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Provision of Information about Infant Feeding Postpartum through Digital Media

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Abstract

Women seek information about infant feeding from multiple sources, which may be conflicting. Increasingly women use digital media for pregnancy information. This study examined women's use of digital media for information on infant feeding.

In addition to clinical and socio-demographic data, detailed data concerning women's infant feeding practices and their use of digital media for infant feeding information were collected.

We surveyed 295 women who attended nine months postpartum as part of a longitudinal study on maternal weight trajectories. Digital media was used by 130 women (44.1%) to access information on infant feeding, which is higher than hitherto reported. Women who did not use digital media were more likely to be multigravidous ($p = 0.03$), to be socially dis-advantaged ($p = 0.01$), and were less more likely to breastfeed ($p = 0.01$). However, on multivariable analysis, only women economically disadvantaged were less likely to use digital media [OR 0.25, $p < 0.02$]. The types of digital media used varied, and an overwhelming majority were non-subscription resources. Less than 5% of women used professional evidence-based digital media sources. The use of digital media was not associated with the timing of weaning.

Information on infant feeding should be evidence-based and provided digitally to women across all socio-economic gradients as part of an e-health national policy.

Keywords

Digital media, Infant feeding, Breastfeeding, Evidence-based

Introduction

Before, during and after pregnancy, women are keen to receive information that will promote not only their own well-being, but also that of their baby [1]. The first year of life is a period of rapid growth and development. An infant's birth weight doubles by six months and triples by one year, a process not repeated at any other phase in the life cycle [2]. A UK study suggests that first-time mothers have a good understanding of weaning guidelines; however, they seek weaning information from multiple sources, many of which conflict with one another [3].

A recent study found that women using maternity services in Ireland in 2012-2013 reported a high usage of digital media to obtain pregnancy information [4]. The prominent use of digital media to obtain pregnancy related information suggests a move towards autonomous information seeking behaviour among women using maternity care services.

The majority of pregnancy apps are not regulated [5]. The United States (US) Food and Drug Administration (FDA) released non-binding recommendations for mobile medical applications in September 2013 [6]. However, the FDA recommendations are specific to US apps, and thus similar apps in other countries may not be regulated [5]. Misinformation from multiple sources about pregnancy and infant feeding is therefore a concern.

The aim of this study was to assess women's digital media use to access infant feeding information and whether there was any association between maternal digital media use and clinical and sociodemographic variables. Further aims were to examine the types of digital media sources accessed and any possible association of digital media use and maternal socio-demographic characteristics on infant feeding practices.

Methods

This study was carried out in the XXXX which is one of the largest maternity hospitals in the EU and cares for women from all socioeconomic groups and from across the urban-rural divide.

As part of a longitudinal study, women who had attended the hospital for antenatal care were re-interviewed at approximately nine months postpartum. These women were asked questions about what websites and/or apps they had used to get information on infant feeding using an unsupervised computer based questionnaire. These websites and apps were then categorised as originating from non-subscription sources, commercial companies (e.g. infant formula companies) or professional groups.

The main inclusion criteria for the study were women booking for antenatal care after an ultrasound examination had confirmed an ongoing singleton pregnancy in the first trimester. To reduce the number of confounding variables, the exclusion criteria were

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Table 1: Study population characteristics (n = 295).

	Total	Breastfed	No Breastfeeding	P
	(n = 295)	(n = 193)	(n = 102)	
Age (years)[1]	32.4 ± 4.8	32.9 ± 4.4	31.7 ± 5.3	0.05
Weight (kg)[1]	69.6 ± 14.7	69.2 ± 14.3	70.8 ± 15.3	NS
BMI (kg\m^2)[1]	25.3 ± 5.0	25.1 ± 4.9	25.9 ± 5.4	NS
% Obese	16.6	15.5	18.6	NS
% Primiparous	42.7	51.3	37.3	0.01
% Smoking[a]	13.9	11.2	19	NS
% Relative Income Poverty[b]	13.3	9.1	21	0.005
% Experiencing Deprivation[a]	19.8	13.8	31	0.005
% Experiencing Consistent Poverty[a]	5.2	2.2	11	0.001

[1]Mean ± SD

[a]Data available on n = 288

[b]Data available on n = 286 P value testing difference between women who breastfed and those who did not breastfeed.

Table 2: Study population characteristics according to digital media use.

