How Breastfeeding & Complementary Feeding Practices affect Nutritional Status of Young Children in Egypt

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Abstract

Background: Adequate complementary feeding practices are important for ensuring optimal nutritional status of children under-five. However, in Egypt, despite adequate complementary feeding practices, still the nutritional status of children is far from optimal.

Aim: To present the status and determinants of poor nutritional status of infants and young children in relation to breastfeeding and complementary feeding practices.

Methods Data was retrieved from the Egypt demographic health survey of 2014. Data for 25 governorates in Egypt including 4 Urban, 12 in Lower Egypt (LE), 8 in Upper Egypt (UE) and 3 Frontier governorates. The data included nutritional status of children under-five of age including underweight, stunting, wasting and overweight. Breastfeeding practices were assessed by percent of any breastfeeding, exclusive breastfeeding (EBF) and predominant breastfeeding (PBF). Complementary feeding practices were assessed by minimum meal frequency (MMF), minimum dietary diversity (MDD), minimum acceptable diet (MAD). The data was analyzed by SPSS (20) using descriptive analysis by mean and standard deviation and Pearson correlation coefficient.

Results: PBF was inversely correlated with obesity (r-0.8, P=0.01) and overweight (r-0.8, P=0.02). Any breastfeeding was inversely correlated with wasting (r-0.7; P=0.04) and with stunting and severe stunting (r0.6) but it was not significant P>0.05. MMF was poorly negatively correlated with wasting (r-0.4) and underweight (r-0.6) at P>0.05. MDD and MAD were poorly negatively correlated with stunting P>0.05. Suboptimal breastfeeding practices with adequate complementary feeding were common among higher levels of education and rich mothers, while inadequate complementary feeding practices were common among the poor and those with lower levels of education.

Conclusions: Partial Breastfeeding or any breastfeeding is protective against obesity and overweight. Mother's level of education exhibits a paradoxical effect whereby higher education is associated with suboptimal breastfeeding practices despite adequate complementary feeding practices. Strengthening maternity support for educated working mothers to continue breastfeeding should be a public health mandate for governments.

Key words: complementary feeding, minimum dietary diversity, minimum meal frequency, stunting, wasting, breastfeeding.

Introduction

Breastfeeding is essential for optimal Infant feeding practices. While breastfeeding should continue for two years, complementary feeding needs to be introduced from the age of six months as recommended by the World Health organization and UNICEF in the World Health Assembly resolution in 2002 and the Global strategy of infant and young child feeding in 2003 [1,2]. However the introduction of foods should be preceded by a period of exclusive breastfeeding (EBF) that should last for at least six months (180 days). This period allows the gastrointestinal tract to be prepared for the assimilation, digestion, absorption and

immunological reactions to the introduction of various foods other than breastmilk. Such foods can provide their nutrient potentials better in a milieu that includes breastmilk as a biologically, digestive and immunogenic tissue that can enhance tolerance and protect the body and digestive tract through its immunomodulatory properties [3, 4, 5].

The effects of breastmilk and formula feeding on the infant microbiome and immunity are a popular topic of research. Breastfeeding has been associated with a decreased risk of necrotising enterocolitis, infections, and diarrhoea in early life and with a lower incidence of inflammatory bowel disease, type 2 diabetes, and obesity later in life compared to formula-fed infants [6,7]. The immune-modulating factors of breastmilk, admixed with the role of the microbiome and its contributing role in enhancing the nutrient and protective benefits of breastmilk and continued breastfeeding has been discussed by many workers **[8,9]**. Moreover, Bifidobacterium has consistently been found in higher abundances in the gut of exclusively breastfed infants **[10].** In consideration to all these benefits, a dilemma remains on why and how children who continue to breastfeed still have nutritional problems despite being given additional foods.

Hence, the aim of this study is to shed further light on the adequacy of complementary feeding practices in-between the different governorates in Egypt in relation to socioeconomic determinants and their effect on the nutritional status of children under-five years of age in Egypt. We propose that immunomodulatory functions of breastmilk and their interaction with complementary foods are linked to the positioning of the mother's education vs. wealth status.

Methods

Source of data: Egypt demographic health survey, 2014 (EDHS) [11] was used as the source for the data for family planning, domestic violence and circumcision. Data were taken for each of the 25 governorates. Governorates included urban governorates (Cairo, Alexandria, Suez and Post Saed), Lower Egypt governorates. (Beheira, Dameitta, Dakahlia, Gharrbia, Ismailia, Kafr-ElSheikh, Kaluibiya, Menoufia and Sharkia), Upper Egypt governorates (Aswan, Assuit, Beni Suef, Fayoum, Giza, Luxor, Menya, Qena and Souhag) and Frontier governorates (Red sea, New Valley, Matrouh). North and South Sinai were not included.

