

Effects of a School-Based Gender Equity Program that Reshapes Gender Norms in Promoting Child and Adolescent Health: A Cross-Sectional Study in China

Restrictive gender norms create powerful, often unseen, barriers to health and well-being worldwide. As a key social determinant of health, these norms drive deep and persistent inequalities, affecting everything from mental health outcomes to academic achievement. The pressure harms everyone. Girls and women are often constrained by rigid norms of femininity, which are strongly linked to outcomes like depression and eating disorders. Meanwhile, boys and men are frequently pushed toward "hazardous masculinities," a framework that encourages violence, substance use, and a dangerous avoidance of health-seeking behaviors.

The most critical period to intervene is adolescence. This period is far more than a simple transition to adulthood; it is a "window of opportunity" where the "social production of gender" is in high gear. Young people are actively negotiating and internalizing these norms, meaning that well-designed interventions at this stage can set a new, healthier trajectory for the rest of their lives. Despite this clear mandate for action, a critical evidence gap stalls progress. While many small-scale interventions focus on changing health behaviors exist, there is a lack of rigorous evaluations of large-scale, comprehensive programs aim to change the gender norms, especially those embedded within public education systems in major developing countries.

Adolescence is the most critical time to intervene. This period is more than just a transition to adulthood; it represents a "window of opportunity" where the "social production of gender" is at its peak. Young people actively negotiate and internalize these norms, meaning that well-designed interventions during this stage can set a healthier trajectory for the rest of their lives. Despite the clear need for action, a significant gap in evidence hampers progress. While many small-scale interventions exist, there is a stark lack of rigorous evaluations for large-scale, comprehensive programs, especially those integrated into government systems in major developing countries. We still do not know if, and how, gender-equity programs can be effective when implemented on a broader scale.

In this study, we conduct the first large-scale evaluation of a novel, multi-component gender equity education program implemented in Guangdong, China. This program was designed as a comprehensive, systemic health intervention, developed to be adaptive and scalable in partnership with local government. Therefore, our study offers insights into what it takes to shift gender norms and improve health outcomes in the background of developing countries.

The program of our interest is not a single-focus program but a comprehensive, systemic health intervention designed to be adaptive and scalable. Its core strategy is to achieve

empowerment through three pillars: 1) a "three-class" curriculum, integrating a specialized course (e.g., gender and mental health), an integrated course (infusing gender-equity concepts into all academic subjects like math and literature), and a practical course (e.g., students conducting gender-based audits of their own school environment); 2) gender-sensitive environments, including training teachers and reforming textbook imagery to show, for example, male nurses and female astronauts; and 3) adaptive implementation, utilizing an urban model (Zhongshan) focused on diverse career pathways and a rural model (Maoming) designed to address the specific needs of left-behind children.

We conducted a cross-sectional study with 3,199 adolescents (mean age 13.90, SD 2.87). The sample was drawn from schools implementing the program (n=1,533) and matched control schools (n=1,666). Using regression models, we assessed the program's association with gender norms (stereotype scores), health outcomes (physical fitness, depressive tendency, self-esteem), and academic performance, controlling for demographic covariates. We explicitly modeled intervention intensity to assess dose-response relationships and conducted gender-stratified subgroup analyses.

Our results show that the intervention is significantly associated with more equitable norms and broad improvements in adolescent well-being. It successfully reshapes norms, as it is associated with significantly reduced gender stereotypes, particularly in the crucial domain of occupational stereotypes ($p < 0.05$). It also demonstrates a strong dose-response effect: higher intervention intensity was linked to the strongest positive outcomes. The high-intensity group (the participants who received the intervention in both primary school and current school) showed significantly lower overall stereotype scores ($p < 0.05$), a near-doubling in the odds of good physical fitness (OR 1.863, $p < 0.001$), a 29% reduction in the odds of depressive tendency (OR 0.710, $p < 0.01$), and significantly higher self-esteem ($p < 0.05$) and academic grades ($p < 0.05$). A key finding is that the program creates a "co-benefit" for boys, as its positive effects were particularly more obvious for boys. For example, boys in the program saw a greater improvement in reducing gender norms and a larger reduction in mental health problems. This addresses a key gap in the literature by showing that dismantling "hazardous masculinities" creates mutual benefits for all.

The findings demonstrate that a school-based intervention can successfully reshape entrenched gender norms and that these changes are associated with tangible, multi-domain improvements in adolescent health and human capital. The scalable, adaptive model from Guangdong, China, offers a valuable blueprint for other countries. It proves that investing in gender equality in schools is not only a moral imperative but also a direct, effective, and measurable strategy to improve population health and well-being.

Keywords: Gender Norms, Child and Adolescent Health, School-based Intervention, Health Equity