	Used Digital Media	Did not Use Digital Media	P
	(n = 130)	(n = 165)	
Age (years)[1]	32.9 ± 4.1	32.2 ± 5.1	NS
Weight (kg)[1]	68.2 ± 13.7	71.0 ± 15.3	NS
BMI (kg\m^2)[1]	24.8 ± 4.7	25.7 ± 5.3	NS
Obese(% (n))	14.6 (19)	18.2 (30)	NS
Primiparous (% (n))	53.1 (69)	41.2 (68)	0.03
Smoking (% (n))[a]	10.9 (14)	16.2 (26)	NS
Experiencing Relative Income Poverty(% (n))[b]	4.7 (6)	20.1 (32)	0.001
Experiencing Deprivation(% (n))[a]	14.1 (18)	24.4 (39)	0.02
Experiencing Consistent Poverty(% (n))[a]	1.6 (2)	8.2 (13)	0.01
Breastfed Infant(% (n))	73.1 (95)	59.4 (98)	0.01
Introduction of Solids (weeks)	20.2 ± 3.8	20.0 ± 5.7	NS

[1]Mean ± standard deviation
[a]Data on n = 288
[b]Data on n = 286

multiple pregnancies, women < 18 years of age, and women with a booking gestation >18 weeks. Women, who delivered elsewhere, usually due to emigration, were also excluded, because follow-up details were not available.

Women were asked whether they had breastfed following their latest pregnancy, and at what age they had introduced solids into their babies' diets. Women were also asked why they had decided to wean their infant at this stage from several options including: 'because it was the right time', 'to make my baby sleep', 'to stop my baby waking up', 'because my baby was hungry', 'because my baby was looking up showing an interest in food', 'because my baby was chewing their fist', 'because my baby was a big baby' and 'none of the above'.

Maternal height was measured to the nearest centimetre using a Seca wall-mounted digital stadiometer with the woman standing in her bare feet. Weight and body composition were measured digitally to the nearest 0.1 kg (Tanita MC 180, Tokyo, Japan) and BMI calculated.

Socio-economic data were also collected. Material indices of disadvantage including relative income poverty, relative deprivation and consistent poverty status were calculated from these data. Relative income poverty status was calculated by comparing equivalised household income against the 60% median income threshold [7]. Relative deprivation was assessed by determining whether respondents had experienced the enforced absence (due to financial constraint) of two or more basic necessities from a list of eleven over the preceding year. Consistent poverty was identified if a respondent was classified as living in relative income poverty in addition to experiencing the enforced absence of two or more of the eleven basic markers of deprivation [8].

Data analysis was carried out using SPSS version 20.0 (IBM Corporation, Armonk, New York). Descriptive statistics, independent samples t-tests and cross tabulation with χ^2 analyses were used to analyse the sample characteristics by maternal breastfeeding status and by digital media usage. Binary logistic regression was performed to assess the association between a number of factors and digital media use. Written informed consent was obtained. The study was approved by the Hospital's Research Ethics Committee.

Results

The number of women enrolled initially in the first trimester was 1035. Of the 1035 women, 98% (n = 1018) delivered a live-born baby in the Hospital. Of the 328 women who were weighed and had their BMI calculated nine months postpartum, 295 completed the questionnaire on digital media use. No differences in weight, BMI, obesity status, gestational ageat the first prenatal visitor caesarean section rates or the proportion of women living outside of Dublin were observed between the women who returned for their follow-up appointment and those who did not return follow-up. Women who did not return were younger and more likely to be current smokers than women who returned.

The characteristics of the women analysed by breastfeeding status are described in table 1. Women introduced solids into their infant's diet at a mean of 20.1 ± 5.0 weeks and 265 women (90%) weaned their infants at < 26 weeks of age. Just under two thirds of women [n = 193 (65.4%)] reported breastfeeding their infants initially. Digital media were used by 130 women (44.1%) to access information on infant feeding.

On univariate analysis, women who were primiparous (p = 0.03) were more likely than multiparous women to use digital media to get infant feeding information. Women experiencing relative income poverty (p = 0.001), deprivation (p = 0.02) and consistent poverty (p = 0.01) were less likely to use digital media than their more affluent peers (Table 2). Women who used digital media were more likely to breastfeed than women who did not use digital media (p = 0.01). The use of digital media was not associated with the timing of weaning (Table 2).