Data collected included maternal level of education

Results

The minimum acceptable diet (MAD) was 23.3% (range= 23.3% to 24.8% for a sample size of 4,744). It was similar in both males and females (23.5% and 23.1% respectively). No differences were shown between urban and rural communities.The lowest MAD was in the second half of the first year (17.1%) increasing into the beginning of the second year to 28.2% and reaching a maximum of 31.5% at age (16 – 19 months) but declining again at 20-23 months to 21.6%. It was highest in families from lowest and highest wealth quintiles (WQ1 and WQ5) (25% and 25.8%) and lowest in WQ2 (21.3%). Children of mothers who were highly educated had the highest MAD scores (24%) compared to mothers who were illiterate or had primary education (22.5%) and mothers who had secondary education (20.1%) **[11]**.

The minimum meal frequency (MMF) was 60.2%. MMF was higher in males (61.2%) than females (55.2%) and in urban (64.3%) than in rural (58.4%). MMF was lowest between 6 to 11 months (56.6%) and increased to a peak of (64.8%) at 16 to 19 months but declined thereafter (63.4%). It was highest in WQ5 (70.8%) and lowest in WQ2 (54.7%). It was highest in the highly educated (67.8%) and lowest in those whose mothers had primary education (52.2%) or no education (54.3%) **[11]**.

The minimum dietary diversity (MDD) at national level was 34.7%. It was higher in females (34.9%) than males (34.5%) and in rural (35.2%) than in urban (34.9%). MDD was lowest between 6 to 11 months (19.9%) and increased to a peak of (48.1%) at 16 to 19 months but declined thereafter (45.2%). It was highest in WQ1 (37.2%) and lowest in WQ2 (32.1%). It was highest in the highly educated (39.4%) and lowest in those whose mothers had primary education or no education (33.6%) (EDHS, 2015).

Figure (1) presents the nutritional status of children under five in Egypt by region. Urban UE governorates had the highest rates of stunting (29.8%) followed by rural areas in UE (24.8%). The highest rates of wasting were found in Urban UE (9%) both rural UE (8.9%). Overweight was a common in urban LE (7.1%) and urban governorates (5.9%) and lowest in UE (1.9%).

Figure (2) presents the distribution of indices of complementary feeding by region in Egypt. MMF was highest in urban governorates and lowest in frontier governroates. MDD was highest in urban governroates and lowest in urban LE with minimum differences between regional governorates as compared to urban governorates. MAD was highest in urban governroates and lowest urban LE and UE.

Figure (3) shows that stunting and underweight were highest in mothers with some primary education and illiterate mothers. While overweight was common among mothers with high education.

Figure (4) shows the relationship between complementary feeding practices by level of education. Mothers with higher education had significantly higher MAD and MMF than those with lower levels of education and illiterate mothers. But MDD was low in all groups but still higher in those with higher levels of education (i.e. mothers with high and secondary education).

Tables (1 and 2) present correlations between breastfeeding practices and nutritional status (table 1) and complementary feeding practices and nutrional status (table 2). Wasting correlated inversely with any breastfeeding and partial breastfeeding (PBF) correlated inversely with obesity and overweight (r-0.8, $P<0.01$; r-0.8, $P<0.02$ respectively). There was some negative correlation of any breastfeeding and EBF with wasting which was statistically insignificant (r-0.6 and r-0.6 respectively at $P>0.05$) (Table 1). There were no significant correlations between indices of complementary feeding (MMF, MDD and MAD) with indices for nutritional status. MMF was poorly negatively correlated with wasting (r-0.4) and underweight (r-0.6) at $P>0.05$. MDD was also poorly negatively correlated with stunting (r-0.6) $P>0.05$. MAD was also poorly negatively correlated with stunting (r-0.4) $P>0.05$ (Table (2).

Table (3) shows that mothers with some primary education had lowest rates of continued breastfeeding (median duration 16.6 months) and no EBF lowest PBF and lowest rates of MAD. While mothers who completed secondary education and went into higher education presented with the highest MDD, MMF and MAD but EBF was not different from the mothers with lower education. Illiterate mothers tended to breastfeed for longer time but had the highest PBF.

Table (4) and Figure (5) present distribution of early infant feeding patterns by level of wealth of Egyptian mothers living in these governorates. It shows that MMF was highest among the richest class. However the poorest mothers tended to display higher MDD and MAD than the other classes, in addition to those having longer median durations of breastfeeding and EBF (1.9 months) who were superseded by the second level of wealth (2.1 months).

