Qualitative findings revealed infertility as a prolonged experience of uncertainty, repeated disappointment, decision-making pressure, social isolation, and insufficient societal recognition. Participants frequently perceived a lack of understanding not only within their social environment but also within healthcare services.

Healthcare professionals confirmed the considerable psychosocial burden experienced by people undergoing fertility treatment, while identifying structural barriers, including limited consultation time, fragmented care pathways, and insufficient integration of psychosocial support into routine fertility services. They advocated for stronger interprofessional collaboration and coordinated care models that address the emotional, psychosocial, and existential dimensions of infertility alongside medical treatment.[6,7]

A key strength of the HoPE project is its successful translation of research into education, clinical practice, and health policy. The findings informed the development of innovative continuing education programmes (Certificate of Advanced Studies and Short Advanced Studies) at Bern University of Applied Sciences, Switzerland, designed to strengthen competencies in person-centred, interprofessional, and psychosocially informed reproductive healthcare among physicians, nurses, midwives, counsellors, medical practice assistants, and other healthcare professionals.

Based on the results, an evidence-based patient information brochure was co-developed to support individuals during the emotionally challenging waiting period between embryo transfer and pregnancy testing, translating research findings into practical guidance. The project has also contributed to national policy discussions by informing the Swiss Parliamentary Group for Family Policy on issues related to infertility, fertility care, reimbursement, and service organisation. The findings have fostered collaborations and contributed to the growing integration of psychosocial care into reproductive medicine.

CONCLUSION

The HoPE study demonstrates that infertility should be understood not only as a medical condition, but also as an emotional, psychosocial, and existential experience. Its impact illustrates how interprofessional research can drive evidence-based improvements in reproductive healthcare through interdisciplinary collaboration, person-centred care, and effective knowledge translation across education, clinical practice, patient resources, and health policy.

References

1. Bernet M et al. Beyond medical treatment: addressing the emotional and spiritual dimensions of infertility – a mixed-methods approach. Abstract L26/O-111. ESHRE Annual Meeting, 5-8 July, 2026.
2. WHO. Infertility prevalence estimates, 1990–2021. 2023. Available at: https://www.who.int/publications/i/item/978920068315. Last accessed: 10 July 2026.
3. European Society of Human Reproduction and Embryology (ESHRE). Routine psychosocial care in infertility and medically assisted reproduction: a guide for fertility staff. 2023. Available at: https://www.eshre.eu/-/media/sitecore-files/Guidelines/Psychology/ESHRE-psychology-guideline_2015_final_version-1_2.pdf. Last accessed: 10 July 2026.
4. Lienhard M et al. Bedürfnisse von betroffenen personen während einer kinderwunschbehandlung und deren erwartungen an die pflegerische betreuung. Medical Update Marketing & Media. 2024;DOI:10.24451/dspace/11368.
5. Sutter L et al. Psychische gesundheit im übergang zum elternsein: herausforderungen und chancen nach kinderwunschbehandlungen. Sozialpsychiatrische Informationen. 2025;55(3):46-50.
6. Bernet M et al. Quality of life, spiritual needs, and well-being of people affected by infertility and its treatment: quantitative results of a mixed-methods study. J Assist Reprod Genet. 2025;42:1853-62.
7. Bernet M et al. "It's like having a second job": qualitative insights into the emotional burden of infertility and the need for coordinated care. J Psychosom Obstet Gynaecol. 2025;46(1):2505589.
8. Boivin J et al. The Fertility Quality of Life (FertiQoL) tool: development and general psychometric properties. Fertil Steril. 2011;96(2):409-15.e3.
9. WHO Regional Office for Europe. Wellbeing measures in primary health care: the DEPCARE project. 1998. Available at: https://iris.who.int/items/07a5e1ac-9832-4088-a25d-0338088bdb05. Last accessed: 10 July 2026.
10. Büssing A. The Spiritual Needs Questionnaire in research and clinical application: a summary of findings. J Relig Health. 2021;60(5):3732-48.

