**SEMINARS IN REPRODUCTIVE MEDICINE**

**Title:** Reproductive life planning in adolescents

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**ABSTRACT**

Unplanned pregnancy in adolescents contributes to the burden of disease, mortality and health and educational disparities experienced by young people during this vulnerable period between childhood and adulthood. Reproductive life planning (RLP) is an approach that has been endorsed and adopted internationally, that prompts individuals and couples to set personal goals regarding if and when to have children based on their own personal priorities. This review discusses RLP tools, their acceptability, effectiveness and issues in implementation across different contexts, with a specific focus on how RLP has been applied for adolescents. Whilst a range of RLP tools are available and considered acceptable in adult populations, there is minimal evidence of their potential benefits for adolescent populations. Online platforms and information technology are likely to promote reach and implementation of RLP interventions in adolescents. Consideration of the socio-ecological contexts where adolescent pregnancies are more common should be integral to much needed future work that explores RLP interventions in adolescents.

**Keywords:** Adolescents, reproductive life planning, pregnancy, sexual and reproductive health.

## INTRODUCTION

Despite a decrease in adolescent birth rates over the past 20 years, adolescent pregnancy remains a significant public health issue internationally [1,2]. Adolescence is the period of transition between childhood to adulthood and how this is recognized varies between cultures [3,4]. If age is used to define adolescence, the United Nations apply the period between 10 to 19 years [4]. In low and middle-income countries (LMICs), an estimated 21 million adolescent girls become pregnant each year and approximately 50% of these pregnancies are unplanned [1]. In high income countries (HICs), adolescent birth rates are four-times lower than LMICs [2] but rates are higher in adolescents living in rural and remote areas of HICs and in those who experience socio-economic disadvantage [5-7]. Whilst pregnant adolescents in many HICs may find it easier to access abortion, pregnancy rates in many countries such as the USA are also declining due to a number of factors such as increased contraception use and access to emergency contraception [8,9].

Some adolescent pregnancies are desired and planned but in most circumstances they occur in underserved communities experiencing poverty and a lack of educational and employment opportunities [10,11]. In many societies, the cultural and religious milieu supports marriage and childbearing at a young age [11-13]. Sexual violence and coercion contribute to unintended pregnancies and many adolescents face challenges to their reproductive autonomy due to gender norms in some cultures and societies [12]. Other factors contributing to unplanned adolescent pregnancy include a lack of knowledge and access to sexual and reproductive health information and services including affordable and stigma free contraception and abortion [1,13].

Around half of adolescent pregnancies in end in abortion [1,14], often where there is no access to safe services [1]. Adolescent pregnancies face higher risk of maternal and neonatal

complications including pre-eclampsia, infection, preterm delivery and low birth weight [12,15,16]. Complications of adolescent pregnancies in girls aged 15-19 years is a leading cause of mortality for this age group [15]. Aside from the health concerns, there can be a range of social and economic consequences for pregnant adolescents. Unmarried pregnant adolescents may face stigma, rejection or violence by partners, parents and peers and pregnancy often results in leaving school, compromising future educational and employment opportunities [7,16].

Addressing unplanned adolescent pregnancy requires public policy that reduces socioeconomic disparity, encompasses educational and life opportunities, health promotion, improved health literacy and universal access to sexual and reproductive health services. Health services should be youth friendly and include contraception, abortion and reproductive life planning (RLP) [13,17]. The Centres for Disease Control (CDC) defines RLP as a set of personal goals regarding if and when to have children based on an individual's or couple's priorities [18]. This type of planning offers the potential to both reduce unplanned pregnancies and improve sexual and reproductive health and pregnancy outcomes in people of all ages [18]. This review will discuss RLP tools, their acceptability, effectiveness and issues in implementation across different contexts, with a specific focus on how RLP has been applied for adolescents.

## DISCUSSION

### *Reproductive life planning*

The concept of RLP was developed in the early 2000s [19,20] and was promoted by the CDC in 2006 as part of their recommendations to improve preconception health [18], and is suggested to be included in the Well Woman check by the American College of Obstetricians and Gynecologists [21]. Reproductive life planning can be used to encourage men and women of any age, with the support of their health care practitioners, to reflect on their intentions for pregnancy and childbearing within the context of their personal, family, social and cultural values and goals and is appropriate to their level of health literacy [19,22,23]. A proposed set of questions to support individuals with RLP can be seen in Table 1 [19].

A discussion based around RLP questions could result in the use of contraception, preconception advice and care, or both, depending on the individual's needs. For many people, and particularly for adolescents, the concept of planning their reproductive life may seem abstract, or too far off to be of immediate concern. However, early discussion of future child-bearing desires gives the individual the opportunity to think about their preferences, to realize that they have choices, to understand the benefits to themselves and their children of planning pregnancy, and, over time, this may develop into a goal or plan.