Figure (1) Nutritional status of children under five by region in Egypt

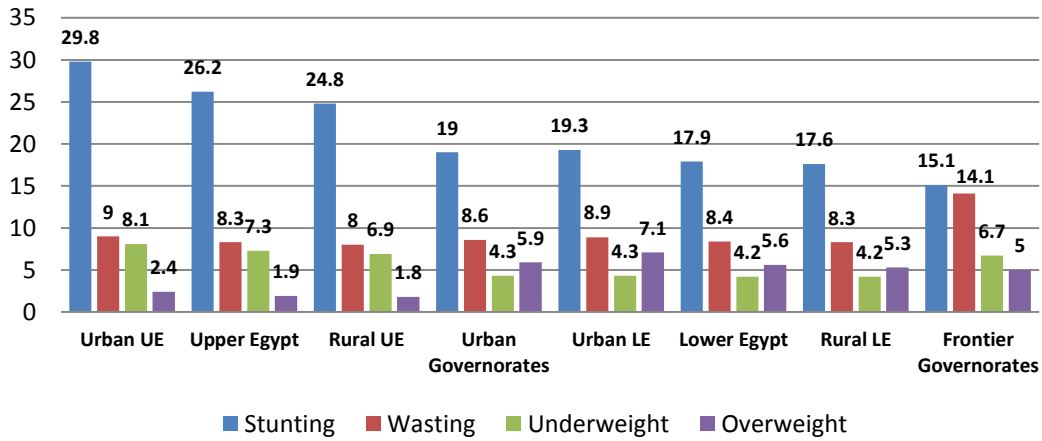


Table (1) Correlation of early breastfeeding patterns with the nutritional status of children under five in the different regions of the country ((Urban governorates, urban and rural LE, urban and rural Upper Egypt and Frontier governorates)

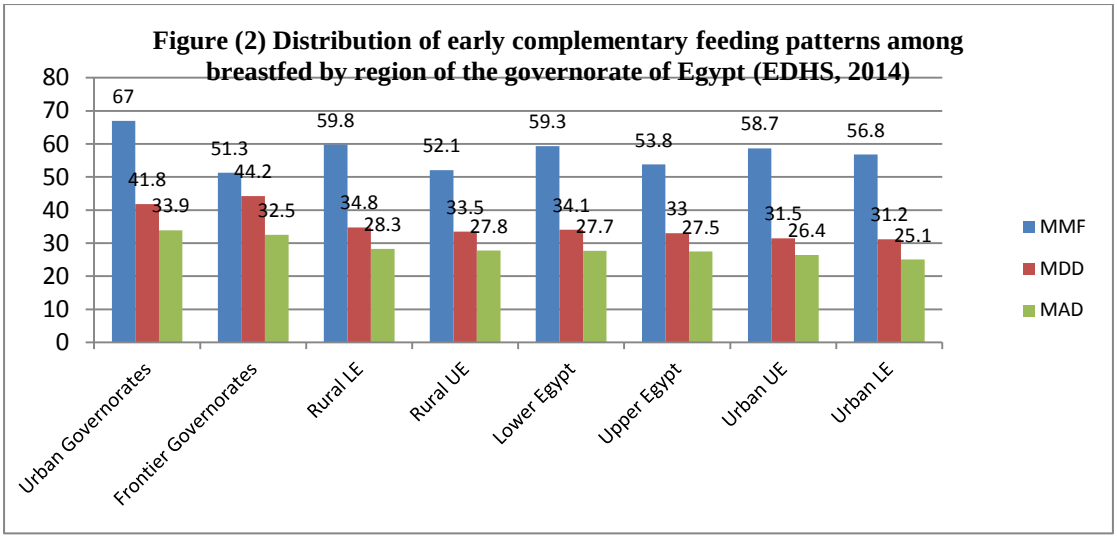
	Any BF (8)	P-value	EBF (8)	P-value	PBF (8)	P-value
H/A>-3SD (Severe stunting)	r0.6	0.148	r-0.24	0.573	r0.154	0.716
H/A>-2SD (Stunting)	r0.6	0.125	r-0.15	0.725	r0.273	0.513
W/H>-2SD (Wasting)	**r-0.7***	**0.04**	r-0.5	0.232	r-0.048	0.910
W/H>+2SD (Obese)	r-0.3	0.442	r-0.6	0.131	**r-0.8***	**0.01**
W/A>-2SD (Underweight)	r0.294	0.480	r-0.164	0.697	r0.613	0.106
W/A>+2SD (Overweight)	r-0.651	0.080	r-0.267	0.523	**r-0.8***	**0.021**

Pearson Correlation: (r), Sig. (2-tailed) P<0.05 significant, P<0.01 highly significant. BF: breastfeeding, EBF: exclusive breastfeeding, PBF: predominant breastfeeding,

Table (2) Correlation of complementary feeding practices with the nutritional status of children under-five of age, in the 8 regions of the country (Urban governorates, urban and rural LE, urban and rural Upper Egypt and Frontier governorates)

Nutritional status	MMF (8)	P-value	MAD (8)	P-value	MDD (8)	P-value
H/A>-3SD (Severe stunting)	r-0.1	0.9	r-0.7	0.06	r-0.6	0.141
H/A>-2SD (Stunting)	r-0.13	0.8	r-0.6	0.104	r-0.5	0.2
W/H>-2SD (Wasting)	r-0.3	0.4	r0.6	0.09	r0.4	0.3
W/H>+2SD (Obese)	r0.5	0.2	r-0.3	0.5	r-0.4	0.4
W/A>-2SD (Underweight)	r-0.6	0.1	r-0.1	0.8	r-0.1	0.7
W/A>+2SD (Overweight)	r0.5	0.25	r0.3	0.5	r0.2	0.63

Pearson correlation (r). P-value, Sig. (2-tailed) P<0.05 significant. MMF: minimum meal frequency, MDD: minimum dietary diversity, MAD: minimum acceptable diet. Food groups: a. infant formula, milk other than breast milk, cheese or yogurt or other milk products; b. foods made from grains, roots, and tubers, including porridge and fortified baby food from grains; c. vitamin A-rich fruits and vegetables; d. other fruits and vegetables; e. eggs; f. meat, poultry, fish, and shellfish (and organ meats); g. legumes and nuts. 2 For breastfed children, minimum meal frequency is receiving solid or semi-solid food at least twice a day for infants 6-8 months and at least three times a day for children 9-23 months. Data does not include North and South Sinai governorates.



Minimum acceptable diet (MAD) was highest in the urban governorates (Cairo, Alexandria, Port Saed and Suez) and Frontier governorates and lowest in urban regional governorates. This was also the case for MDD. But MMF was lowest in Frontier and rural UE .

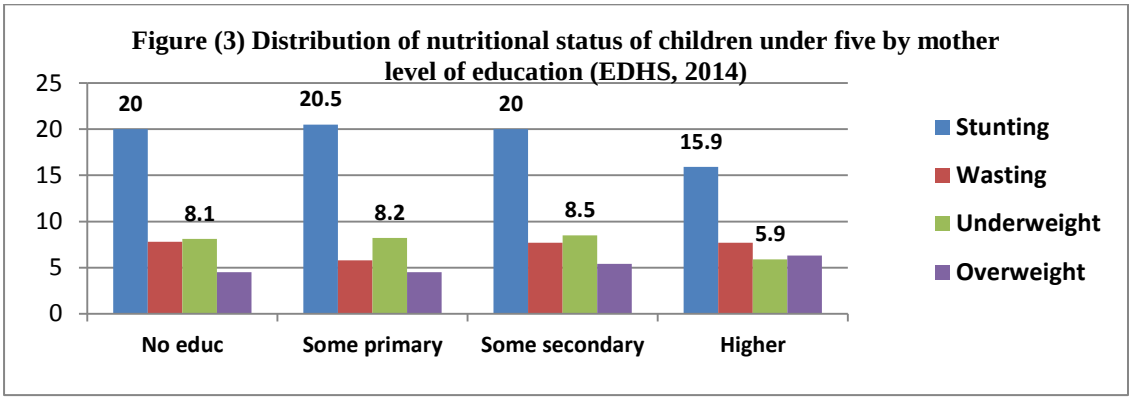


Table (3) Percent distribution of early infant feeding patterns by level of education of Egyptian mothers living in these 25 governorates (Source: EDHS, 2014)

Mother's education	Any BF (median duration in months)	EBF (median duration in months)	PBF (median duration in months)	MMF	MDD (4+ food groups)	MAD
No education	18.3	1.8	5.4	53.5	35	29
Some primary	16.6	0	3.2	52	29.7	22
Some secondary	17.5	1.9	4.1	53.9	29.6	23
Higher	17	1.8	3.9	60.4	36.2	30.2

Exclusively breastfed (EBF), PBF: predominantly BF includes EBF or received breast milk and plain water, and/or non-milk liquids only. Governorates do not include North and South Sinai. MMF: minimum meal frequency, MDD: minimum dietary diversity, MAD: minimum acceptable diet.

