Reviewer's report

Title: Histological type and grade of breast cancer tumors by parity, age at birth, and time since birth: a register-based study in Norway

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Reviewer: Isabelle Soerjomataram

Reviewer's report:

The paper described the occurrence of breast cancer by histological type and grade according to reproductive factors.

This paper is generally well written, the analysis (method) was well done and the data are sound.

My general comment that requires major revision from authors is that the paper almost literally just describes the relations between outcome (of interest) and available variables. The discussion mentioned several other papers/studies to support findings/results but authors discussed very little the relevancy and implication of their findings. This applies to the whole discussion of results part of the paper.

For example at page 13 authors discussed that higher parity relates to lower risk of mucinous tumor and higher risk of paget disease. Does this mean that hormonal factors protected the growth of mucus producing cell (origin of mucinous tumor)? Pagets disease originates from the ducts why was the same observation not found for ductal tumor? Do authors have hypotheses on the pathohistology of breast cancer in relation to reproduction history that can be assessed using their results?

What are the clinical implications, for patients, diagnosis, doctors or others?

Minor revisions:

It is also not clear why histological type and grade are both chosen as outcome of the study. Both outcomes are strong prognostic factors of breast cancer, but so do tumor size, nodular involvement etc. Why only these two factors? Or why include both of them in one paper? What do they complement each other?

I saw also very little exploration of familial breast cancer history in the paper. Authors mentioned it once in the result, reporting the relation between histological type and familial risk. Why was the same analysis for grade not done? There are only 2 categories of grade, case number might be enough.

Finally it would be informative to add the grading system that is used in the method. I thought European pathologist generally use Nottingham classification but the reported grade in 3 tier grading system.

Final suggestion (discretionary revision):
I saw that authors adjusted age at first birth when analyzing the effect of parity. Parity and age at first birth is probably highly related. Correction in a regression analysis might adjust for confounding, but effect modification may still exist. Perhaps authors could examine this as a supplement to the main analysis.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests