

Web-Based Preconception Interventions to Prevent FASD

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Issue

It is estimated that between 10-15% of Canadian women consume alcohol during pregnancy, and up to 5% of infants are born each year with Fetal Alcohol Spectrum Disorder (FASD).¹ In response, researchers are exploring evidence-informed approaches for reducing prenatal alcohol exposure (PAE), and improving birth outcomes and the health of parents-to-be. One approach is through preconception health (PCH) interventions, which have the potential to optimize the health and wellbeing of women, men, and children.

Background

FASD is characterized by physical, cognitive, social-emotional, and behavioural difficulties as a result of PAE.² When adequate supports are not put into place, FASD can be associated with negative long-term outcomes including problems with school and employment, confinement, mental health and substance use difficulties, and trouble with the law.³ Researchers, policy makers, and service providers spend considerable effort to identify best practices and develop policies for FASD diagnosis, intervention, and prevention.

In the FASD prevention field specifically, many initiatives have been undertaken to support women to reduce or abstain from alcohol during pregnancy. One of the strategies in this work involves improving the health of women *before* they conceive, to maximize the chances of positive pregnancy outcomes and improve women's overall health. These PCH interventions typically include evaluation and education around risk factors, and support for healthy decision-making before, during, and after pregnancy. Web-based programs are emerging as an effective way to increase preconception awareness and willingness to discuss PCH with service providers,⁴ as well as a promising avenue for PCH intervention to change behaviours. These initiatives are important, as they have the potential to provide feasible, cost-effective, and accessible support to a wide range of individuals.

Web-Based Preconception Health Interventions

One of the first web-based PCH interventions to be evaluated was a self-guided change tool focused on reducing the number of alcohol-exposed pregnancies among women at risk.⁵ The intervention was delivered both through the mail and online, and supported self-guided change through four modules covering current drinking patterns, decision-making, goal setting and planning, and overcoming barriers. After the intervention, over half (58%) of the women who completed were deemed no longer at risk for alcohol-exposed pregnancies, but there was no difference in the rate of risk reduction whether the women completed the web-based or mail-

based version. However, women in the web-based group were more likely to complete all modules at follow-up, and educated women were more likely to complete the intervention.

The *Gabby System* is another online interactive agent developed to engage women in discussing PCH with the ultimate goal of reducing a range of risk factors.⁶ Research results indicate that women find the Gabby System to be user-friendly, useful, an appropriate length, and that Gabby is easy to talk to, trustworthy, and provides useful information.^{6,7} Moreover, after having completed the Gabby System intervention, a majority of women reported they had taken some action to resolve risk factors.^{6,7}

A third web-based intervention was recently developed to improve knowledge and behaviours related to adverse pregnancy outcomes in women planning to become pregnant.⁸ Women in this study were provided with individually-tailored information to identify risk factors, and invited to schedule a preconception visit with a health care provider, bringing the information package along. Among women who responded to follow-up, the greatest reductions were seen in alcohol consumption, followed by folic acid supplementation, and susceptibility to hepatitis B and rubella, and most women had attended a preconception visit.

Importantly, researchers have also highlighted the father's role in reducing preconception risk factors, and emphasized that intervention efforts should involve both parents to be most effective in promoting healthy pregnancies.^{9,10} The web-based platform, *Smarter Pregnancy*, involves personalized coaching on nutrition and lifestyle factors for couples who are planning to become, or are already pregnant.¹⁰ This intervention has shown positive results at 6 months follow-up, with the majority of participants reporting high usability, and persistent reductions in nutritional inadequacies and alcohol and tobacco use among both mothers and fathers.

Together, these studies indicate that web-based interventions are a promising avenue for reducing pregnancy risk factors and promoting PCH, reaching a wide range of individuals. These interventions are perceived by users to be understandable, useful, and accessible, and individually tailored feedback and interactivity appear to be particularly important components.