Figure (4) Distribution of early infant feeding patterns by level of education of Egyptian mothers living in these governorates (EDHS, 2014)

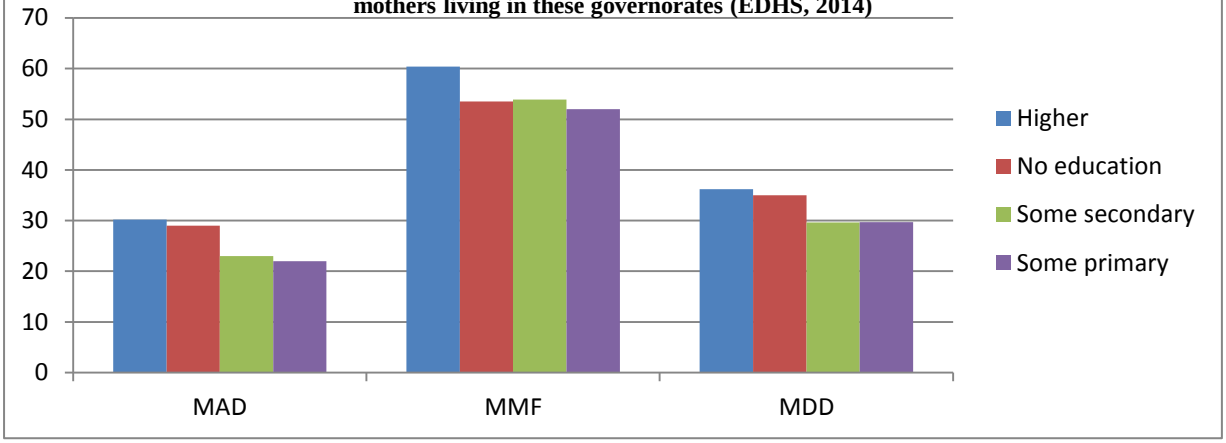
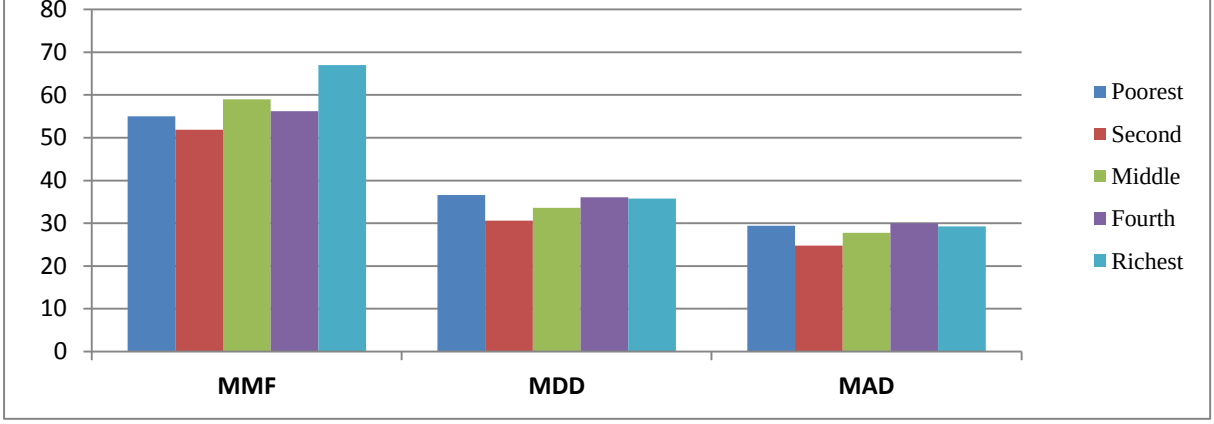


Table (4) Percent distribution of early infant feeding patterns by level of wealth of Egyptian mothers living in the 25 governorates of Egypt

Mother's level of wealth	Any BF (median duration in months)	EBF (median duration in months)	PBF (median duration in months)	MMF	MDD (4+ food groups)	MAD
Poorest	17.6	1.9	4.6	55	36.6	29.4
Second	17.6	2.1	4.8	51.9	30.6	24.8
Middle	17.3	1.6	3.9	59	33.6	27.8
Fourth	17.0	1.9	3.9	56.2	36.1	30.0
Richest	16.0	1.6	3.2	67	35.8	29.3

Exclusively breastfed (EBF), PBF: predominantly BF includes EBF or received breast milk and plain water, and/or non-milk liquids only. Governorates do not include North and South Sinai. MMF: minimum meal frequency, MDD: minimum dietary diversity, MAD: minimum acceptable diet.