The Role of the Exposome and Lifestyle in Live Birth Outcomes Among Lebanese Patients Undergoing IVF

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BACKGROUND AND AIMS

Clinical predictors such as maternal age and ovarian reserve are well-established determinants of IVF success.[1] Increasing evidence suggests that environmental and lifestyle exposures also influence reproductive outcomes; however, these factors remain insufficiently investigated in low- and middle-income countries.[2,3] In Lebanon, reproductive research has historically focused on maternal and child health, with limited attention paid to the role of environmental exposures in assisted reproductive technologies.[4,5] This study aimed to investigate the specific contribution of environmental, chemical, and lifestyle exposures to live birth outcomes among Lebanese patients who have undergone IVF, while integrating complementary biomonitoring evidence from the Environmental Exposures in Lebanese Infants (EELI) mother–child cohort to provide a broader, evidence-based understanding of reproductive and early-life environmental health.[4-7]

MATERIALS AND METHODS

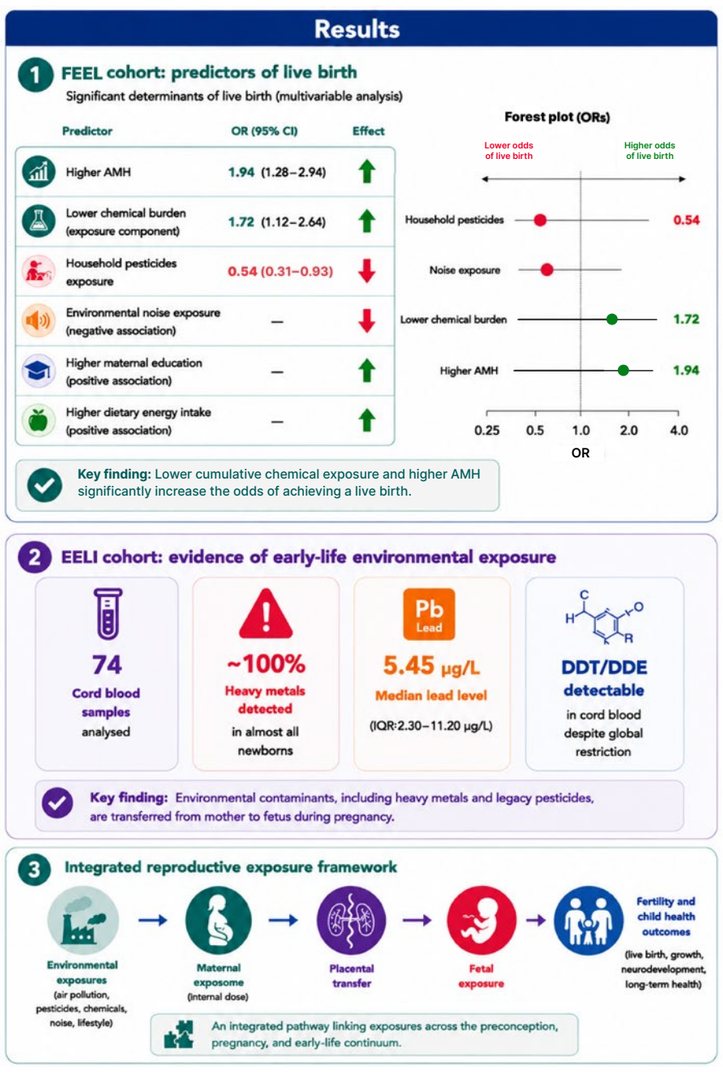
This prospective cohort study was conducted within the Fertility in Light of Environmental Exposures and Lifestyle (FEEL) study and included infertile patients undergoing IVF treatment.[6] Participants were prospectively followed throughout their treatment cycles to accurately assess cumulative live birth outcomes. Demographic, clinical, lifestyle, dietary, and environmental exposure data were collected using standardised questionnaires and clinical assessments. Principal component analysis was performed to derive robust composite environmental exposure measures, while multivariable logistic regression was used to identify independent predictors of live birth after adjustment for relevant clinical and sociodemographic confounders. To complement these findings, biomonitoring evidence from the EELI cohort, including analyses of heavy metals and legacypesticides in cord blood, was incorporated to contextualise environmental exposure pathways during pregnancy and early life.[4,5,7]