After controlling for relative deprivation, consistent poverty, breastfeeding, primiparity, age, maternal weight and BMI, only

Table 3: Logistic regression of factors associated with digital media use for infant feeding information.

		n	Odds Ratio	95.0% C.I.		P-value
Relative Income Poverty	Absent	248	1.0[a]			
	Present	38	0.25	0.08	0.79	0.02
Consistent Poverty	Absent	271	1.0[a]			
	Present	15	1.07	0.15	7.77	NS
Relative Deprivation	Absent	230	1.0[a]			
	Present	56	0.71	0.35	1.46	NS
Primiparity	No	151	1.0[a]			
	Yes	135	1.56	0.92	2.64	NS
Breastfeeding	No	100	1.0[a]			
	Yes	186	1.37	0.79	2.35	NS
Age	Linear variable	286	1.05	0.99	1.11	NS
Weight	Linear variable	286	0.98	0.94	1.03	NS
BMI	Linear variable	286	1	0.87	1.15	NS

Data for n = 286 for which all variables available, 1.0
[a]Denotes reference category
C.I. confidence interval

Table 4: Digital media sources of infant feeding information (n = 128).

	Number (n)	Percentage (%)
Professional		
Health Service Executive website	4	3.1
Safefood	2	1.6
Commercial/Branded		
First 1000 days	11	8.6
Aptamil Website	4	3.1
Miliupa	5	3.9
SMA	2	1.6
Non-subscription Informational		
Parenting	1	0.8
AnabelKarmel	26	20.3
Baby Centre	26	20.3
Baby Led Weaning	10	7.8
EU Mom	18	14.1
Google	3	2.3
Rollercoaster	10	7.8
Mummy Pages	4	3.1
Kelleymom	2	1.6

Table 5: Participant reasons for introducing solids (n = 295).

	Number (n)	Percentage (%)
Because it was the right time	106	35.9
To make my baby sleep	1	0.3
To stop my baby waking up	2	0.7
Because my baby was hungry	51	17.3
Because my baby was looking up and showing interest in food	121	41
Because my baby was chewing their fist	2	0.7
Because my baby was a big baby	2	0.7
None of the above	10	3.4

relative income poverty remained associated with digital media use, with women in this low income group less likely to refer to these digital resources (Table 3). The majority of digital media sources used originated from non-subscription sources (Table 4). No women who were at risk of relative income poverty or at risk of consistent poverty used professional digital media sources and only two women (3.6%) at risk of relative deprivation used professional digital media sources.

Women experiencing consistent poverty introduced solids at an earlier stage than their more affluent counterparts [17.4 ± 3.6 weeks versus 20.2 ± 5.0 weeks (p = 0.04)]. The reason most commonly cited for introducing solids was "because my baby was looking up and showing an interest in food" (Table 5).

Discussion

This prospective observational study found that 44% of post pregnancy women used digital media to access information on infant feeding. Of the women who used websites, 78% used non-subscription resources which are not regulated, for example, internet forums. Only 5% of women used professional websites and 17% of women used branded commercial websites. Women who did not use digital media were more likely to be multigravidous, to be socially dis-advantaged, and were less more likely to breastfeed. However, on multivariable analysis, only women economically disadvantaged were less likely to use digital media.

These findings have implications for maternal and infant health outcomes, as there is a risk of misinformation and/or conflicting information being disseminated through these unregulated channels. The utility of digital media should, therefore, be recognised and prioritised in devising effectively-communicated public health strategies in the areas of infant feeding and weaning. Relative income poverty was negatively associated with digital media use. These findings suggest that the efficacy of these digital media in the public promotion of breastfeeding could be further enhanced by ensuring that they are accessible and more intensively promoted to low socioeconomic status (SES) groups.

A strength of our study is the prospective longitudinal study design which may reduce recall bias when women were answering the questionnaire at nine months postpartum. A potential weakness of the study is the large number of women who did not re-attend their scheduled postpartum visits. This sub-set of the original cohort who participated in the nine month follow-up may be subject to a degree of self-selection bias. This attrition may be explained by the fact that women were re-attending on a voluntary basis without any financial incentive. This loss to follow-up may also be attributable to the logistical challenges of returning to the maternity hospital for a research study, for a mother with a new baby and/or other children. The follow-up of women in the first year after delivery of their baby in a population based research study is particularly challenging, which may explain why there are such large gaps in our knowledge on postpartum weight changes [9]. This study has a larger sample size than a previous Irish study examining the sources of information for infant feeding advice, increasing the strength of our findings. Nonetheless due to the relatively small sample size and high attrition rates, an effect-causal relationship between digital media use and infant feeding practices cannot be presumed from these results [10].

