

---

# APPLICATION OF SUPERVISED MACHINE LEARNING ALGORITHMS TO IDENTIFY THE PREVALENCE AND DETERMINANTS OF SPONTANEOUS ABORTION AMONG EVER-MARRIED WOMEN IN SOMALILAND: INSIGHTS FROM SLDHS DATA 2020

---

Leila Mohamed Farah<sup>1,\*</sup>, Abdisalam Hassan Muse<sup>1</sup>

<sup>1</sup>Faculty of Science and Humanities, School of Postgraduate Studies and Research (SPGSR),  
Amoud University, Borama 25263, Somalia

## ABSTRACT

This study examined the prevalence and determinants of spontaneous abortion among ever-married women in Somaliland using the Somaliland Demographic Health Survey 2020. The results showed that 95.85% of respondents had unintended abortions, while 4.1% had not experienced abortions. The results were presented using Chi-square with a 95% confidence interval (CI) and a p-value  $\leq 0.05$ . The analysis indicates that abortion rates vary across regions in Somaliland. The Waqooyi Galbeed region has a statistically significant association with abortion compared to other regions AOR=2.4, p-value=0.002. Additionally, individuals in the second wealth index category are more likely to have abortions AOR=2.01, p-value=0.012. The study also found that difficulties in accessing medical help are significantly related to abortion AOR=1.6, p-value=0.005, and individuals with more than five children are more likely to have spontaneous abortions, showing a statistically significant association AOR=1.9, p-value=0.003. Five machine learning models were used to analyze predictors of spontaneous abortion, with Random Forest and KNN being the most accurate models, achieving accuracy rates of 95.9% and 95.5% respectively.

**Keywords** Spontaneous abortion · machine learning · logistic regression · prediction

## References

- [1] Abera, G. B., Berhanu, B., Kahsay, A. B., Gebru, H. B., & Aregay, A. (2012). Assessment of determinants of induced abortion among child bearing age women attending maternal and child health clinic in mekelle Town, Tigray, Ethiopia: A cross-sectional study. *International Journal of Pharmaceutical Sciences and Research*, 3(12), 4745–4756.
- [2] Ahmed, S. A., Mohamed, M. H., Hussein, A. M., & Nur, M. M. (2021). The Effect of Unplanned Pregnancy among Women Collage in Wadajir Distract Moqdisho Somalia. *Open Journal of Nursing*, 11(01), 42-55.
- [3] Alemu, M. D., Workie, S. B., Kussa, S., Gidey, T. T., & Berheto, T. M. (2024). Trend and determinants of unmet need for family planning among married women in Ethiopia, evidence from Ethiopian demographic and health survey 2000 – 2016; multilevel analysis. 5, 1-15.
- [4] Ali Egal, J., Essa, A., Osman, F., Klingberg-Allvin, M., & Erlandsson, K. (2023). Facility-based maternal deaths: Their prevalence, causes and underlying circumstances. A mixed method study from the national referral hospital of Somaliland. *Sexual and Reproductive Healthcare*, 37(May), 100862.

---

\*Corresponding Author's E-mail: Leilamohamed879@gmail.com; Abdisalam.hassan@amoud.edu.so

- [5] Madgett, P. J., & Bélanger, C. H. (2008). First university experience and student retention factors. *Canadian Journal of Higher Education*, 38(3), 77-96.
- [6] McInnis, C., Hartley, R., Polesel, J., & Teese, R. (2000). Non-completion in vocational education and Training and Higher Education. *BMC Women's Health*, 20(1), 1–11.
- [7] Çetinkaya, M., & Mercan, Y. (2021). Spontaneous and Induced Abortions and Its Determinants in Women Aged 15-49. *Turkish Journal of Family Medicine and Primary Care*, 15(3), 490–500.
- [8] Cohain, J. S., Buxbaum, R. E., & Mankuta, D. (2017). Spontaneous first trimester miscarriage rates per woman among parous women with 1 or more pregnancies of 24 weeks or more. *BMC Pregnancy and Childbirth*, 17(1), 1–7.
- [9] Florent, F. Y., Hetchu, P. B., Anyimbi, M. O., & Foumane, P. (2022). Determinants of First Trimester Spontaneous Abortion Among Pregnant Women Who Visit Yaoundé Hospitals: Case Control Study. *Ethiopian Journal of Reproductive Health*, 14(3), 1–10.
- [10] Gilano, G., & Hailegebreal, S. (2021). Determinants of abortion among youth 15–24 in Ethiopia: A multilevel analysis based on EDHS 2016. *PLoS ONE*, 16(3 March), 1–9.
- [11] Lubeya, M. K., Mukosha, M., Jacobs, C., Chanda, K., Phiri, C. C., Munakampe, M. N., Sichone, V., Makasa, M., Mangala, B., Vwalika, B., & Kaonga, P. (2022). Magnitude and determinants of unsafe abortion among Zambian women presenting for abortion care services: A multilevel analysis. *International Journal of Gynecology and Obstetrics*, 159(3), 979–982.
- [12] Nigussie, T., Feyisa, M., Yosef, T., Berhanu, M., & Asefa, A. (2020). Prevalence of Induced Abortion and its Associated Factors among Female Students of Health Science in South West Ethiopia. *The Open Nursing Journal*, 14(1), 248–253.
- [13] Oumer, M. (2019). Prevalence and Associated Factors of Induced Abortion Among Women of Reproductive Age Group in Gondar Town, Northwest Ethiopia. *Science Journal of Public Health*, 7(3), 66.
- [14] Brosens, J. J., Brewin, J., Ramhorst, R., Lucas, E. S., McCoy, R. C., Anderson, R., Daher, S., Regan, L., Al-Memar, M., Bourne, T., MacIntyre, D. A., Rai, R., Christiansen, O. B., ... Coomarasamy, A. (2021). Miscarriage matters: the epidemiological, physical, psychological, and economic costs of early pregnancy loss. *The Lancet*, 397(10285), 1658–1667.
- [15] Sesay, F. R., Anaba, E. A., Manu, A., Maya, E., Torpey, K., & Adanu, R. M. K. (2023). Determinants of induced abortion among women of reproductive age: evidence from the 2013 and 2019 Sierra Leone Demographic and Health Survey. *BMC Women's Health*, 23(1), 1– 10.
- [16] SLHDS. (2020). The Somaliland Health Demographic Survey. [www.somalilandmohd.com](http://www.somalilandmohd.com)
- [17] Verma, P., Swain, P. K., Singh, K. K., & Khetan, M. (2020). Count data regression modeling: An application to spontaneous abortion. *Reproductive Health*, 17(1), 1–9.