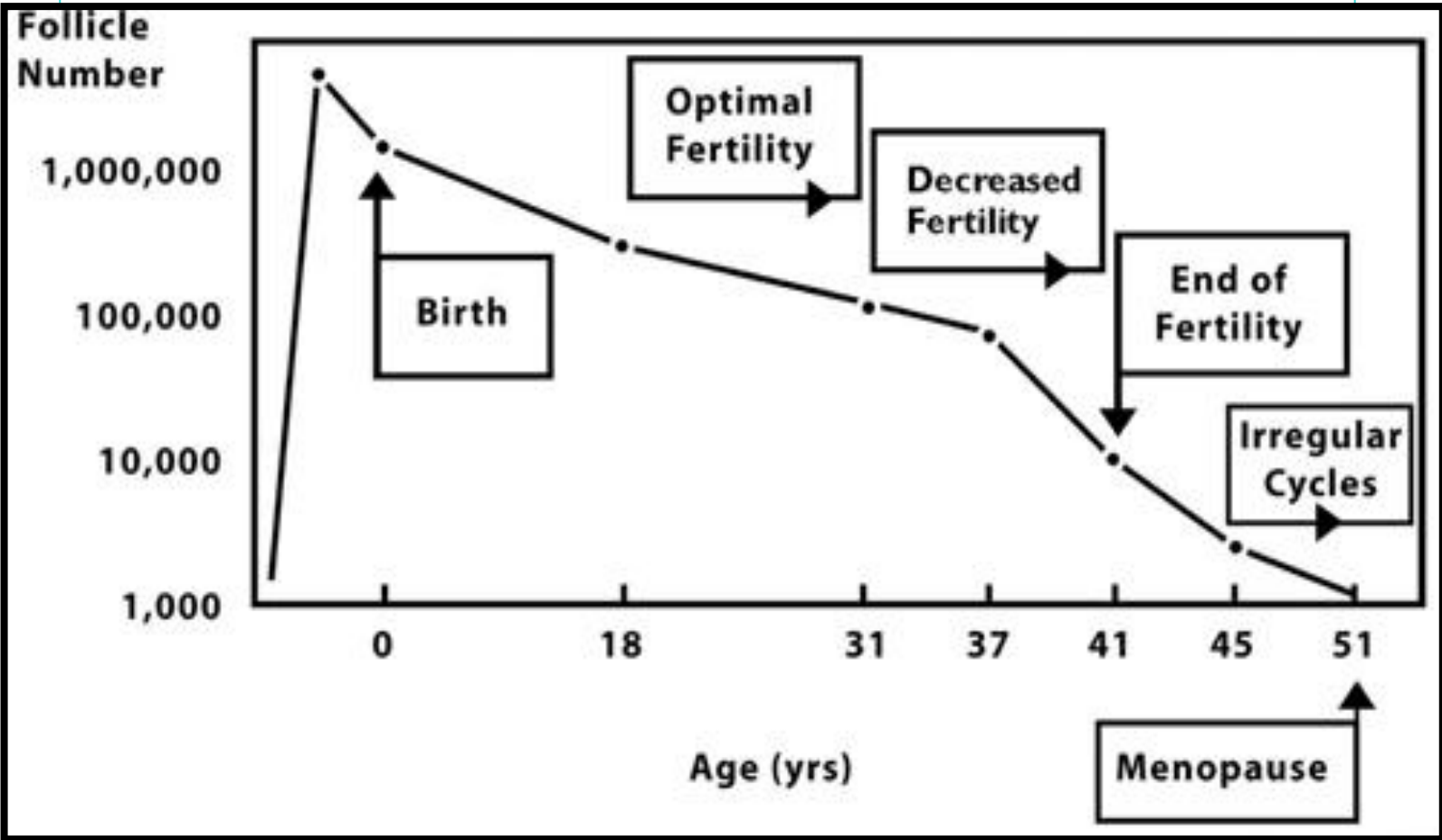


Predictors of Anti-Müllerian Hormone, a Biomarker of Ovarian Reserve: A Systematic Review of the Literature

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Background

- Anti-Müllerian hormone (AMH) is a non-invasive marker of *ovarian reserve*, the number of remaining follicles in the ovary.
- There is inadequate knowledge of the biobehavioral predictors of AMH levels in normo-ovulatory women.



Purpose

- The purpose of this systematic review is to summarize the evidence on the biobehavioral factors associated with AMH levels in normo-ovulatory women.

Methods

- An electronic literature search was conducted in PubMed on May 25, 2017 using the following search terms: “anti-Müllerian hormone” NOT “polycystic ovarian syndrome” NOT “cancer” NOT “assisted reproductive technology”, and using filters: 10 years, females, humans, English.
- The Quality Assessment Tool for observational cohort and cross-sectional studies was used to rate the internal validity of the studies included.

Results

- The search strategy resulted in 476 studies. Forty studies were selected from the primary search. Nine were excluded because they did not meet inclusion criteria.
- Five studies were added from reference lists of included studies.
- **A total of 36 studies were included in the review.**

Factor	Effect	Studies	Quality ratings	Main finding
Contraceptives (n=12)	Yes	8	Fair (n=6) Good (n=2)	• Current use of contraceptives, but not previous use, associated with significantly lower AMH levels.
	No	4	Poor (n=2) Fair (n=1) Good (n=1)	• No significant difference between users and non-users of contraceptives.
Smoking (n=7)	Yes	2	Fair	• Current smoking, but not previous smoking associated with significantly lower AMH levels.
	No	5	Poor (n=1) Fair (n=4)	• Decreasing trend observed in current and previous smokers but did not reach significance (n=1) • Current smoking has a significant effect but not after controlling for age (n=1) • No significant effect of current or previous smoking on AMH levels (n=3)
Alcohol and caffeine (n=4)	Yes	2	Fair	• Significantly lower AMH levels in women who consumed alcohol and caffeine
	No	2	Fair	• No significant association between AMH levels and alcohol or caffeine consumption
BMI (n=7)	Yes	4	Fair (n=3) Poor (n=1)	• Increased BMI associated with significantly lower AMH levels
	No	3	Fair	• Increased BMI associated with lower AMH levels but not significant after adjusting for age (n=1) • No significant association between BMI and AMH levels (n=2)
Maternal age at menopause (n=2)	Yes	2	Fair	• Earlier maternal age at menopause associated with lower AMH levels
Age at menarche (n=2)	Yes	1	Fair	• Later age at menarche associated with significantly lower AMH levels
	No	1	Fair	• Years since menarche associated with lower AMH levels but not significant in multiple linear regression
Parity (n=6)	Yes	4	Fair	• Higher parity associated with significantly lower AMH levels (n=3) • Higher parity associated with higher AMH levels (n=1)
	No	2	Fair	• No significant association between parity and AMH
Ethnicity (n=2)	Yes	1	Fair	• AMH levels significantly different between ethnic groups
	No	1	Fair	• No significant effect of ethnicity on AMH levels
Cardiometabolic (n=2)	Yes	2	Good (n=1) Fair (n=1)	• Over time, cholesterol and LDL profiles are less favorable in women with lower AMH levels • Increase in HOMA-IR associated with significantly lower AMH levels

Discussion

- **Reproductive:** Probable association between current contraceptive use and lower AMH levels. Earlier maternal age at menopause associated with lower AMH levels. Contradictory evidence regarding age at menarche and parity and AMH levels.
- **Lifestyle:** Contradictory evidence regarding the association between smoking and alcohol and caffeine consumption and AMH levels.
- **Cardiometabolic:** Contradictory evidence regarding the association between BMI and AMH levels. Insufficient evidence regarding association between cardiometabolic factors and AMH levels.

Conclusions

- The accuracy of AMH as a biomarker of ovarian reserve depends on an adequate understanding of the biobehavioral factors affecting its concentrations.
- There is a need for longitudinal studies with consistent measurement of biobehavioral factors so as to permit a meta-analysis and the development of multivariate predictive models for hypothesis testing.
- Picture from: <http://human-fertility.com/diminished-ovarian-reserves/>
- Other references available upon request.