Figure (5) Distribution of early infant feeding patterns by level of wealth of Egyptian mothers living in the 25 governorates (EDHS, 2014)



Discussion

Nutritional status of young children is determined by early feeding patterns. Stunting is highest in urban UE (25.4%) and lowest in Frontier governorates (11.4%). Wasting is highest in LE (14.3%). Wasting was significantly inversely correlated with any breastfeeding. Overweight is highest in LE (7.9%) and lowest in rural UE (2.7%). PBF was significantly correlated with overweight. Such correlations between breastfeeding practices and nutritional indices indicate that the early practices of breastfeeding influence the outcome of growth and development of these children. However we found no significant correlations

between complementary feeding indices and the nutritional status of children. This supports our hypothesis that early breastfeeding practices influence outcome of growth in children. Early breastfeeding may be working through neuro-immune-endocrine pathways to influence growth of the child. The emergence of evidence that support immune-modulatory functions of breastmilk and complementary foods indicates that intake and utilization of foods is not determined by quantity of intake but rather the quality and methods of intake and mother-child interactions that support the optimum utilization of these intakes. The differences in the influence of wealth and education on the child's growth, whereby the uneducated have the highest rates of stunting and in the same time the longest duration of any breastfeeding PBF with no substantial differences in complementary feeding indices, indicates that we are dealing with more complex mechanisms than intake alone. For instance MMF was highest amongst those mothers with higher education who had low breastfeeding rates. Hence the high frequency of feeding, means that these children are exposed to multiple opportunities for stimulation through on-to-one interactions with the care-giver, which in turn stimulate the neuro-immune-endocrine axis to work more efficiently to utilize foods by enhancing local immune and hormonal food assimilative processes in the gut **(12,13,14)**.

In Egypt the ISSS at 6-8 months is high at 75.2%. A local study in Alexandria showed that more than two thirds of studied mothers initiated weaning before six months. Initiation of weaning at 4 months was 58.8% and at 5 months of age was 23.6%. Grains (88.2%), dairy products (78.4%) and vegetables (72.6%) were the most commonly used weaning foods. Causes of early weaning off breastmilk included perceived milk insufficiency (7.8%), working mother (7.8%), baby related causes (hungry 33.3%, milk refusal (3.9%) or twins (3.9%). Working mothers who were breastfeeding were 27%, while 73% of working mothers were not breastfeeding **(15, 16)**. Another study reported that about two fifths of studied mothers (39.6%) used feeding bottles for their infants. Bottles were used by 50% of mothers who AF their infants compared to one third of mothers who PBF, while the least frequency reported was among mothers who EBF (10.7%) ($P<0.0001$). This indicates that EBF assists the child to develop feeding skills for chewing and acceptance of solids and semi-solids more than artificially fed, who continue to rely more on bottle-feeding rather than feeding by spoon or cup **(16)** .

However one quarter of young children in UE and LE versus one third in urban and frontier governorates have an acceptable dietary intake (MAD with no differences in gender or urban and rural communities. The lowest MAD was in the second half of the first year improving into the second year. Children of mothers who were highly educated had the highest MAD scores. Higher frequency of feeding (MMF) was higher in urban than in rural communities. MMF was lowest between 6 to 11 months and increased at 16 to 19 months but declined thereafter. MDD was slightly higher in rural than in urban it showed the same pattern of MMF increasing from 6 months to reach peak at 16 to 19 months but declined thereafter. All the indices increased slightly by wealth status (11) but more by educational status.

Complementary foods accompany and complement breastmilk throughout the weaning period, providing additional nutrients to the developing digestive system and modulating microbial colonization **(3,4,5)**. The young immune system is influenced by the gut microbiome and supported by metabolites produced during the microbial fermentation of prebiotic compounds, leading to a tolerance for commensal microbes and specific responses to pathogens**(5,6)**. Prebiotic compounds in breastmilk promote commensal immune-modulating bacteria, such as Bifidobacterium, and beneficial metabolites,

such as short chain fatty acids (SCFAs) and vitamins [3,6,7].

The low MAD in Egypt is mainly attributed to the low MDD, since MAD is a combination of MMF and MDD. Hence educational messages for improving CF should focus on encouraging mothers to feed their infants a variety of foods that are high in nutritious components as fresh fruits and vegetables rather than readymade marketed baby foods that many poorly educated urban mothers resort to giving as a substitute to home prepared foods.

