Assessing the relationship between lifestyle and the incidence of ovulatory infertility in women-preliminary results

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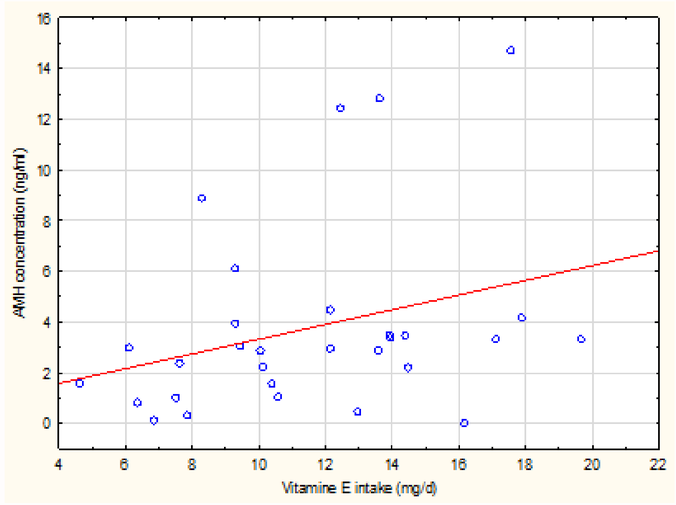
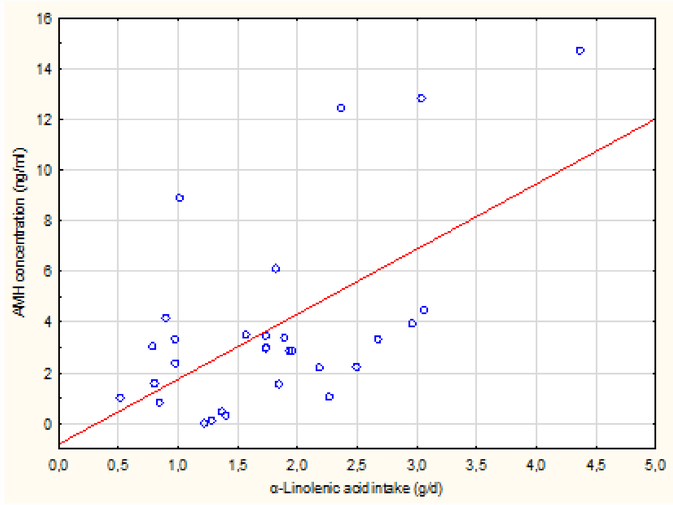
Antimüllerian hormone is a recognized marker of a woman's remaining reproductive potential. It is used to monitor ovarian reserve, which reflects the ability of the ovary to produce fertile eggs. Low AMH results indicate reduced ovarian reserve, i.e., fewer ovarian follicles available. On the other hand, elevated blood levels are seen in women with polycystic ovary syndrome (PCOS). This indicates that the hormone is produced in pathological amounts by a large number of ovarian follicles. Data from scientific studies on the relationship between the intake of omega-3 fatty acids and improved fertility are inconclusive. Studies show that serum concentrations of omega-3 fatty acids play an important role in reproduction in animal models, while conflicting results have been reported in human studies of infertile women. This area is still under investigation.

The following 3 variables: vitamin E, alpha-linolenic acid, and the dietary intake of omega-3 fatty acids correlate with AMH but they also correlate with one another which is an obstacle to include them as predictors in the linear regression model, for this reason the Principal Component Anslysis was used. It creates 3 independent components for the 3 variables, which carry the same information as the input variables, but are not correlated with one another.

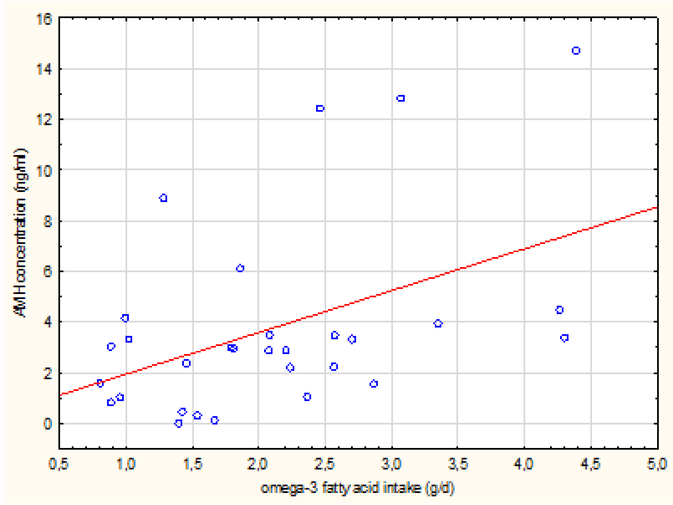
This allows them to be included in the process of designing a linear regression model in place of the original variables. Finally, the 3 output variables obtained through PCA (the 3 main components that replaced vitamin E, omega 3 fatty acids, and daily intake of alpha-linolenic acid), and 2 other variables (age and MCHC concentration) were used in the process of creation of the linear regression model.



Positive correlation (R=0.4, p=0.047) between vitamin E dietary intake (g/d) and AMH concentration (ng/ml)



Positive correlation (R=0.44, p=0.016) between 18:3 fatty acid dietary intake (g/d) and AMH concentration (ng/ml)



Positive correlation (R=0.45, p=0.013) between omega-3 fatty acid dietary intake (g/d) and AMH concentration (ng/ml)

variable	n-3 PUFAs	vitamin E	alpha-linolenic acid	ferrtin	MCHC	VFA	age
n-3 PUFAs	x	0,036	< 0,001	0,78	0,8	0,74	0,24
vitamin E	0,036	x	0,05	0,2	0,91	0,54	0,57
alpha-linolenic acid	< 0,001	0,05	x	0,97	0,58	0,82	0,22
ferrtin	0,78	0,2	0,97	x	0,07	0,48	0,12
MCHC	0,8	0,91	0,58	0,07	x	0,84	0,64
VFA	0,74	0,54	0,82	0,48	0,84	x	0,84
age	0,24	0,57	0,22	0,12	0,64	0,84	x

Mutual correlations between variables included in the process of creation of linear regression model

AMH	β	p-v	95% CI	
Factor 1	1,43	0,002	0,59	2,26
Factor 2	-0,08	0,91	-1,71	1,54
Factor 3	2,84	0,14	-1,04	6,73
ferritine	-0,007	0,38	-0,02	0,009
MCHC	1,44	0,024	0,2	2,68
VFA	-0,03	0,161	-0,068	0,013
age	-0,33	0,029	4,92	24,5

Univariate linear regression analysis

AMH	β	p-v	95% CI	
Factor 1	1,41	<0,001	0,68	2,13
MCHC	1,49	0,004	0,52	2,46
age	-0,16	0,178	-0,39	0,77

Multivariate linear regression model

STUDY GROUP

The preliminary study was conducted in 30 women with and without fertility impairment. In all the subjects blood samples for the hormone test were taken at the same phase of the cycle. The patients came from the Department of Gynecologic Endocrinology and Gynecology of the Developmental Age, Medical University of Bialystok.

RESULTS

The multivariate linear regression model has an R^2 value of 0.5005, indicating that it explains more than 50% of the variability in the AMH variable.

CONCLUSIONS

Due to the small size of the study group, the results of the study should be considered preliminary. They suggest that dietary levels of omega-3 fatty acids in addition to vitamin E and MCHC concentrations as well as age may impact serum AMH levels.