A recent study found that women using maternity services in Ireland in 2012-2013 reported the common use of digital media to obtain pregnancy information. Ninety-five per cent of women reported that they had used the internet to get information related to their pregnancy or the care of their baby, 76% had a smartphone and 59% of smartphone owners had used a pregnancy app [4]. Another Irish study (n = 215) found that only 8% of mother's used the internet for infant feeding information [10], while a UK study found that 25% first-time parents used the internet and gained 'influential' (i.e. improved their knowledge) weaning information [3].

Our study found that 44% of women used digital media which suggests an increase use in digital media to access infant

feeding information than previously reported. The advantages of disseminating infant feeding and weaning information through digital media are that it can be made available over a long time, globally as well as locally; and in different languages. This content can also be easily updated and archived for subsequent use, and the use of digital media by participants can be measured and analysed. In addition, interactivity with participants can be developed to encourage more sustained and effective user-engagement with the information presented. Higher costs may be incurred in the initial development of such computerised systems however, once they are established they are more cost effective than traditional media in disseminating information.

The prominence of digital media as existing sources of pregnancy-related information suggests that these media can be leveraged for the more effective communication of breastfeeding and weaning information to women. It also highlights the need to regulate the provision of these resources to pregnant and lactating women. Studies have investigated sources of weaning advice to parents, with advice from family and friends, health professionals and now increasingly the internet being commonly cited [3]. The US FDA released non-binding recommendations for mobile medical applications in September 2013 [6]. However, these FDA recommendations are specific to US apps, meaning that similar apps developed and provided in other countries may not be regulated [6]. Further studies are needed to analyse specifically the content of the non-subscription information digital media sources.

The Food Safety Authority of Ireland (FSAI) currently recommends that weaning should begin close to six months (26 weeks) of age. It is safe to give solid food to infants at four months of age but not before this [2]. In the current study, women introduced solids into their infant's diet at a mean of 20.1 ± 5.0 weeks and 265 women (90%) weaned their infants at < 26 weeks of age. Parental decisions to introduce solids have been shown to be largely baby-led, and mothers may face a conflict between the recommendations to wait until six months and perceived signs from the baby that they are ready for solid food at an earlier age [11-12].

When the women in this study were asked about their reasons for introducing solids, the most common reply was 'because my baby was looking up and showing an interest in food'. It has been suggested that some parents in Ireland may be receiving incorrect and inconsistent advice from health professionals regarding optimal infant feeding practices [13]. It has also been suggested that because readiness for solids is a developmental process; health professionals may find it difficult to remain consistent with published guidelines while at the same time offering advice that is tailored to signals from the infant [11,14].

Younger, less well-educated women have been shown to be particularly vulnerable to misinformation in the areas of infant feeding and weaning [3]. This group may rely heavily on advice from family and friends who have possibly less personal and cultural exposure to breastfeeding, and who may not be supportive of later weaning at six months of age [3]. Lower maternal age and first time mothers are more likely to use informal sources of information for infant feeding, such as their grandmothers [10]. In the current study, women who were living in consistent poverty introduced solids at an earlier stage than women who were not experiencing consistent poverty. Women who were experiencing relative income poverty, deprivation and consistent poverty were also less likely to breastfeed than their more advantaged peers. These findings, along with the less common use of digital media for infant feeding and weaning information by these low SES women, suggest that the enhanced customisation and targeting of these web-based resources towards socially-deprived women may improve their poorer infant feeding and weaning practices.

Conclusions

The first year of life is a period of rapid growth and development, and the timing of solid food introduction is important for optimal development. The emerging use of the internet by women to access information about infant feeding needs to be considered by health professionals and policy makers. The prominent use of unregulated, non-subscription web-based resources by women may promote the dissemination of poorly-evidenced advice and misinformation in this area.

There is, therefore, a need to promote the use of professional websites and apps which are evidence-based, and to regulate the provision of web-based resources relating to pregnancy and infant feeding. It is recommended that further work be focused on women of low socio-economic status who have been shown to have poorer infant feeding practices in this and other studies. This group may be particularly vulnerable to adopting poor quality, conflicting advice from unregulated sources in relation to infant feeding; and may therefore benefit particularly from the use of evidence-based, professional websites.

Conflict of Interests

The authors declare no conflict of interests.

Ethical Statement

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects/patients were approved by the Hospital's Research Ethics Committee. Written informed consent was obtained from all subjects/patients.

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