RESULTS

Higher anti-Müllerian hormone (AMH) was independently associated with greater odds of live birth (odds ratio [OR]: 1.94; 95% CI: 1.28–2.94). A principal component representing lower cumulative chemical exposure was also positively associated with live birth (OR: 1.72; 95% CI: 1.12–2.64). Conversely, household pesticide exposure was associated with significantly lower odds of live birth (OR: 0.54; 95% CI: 0.31–0.93), while higher environmental noise exposure demonstrated a negative

association with reproductive success, including perceived noise affecting sleep (moderate disagreement: OR: 0.020; 95% CI: 0.0007–0.55; strong disagreement: OR: 0.051; 95% CI: 0.003–0.80). Higher maternal education and greater dietary energy intake were positively associated with IVF outcomes. Complementary evidence from the EELI cohort demonstrated widespread prenatal environmental exposure, with heavy metals detected in nearly all cord blood samples (n=74), a median cord blood lead concentration of 5.45 µg/L, and detectable levels of legacy pesticides,

Figure 1: Environmental, lifestyle, and biomonitoring determinants of live birth outcomes in Lebanese patients undergoing IVF.



Created using ChatGPT (OpenAI, San Francisco, California, USA).

AMH: anti-Müllerian hormone; DDE: dichlorodiphenyldichloroethylene; DDT: dichlorodiphenyltrichloroethane; IQR: interquartile range; OR: odds ratio.

confirming fetal exposure to environmental contaminants before birth. An overview of the principal findings from the FEEL and EELI cohorts, together with the integrated reproductive exposome framework, is presented in Figure 1.

CONCLUSION

Clinical factors remain important determinants of IVF success, but modifiable environmental and lifestyle exposures also contribute to reproductive outcomes. Lower chemical exposure and reduced household pesticide exposure were associated with improved live birth outcomes, while biomonitoring evidence confirmed that environmental contaminants are transferred to the fetus during pregnancy. These findings support the integration of exposome assessment into routine fertility care as a feasible, preventive strategy that complements conventional clinical management. Incorporating environmental health perspectives into reproductive medicine may improve IVF success rates, promote healthier pregnancies, and contribute to better long-term health outcomes across the life course.

References

1. Whaibeh E al. Correlates of prenatal heavy metal contamination in Lebanese infants using cord blood analysis. Sci Rep. 2026; DOI:10.1038/s41598-026-46981-1.
2. Whaibeh E et al. Cord blood lead screening in Lebanon: findings from the environmental exposures in Lebanese infants (EELI) study. Environ Pollut Bioavailab. 2025;37(1):2524084.
3. Whaibeh E et al. The Environmental Exposures in Lebanese Infants (EELI) birth cohort: an investigation into the Developmental Origins of Health and Diseases (DOHaD). Int J Environ Health Res. 2024;34(3):1675-86.
4. Whaibeh E et al. Air pollution and perinatal health in the Eastern Mediterranean region: challenges, limitations, and the potential of epigenetics. Curr Environ Health Rep. 2022;9(1):1-10.
5. Fares KS et al. Exploring determinants of cumulative live birth rates in IVF: insights from the EELI study in Lebanon. Reprod Health. 2026;23(1):35.
6. Fares KS et al. The role of diet and food supplements in infertility management in the Eastern Mediterranean region: a narrative review. Int J Reprod Biomed. 2025;23(1):1-16.
7. Fares KS et al. The influence of environmental and chemical exposures on fertility in the Eastern Mediterranean region: a narrative review. Int J Reprod Biomed. 2025;23(10):787-802.