A study, conducted in two primary health care units in Kafr El-Sheikh governorate, examined the weaning practices among mothers/caregivers of infants aged 6 months. The study included 292 infants aged 6 months in two primary health care units (health office Motobis Family health unit of Ibiana) in Kafr El-Sheikh governorate. Two thirds of the mothers started weaning their infants before the age of six months. EBF was 32.2%. The working mothers in both groups were the same (17.7% vs. 19.1% P>0.05). Weaning at 2-4 months was (43.4%), one third (35.9%) at <2 months and 20.7% at 4-6 months. More than one third of the mothers (34.4%) started early weaning because of infant crying after breastfeeding. Less than one third of the mothers (32.3%) started early weaning because the baby demanded more frequent milk feeds (32.3%), was hungry after short periods of sleep through the night or mother had a medical condition (0.7%). More than one fifth of the mothers (21.2%) started early weaning because they returned to work after maternity leave. On the other hand, a minority of mothers started weaning because the growth of the baby was inappropriate for age (5.6%) or because they had a medical condition (0.7%). More than two fifths (46%) of weaned infants had problems just after introducing weaning foods. Mothers who did not wean before 6 months reported that it was because it was a family habit (79.8%) or because baby refused (20.2%) [17].

The leading governorates with high illiteracy rates were mostly those in UE where stunting and underweight prevail and this could be linked to poor complementary feeding practices in these regions. Urban UE governorates had the highest rates of stunting and underweight followed by rural areas in UE. The highest rates of wasting were found in LE both rural and urban areas. Overweight was a feature of urban governorates and in particular urban LE and lowest in UE. Hence our findings showed that place of residence is linked to level of education of mothers and the nutritional status of their children. It is likely that cultures or regions that support women to become educated are more likely to be investing in the better nutritional outcome and health of their children and thereby the economic status of their region.

Other factors influencing gut functions is the differences in microbial community structure and gene content (i.e., the metagenome) between caesarean- and vaginally-delivered infants which gradually decrease over the first year of life, but the differences in innate and adaptive immunity remain detectable for up to 2 years of age. Caesarean-delivered infants have lower levels of IgA-, IgG-, and IgM-secreting cells, indicating reduced adaptive immune responses, have lower levels of Th1 supporting chemokines, IFNy and IL-8, and have decreased CD4+ T cell responses [18]. Caesarean-section (C-S) delivered infants, in particular those who were born by elective caesarean delivery instead of emergency delivery, are at higher risk for asthma, atopy, juvenile arthritis, and inflammatory bowel disease [19,20,21]. Any caesarean delivery is associated with a 15% increased risk for obesity, but there is a 30% increased risk in elective caesarean-delivered infants [22, 3]. Hence the increased C-S in Egypt and high rates of obesity may influence nutritional status and gut functions.

Complementary feeding should be supported by continued optimum and intense breastfeeding. This appears to be beneficial for maximizing the

benefit from weaning foods. Workers have shown that Bifidobacteria or fiber protects against diet-induced microbiota-mediated colonic mucus deterioration [(22)]. It has been shown that of antibodies in breast milk have long-term impacts on the gut microbiota and intestinal immune system of breastfed offspring [(23)]. Moreover secretory antibodies in breastmilk appear to promote long-term intestinal homeostasis by regulating the gut microbiota and host gene expression [(24)]. However the EBF duration and breastfeeding continuity in Egypt is low and continues to decrease [(25)]. Breastfeeding promotion and support is needed through educational messages that reach the mothers early during pregnancy and after delivery. Peer group counselors are effective means for education and supporting mothers [(26)].

Further evidence that the nutritional status of children under five was influenced by the level of mother education was shown in figure (3). Our analysis showed that stunting and underweight were highest in mothers with some primary education and illiterate mothers. While overweight was common among mothers with high education. This could be explained by the feeding patterns of these mothers. Mothers with some primary education had lowest rates of continued breastfeeding (median duration 16.6 months) and no EBF lowest PBF and lowest rates of MAD. While mothers who completed secondary education and went into higher education presented with the highest MDD, MMF and MAD but EBF were not different from the mothers with lower education. Illiterate mothers tended to breastfeed for longer time but had the highest PBF.

By wealth status the main difference observed were related to MMF which was highest among the richest class, however the poorest tended to display higher MDD and MAD than the other classes in addition to having longer median durations of breastfeeding and EBF (1.9 months, superseded by the second class 2.1 months).

