

Maternal preconception Folic Acid intake in Malta

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Folic acid and folates

- Folic acid is the synthetic form of folate – one of the B vitamins
- Folates are found in
 - Dark Leafy Greens
 - Asparagus
 - Broccoli
 - Citrus Fruits
 - Beans, Peas, and Lentils
 - Avocado
 - Okra
 - Brussels Sprouts



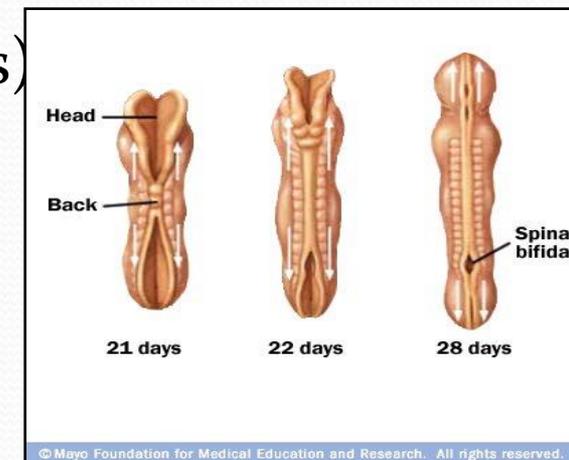
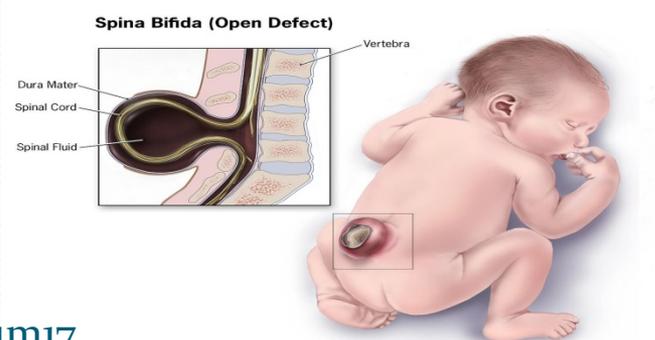
Bioavailability

- Folic acid has greater bioavailability than food folates:
 - 100% of folic acid is bioavailable if taken without food
 - At least 85% of folic acid is estimated to be bioavailable when taken with food, whereas
 - Only about 50% of folate naturally present in food is bioavailable

(<https://ods.od.nih.gov/factsheets/Folate-HealthProfessional/>)

Importance of folates

- **General health - play an important role in:**
 - formation of red and white blood cells,
 - formation of nucleic acids in DNA and RNA
 - homocysteine metabolism.
- **Major importance in pregnancy and infant health:**
 - Prevention of megaloblastic anaemia, prematurity, pre-eclampsia and spontaneous pregnancy loss
 - Prevention of Neural Tube Defects (NTDs)



Folic acid and prevention of NTDs

- Periconceptional Folic acid intake can decrease the rate of NTDs by 50% for the first occurrence and up to 70% for recurrence if taken at the correct time, giving good scope for action to actively prevent these defects.
- However folic acid is most effective if started at least 1 month prior to conception

MRC Vitamin Study Research Group. Prevention of neural tube defects : Results of the Medical Research Council Vitamin Study. *Lancet*. 1991;338(8760):131-137.

International recommendations on Folic Acid requirements

- In an otherwise healthy woman folate requirements for healthy pregnancy and to avoid birth defects:
 - 400 ug folic acid per day
 - (equivalent to 600 ug from food folates)

Taken from 4 weeks before conception to 12 weeks after conception

CDC (Center for Disease Control). Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. MMWR. 1992;41(RR-14):1-7

Food intake required to reach recommended intake



- 23 spears of cooked asparagus or
 - 4 cups of cooked okra or
 - 4 cups of raw spinach or
 - 2 slices of beef liver or
 - 6 cups of orange juice or
 - 4.5 cups of cooked broccoli
- on a daily basis* to satisfy and reach the recommended intake.