Recommendations

- Canadian research on web-based PCH interventions is lacking, and studies are needed to explore the unique factors that might influence how web-based interventions may be best implemented with a range of women and men in Canada.
- It will be important to identify and reach subgroups of women who may be in greater need of prenatal education and support. Those who are socially disadvantaged may need to be provided with cell phones or access to computer kiosks in public health clinics in order to benefit from web-based interventions.
- Because of limited access to the Internet, individuals in rural and isolated communities represent another hard-to-reach group and may require creative and innovative approaches to benefit from web-based interventions.
- Fathers are important contributors to PCH and should be involved and engaged in our efforts to promote healthy families.
- There exist several websites related to PCH health in Canada, such as Alberta's *Ready or Not* (<https://readyornotalberta.ca>) and Ontario's *Best Start* (<http://www.beststart.org>) to be linked to new web-based interventions.

References

1. Popova, S., Lange, S., Probst, C., Parunashvili, N., & Rehm, J. (2017). Prevalence of alcohol consumption during pregnancy and Fetal Alcohol Spectrum Disorders among the general and Aboriginal populations in Canada and the United States. *European Journal of Medical Genetics*, *60*(1), 32-48. doi:10.1016/j.ejmg.2016.09.010
2. Chudley, A. E., Conry, J., Cook, L. L., Loock, C., Rosales, T., & LeBlanc, N. (2005). Fetal Alcohol Spectrum Disorder: Canadian guidelines for diagnosis. *Canadian Medical Association Journal*, *172*(5), S1-S21. doi:10.1503/cmaj.1040302
3. Streissguth, A. P., Bookstein, F. L., Barr, H. M., Sampson, P. D., O'Malley, K., & Young, J. K. (2004). Risk factors for adverse life outcomes in Fetal Alcohol Syndrome and Fetal Alcohol Effects. *Journal of Developmental and Behavioral Pediatrics*, *25*(4), 228-238. doi:10.1097/00004703-200408000-00002
4. Batra, P., Mangione, C. M., Cheng, E., Steers, W. N., Nguyen, T. A., Bell, D., .Kuo, A. A., & Gregory, K. D. (2017). A cluster randomized controlled trial of the MyFamilyPlan online preconception health education tool. *American Journal of Health Promotion*, 890117117700585. doi:10.1177/0890117117700585
5. Tenkku, L. E., Mengel, M. B., Nicholson, R. A., Hile, M. G., Morris, D. S., & Salas, J. (2011). A web-based intervention to reduce alcohol-exposed pregnancies in the community. *Health Education & Behavior*, *38*(6), 563-573. doi:10.1177/1090198110385773
6. Gardiner, P., Hempstead, M. B., Ring, L., Bickmore, T., Yinusa-Nyahkoon, L., Tran, H., Paasche-Orlow, M., Damus, K., & Jack, B. (2013). Reaching women through health information technology: The Gabby preconception care system. *American Journal of Health Promotion*, *27*(3), ES11-ES20.
7. Jack, B., Bickmore, T., Hempstead, M., Yinusa-Nyahkoon, L., Sadikova, E., Mitchell, S., Gardiner, P., Adigun, F., Penti, B., Shulman, D., & Damus, K. (2015). Reducing preconception risks among African American women with conversational agent technology. *Journal of the American Board of Family Medicine*, *28*(4), 441-U141. doi:10.3122/jabfm.2015.04.140327
8. Agricola, E., Pandolfi, E., Gonfiantini, M. V., Gesualdo, F., Romano, M., Carloni, E., Mastroiacovo, P., & Tozzi, A. E. (2014). A cohort study of a tailored web intervention for preconception care. *BMC Medical Informatics and Decision Making*, *14*. doi:10.1186/1472-6947-14-33
9. Agricola, E., Gesualdo, F., Carloni, E., D'Ambrosio, A., Russo, L., Campagna, I., Pandolfi, E., & Tozzi, A. E. (2016). Investigating paternal preconception risk factors for adverse pregnancy outcomes in a population of Internet users. *Reproductive Health*, *13*. doi:10.1186/s12978-016-0156-6
10. Van Dijk, M. R., Huijgen, N. A., Willemsen, S. P., Laven, J. S., Steegers, E. A., & Steegers-Theunissen, R. P. (2016). Impact of an mHealth platform for pregnancy on nutrition and lifestyle of the reproductive population: A survey. *JMIR mHealth and uHealth*, *4*(2), e53. doi:10.2196/mhealth.5197