In conclusion, it was evident from the analysis of the EDHS data that the educational status of mothers is a major influence on the feeding patterns and nutritional status of their children under the age of five years, more than wealth. The adequacy of complementary feeding practices and the outcome of the nutritional status of children vary across the country and are determined by the educational status of mothers more than the wealth status of the community of these women particularly in the governorates of UE. These suffer the most from poor feeding practices and poor nutritional status of infant and young children. While illiteracy is also more common in these regions. Improving the nutritional status by optimizing feeding practices, through intensifying and prolonging breastfeeding with quality (diverse and frequent) complementary foods can reduce stunting and poor nutritional status. This requires abolishing illiteracy in the low social classes while supporting women in higher classes to continue to higher levels of education and become supported in their workplaces. Education of women is the most powerful tool for empowering the health and economic status of future generations and meeting the challenges of poverty and economic development. Poor education of females prevent them from understanding how to care and nurture their child, increase the opportunity of having more children and decrease their ability to share in the economic drive to development. Investing in education of women is the key to healthy and powerful communities. However, this needs to be supported by having workplaces that are baby and child friendly for supporting breastfeeding and child care for working mothers and single parents of either sex to contribute in development with their children hand in hand. Building workplaces with innovative child care centers helps to teach our children the basics of development and growth of an economy. Parents are working to school their children and pay for their fees, this concept needs to change and children need to contribute

to the growth of the economy by making schools a source for growth of the country's economy.

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تأثير ممارسات الرضاعة الطبيعية و التغذية التكميلية على الوضع التغذوي للأطفال الصغار في مصر

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نبذة مختصرة

الخلفية : تعتبر ممارسات التغذية التكميلية الكافية مهمة لضمان الوضع التغذوي الأمثل للأطفال دون سن الخامسة. ومع ذلك ، في مصر ، على الرغم من ممارسات التغذية التكميلية الكافية ، لا يزال الوضع التغذوي للأطفال بعيدًا عن المستوى الأمثل.

الهدف : عرض حالة ومحددات الحالة التغذوية للرضع والأطفال الصغار فى محافظات جمهورية مصر العربية و علاقتها بالرضاعة الطبيعية وممارسات التغذية التكميلية.

طريقة البحث : تم استرجاع بيانات الطرق من المسح السكاني للصحة في مصر لعام 2014 من 25 محافظة في مصر بما في ذلك 4 مدن ، 12 محافظة بالوجه البحري و8 في صعيد مصر و 3 محافظات حدودية. تضمنت البيانات معدلات معرفة القراءة والكتابة لدى الأمهات ، والوضع التغذوي للأطفال دون سن الخامسة للوزن مقابل العمر ، والطول بالنسبة للعمر والوزن للطول لتقييم نقص الوزن ، والتقزم ، والهزال ، والبدانة. تم تقييم ممارسات تغذية الرضع من خلال الإرضاع من الثدي ، والرضاعة الطبيعية الحصرية/المطلقة والرضاعة الطبيعية لأى مدى، والحد الأدنى من تواتر الوجبة، والحد الأدنى للتنوع الغذائي ، والحد الأدنى من النظام الغذائي المقبول. تم تحليل البيانات بواسطة SPSS باستخدام معامل الارتباط Pearson.

النتائج : ارتبطت الرضاعة الطبيعية الجزئية عكسيا مع السمنة (r-0.8، P = 0.01) وزيادة الوزن (r-0.8، P = 0.02). ارتبط الرضاعة الطبيعية لأى مدى عكسيا مع الهزال (r-0.7 ؛ P = 0.04) ومع التقزم والتقزم الشديد (r0.6) ولكنه لم يكن ارتباطاً مؤثراً P> 0.05. كان الحد الأدنى لتواتر الوجبة مرتبطًا سلبًا بالهزال (r-0.4) ونقص الوزن (r-0.6) لكنه كان ضعيف (P> 0.05). كان هناك ترابط سلبي ما بين مع التقزم والحد الأدنى للتنوع الغذائي والحد الأدنى من النظام الغذائي المقبول ولكنه كان ضعيف P>0.05. و قد شاعت ممارسات الرضاعة الطبيعية دون المستوى الأمثل مع التغذية التكميلية الجيدة بين المستويات العليا من التعليم والأمهات الموسرات ، في حين كانت ممارسات التغذية التكميلية غير الكافية شائعة بين الفقراء وذوي المستوى التعليمي المنخفض.

الاستنتاجات : الرضاعة الطبيعية الجزئية أو الرضاعة الطبيعية إلى أى مدى هي وقاية ضد السمنة وزيادة الوزن. إن مستوى تعليم الأم له تأثير متناقض حيث يرتبط التعليم العالي بممارسات الرضاعة الطبيعية دون المستوى الأمثل على الرغم من ممارسات التغذية التكميلية المناسبة. يجب أن يكون تعزيز دعم الأمومة للأمهات العاملات المتعلمات لمواصلة الرضاعة الطبيعية من مهام الصحة العامة للحكومات.