl), mother's age, delivery type, place of residence, mother's nationality, mother's and father's religion, waterpipe smoking-pregnancy and lactation.

negative impact of cultural misconceptions is of utmost importance. In addition, gynecologists should not hesitate to direct future mothers, and pediatricians to forward current mothers with difficulties, to lactation consultants. Enlightening future mothers on BF benefits and providing them with practical tips (i.e. related to proper latching, positioning, mastitis, pain management, milk pumping and storage, etc.) would decrease early weaning.

At the community level, breastfeeding awareness campaigns should be achieved at the national level by involving the different stakeholders. For instance, effective, simplified and culturally relevant messages should be delivered on TV or through other media, in order to counteract socio-cultural misconceptions (like insufficient milk supply or poor milk quality).

At the social level, family and social support are essential for a positive breastfeeding experience. The use of simple educational material would tackle negative attitudes and incorrect perceptions prevalent in the culture of both the mother and her environment. Increasing the breastfeeding-friendliness of public places and the workplace should be implemented by enforcing the idea of collective responsibility for improving the health of both the mother and the child. Evidence has shown that Lebanon's short maternity leave may be one of the most important contributors to decreased rates of breastfeeding (Saade et al., 2010). This should definitely push government authorities to mandate a longer maternity leave.

Conclusion

Our study highlights the various health benefits of BF in a sample of toddlers recruited from daycare centers across Lebanon, a middle income country. In Lebanon, BF rates are low and witnessing a severe decrease over time. This growing problem needs to be addressed urgently. Policies should thus be implemented and laws protecting BF reinforced. At the community level, it is important to focus on creating a supportive environment for BF mothers and to start raising awareness, while involving the different stakeholders and, most importantly, the mother and the father. Future research should investigate on the determinants of complementary feeding practices and their relationship with recurrent illnesses and chronic affections (i.e. coeliac disease, diabetes, asthma, food allergies, etc.). This could be achieved by focusing on the timing and sequence of individual fluids and solid foods introduced as well as continuing or not to breastfeed after solid foods introduction. Future research could also be directed towards implementing the intervention strategies proposed above and testing their prospective effects on BF duration and rates.

Declaration of interests

None.

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