RATIONALE AND AIM:

- The prevalence rate of NTDs in Malta is 10.0/10,000 births, yet it has been documented that the rate of non-preventable NTDs can be brought down to 5-6/10,000 births.¹
- This study aims to investigate the maternal intake of preconception folic acid in Malta and the maternal factors associated with increased likelihood of taking preconception folic acid supplementation.

¹ Crider, K. S., Devine, O., Hao, L., Dowling, N. F., Li, S., Molloy, A. M., ... & Berry, R. J. (2014). Population red blood cell folate concentrations for prevention of neural tube defects: Bayesian model. *BMJ*, 349, g4554.

Method

- Retrospective Registry data study
- The National Obstetric Information System (NOIS) of the Directorate for Health Information and Research collects information on all births on the Maltese Islands. This register collects detailed demographic, pregnancy, delivery and infant outcome data. One of the variables recorded when women attend their first antenatal visit at hospital is whether they have taken folic acid before pregnancy.
- NOIS data for 2015 was used to analyse the maternal intake of preconception folic acid in Malta.
- Excel and Epi Info were used to analyse data.

Results:

- Total women delivering in 2015: 4385
- Women reported to take folic acid preconceptionally:
1123 (25.6%)

Univariate analysis for associated factors

Maternal variable		Total	When folic taken		% with <i>preconception Folic Acid Intake</i>	P value
			Preconception	Not preconception		
Age	<25	639	44	595	6.89	p<0.0001
	25-35	3123	907	2216	29.04	
	>35	619	172	447	27.79	
Parity	Nulliparae	2220	701	1519	31.58	p<0.0001
	Multiparae	2161	422	1739	19.53	

Univariate analysis for associated factors

Maternal Variable		Total	When folic taken		% with <i>preconception Folic Acid Intake</i>	P value
			Preconception	Not preconception		
Education	Tertiary	1480	556	924	37.57	
	Vocational	1046	278	768	26.58	
	Secondary	1628	280	1348	17.20	p<0.0001
Nationality	Maltese	3542	996	2546	28.12	
	Europe & Russia	457	93	364	20.35	
	Others	379	34	345	8.97	p<0.0001

Univariate analysis for associated variables

Maternal Variable		Total	When folic taken		% with preconception Folic Acid intake	P value
			Preconception	Not preconception		
Locality	NorthWest	2500	678	1822	27.12	p=0.026
	SouthEast	1589	381	1208	23.98	
	Gozo	292	64	228	21.92	
Marital Status	Married	3006	975	2031	32.44	p<0.0001
	Not Married	1376	148	1228	10.76	

Univariate analysis for associated variables

Maternal variable		Total	When folic taken		% with preconception Folic Acid intake	P value
			Preconception	Not preconception		
Planned Pregnancy	Yes	2882	1072	1810	37.20	p<0.0001
	No	1215	40	1175	3.29	
ART*	Yes	97	63	34	64.95	p<0.0001
	No	4284	1060	3224	24.74	

*ART – Assisted Reproductive Technology

Conclusion

- Analysis showed that the characteristics significantly associated with taking preconception folic acid ($p < 0.05$) include:
 - Maternal age > 25 years,
 - Nulliparity,
 - Increased educational level,
 - Maltese nationality,
 - Residence in North West of Malta,
 - Marital status - married,
 - Planned pregnancy and
 - Use of artificial reproductive technology

Discussion

- Although preconception folic acid supplementation has been advised since the early 1990s, in Malta only a *quarter* of mothers are actually taking this before pregnancy. This low compliance is also documented in several studies from various countries.
- Several maternal factors have been found to be associated with better intake of preconception folic acid.
- Effective methods of increasing maternal preconception intake of folic acid must be implemented in order to decrease the rate of NTDs in Malta.
- This is truly an area where public health initiatives can be effective

Thank you



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