Introduction: The presence of heavy metals in the environment has been linked to female infertility. Follicular fluid (FF), which surrounds the developing oocyte in the ovary, can provide valuable insights into the multielemental content. However, there is a lack of comprehensive studies that analyze trace elements in FF samples using standardized protocols and methods. The objective of this study was to develop a reliable method utilizing ICP-MS/MS without sample digestion to detect 22 analytes in FF samples.

Methods: Four FF samples (n=4) were obtained from patients undergoing in vitro fertilization (IVF) treatments. These were aliquoted and processed, properly. They were subsequently analyzed by ICP-MS/MS, both in He and no-gas mode. Finally, the data of interest were compiled in a database.

Results: The analyte recoveries ranged from 70% to 130%, with better results observed in no-gas mode compared to He mode. Among the 22 elements analyzed, only ^{9}Be, ^{140}Ce, ^{111}Cd, ^{139}La, ^{208}Pb and ^{238}U were not detected. Minor concentrations were observed for ^{137}Ba, ^{209}Bi, ^{59}Co, ^{55}Mn, ^{95}Mo, ^{60}Ni, ^{121}Sb, ^{118}Sn, ^{205}Tl, and ^{51}V, while intermediate concentrations were found for ^{7}Li, and ^{88}Sr. Major concentrations were identified for ^{52}Cr, ^{85}Rb, ^{47}Ti and ^{66}Zn.

Conclusions: A new procedure has been developed with several advantages. One of them is the good results in terms of recovery for a wide variety of elements in a poorly studied biological matrix as follicular fluid using ICP-MS/MS. Also, the low amount of sample required to perform the analysis and the development of a green method where the sample is not digested and, not diluted which allowed to not excessively dilute the concentration of analytes. Moreover, this developed method provides a novel approach to diagnose and predict health risks in women with gynecological pathologies and to assess their overall health, including reproductive health.