Other RLP tools that have been developed include the One Key Question® (OKQ) approach [24] and the Pregnancy, Attitudes, Timing and How important is pregnancy prevention (PATH) tool [25,26]. The OKQ® approach [24] aims to support primary health workers to routinely ask reproductive aged women, "Would you like to become pregnant in the next year?" There are four response options: "Yes," "No," "Unsure," and "Okay either way." Depending on their response, women are then offered preventive health services relevant to their needs that may include identifying and addressing preconception risk or contraceptive

counseling. The PATH tool [25,26] promotes patient-centred, open-ended questions including, “Do you think you might like to have (more) children at some point?” Again, depending on the woman’s response (Yes, Not Sure, No) they will be directed to appropriate reproductive health options. Other pregnancy screening tools which ask women, in different ways, about their current pregnancy intentions have also been developed. The Family Planning Quotient [27], the Desire to Avoid Pregnancy (DAP) Scale [28] and the Attitude Toward Potential Pregnancy Scale [29]. These screen for current pregnancy intentions and can be used to initiate discussions around relevant reproductive health but do not include a comprehensive work plan supporting further response based counseling like RLP [19], the OKQ approach [24] and the PATH tool [25,26] (Table 2).

A novel digital online conversational agent ‘Gabby’ [30,31] undertakes RLP by starting with a preconception health risk assessment that includes current pregnancy plans. From the risk assessment, Gabby creates a personalized, individual plan called a “My Health To-Do List” that directs counseling towards addressing preconception risks or contraception. Depending on the woman’s responses, Gabby works with them over time to meet her reproductive and general health goals. Building on the PATH tool [25,26], the online MyPath reproductive goals assessment [32] was designed to be used prior to primary care visits. Tested in women Veterans in the USA, MyPath also included information about reproductive health and contraception. This online tool and found to be acceptable to both women and healthcare providers and increased women’s uptake of primary care visits to address their reproductive health needs.

There has also been some targeting of RLP towards adolescents. For example, TeenSource [33] is a USA-based, not-for-profit, online resource that encourages adolescents to consider RLP and provides them with information about sexually transmitted infections, contraception and relationships. The Best Start Resource Centre [34], funded by the Government of

Ontario, developed the My Life My Plan [35] resource that supports adolescents to plan several aspects of their lives, including the plans around reproduction. To the authors' knowledge, these resources have not been evaluated. READY-Girls is a RLP counseling program for adolescents with type 1 diabetes [36]. This mostly self-directed program was evaluated as having a positive impact on preconception advice-seeking behaviors [36] (Table 2).

A recent systematic review of RLP interventions conducted by Hipp *et al*. [37] in 2019 identified 12 studies that met their inclusion criteria. Interestingly, all included studies were conducted in HICs, ten in the United States of America (USA) and two in Sweden. Most were targeted to women and none were targeted to adolescents, specifically. In this systematic review [37], the authors observed three outcomes by which RLP interventions have been evaluated using a range of study designs. These outcomes were i) health providers and participants' perceptions and acceptability of RLP, ii) change in participants' knowledge, and iii) change in participants' behaviors. While the overall findings synthesized by Hipp *et al.* [37] were derived from studies that included mostly adult participants, they provide a hint, or starting point, for discussing the potential acceptability and efficacy of RLP interventions in adolescents.

*Acceptability for women and health providers*

Reproductive life planning is generally considered to be acceptable by women and health providers across a range of health care and geographical settings [37]. A number of factors have been explored, including the ways in which information was communicated, specific elements of RLP that participants found most valuable, the settings in which the interventions were delivered and the societal and individual factors that affected how participants perceived RLP.

In terms of communication and specific elements of RLP, women have reported that they value the straightforward and organized formatting of RLP interventions, opportunities for self-reflection [38] and being prompted to ask questions and discuss specific topics of interest with their health providers [38,39] Callegari *et al*. [40] and Kransdorf *et al*. [41] found that women desired provider-initiated and non-judgmental counseling that incorporated their preferences, desires, and values.

In relation to settings in which RLP interventions were delivered and societal and individual factors that affected how participants perceived RLP, Bello *et al*. [38] qualitatively synthesized women's and providers' perceptions of a novel reproductive health self-assessment tool in a primary care clinic that served low-income African American women in Chicago, USA. Providers thought that the RLP self-assessment tool prompted women, who would otherwise not bring up the topic, to initiate conversations about their sexual and reproductive health. Women reported that the RPL self-assessment tool gave them an opportunity to reflect on their pregnancy plans and gain new knowledge about the importance of their health before pregnancy. Patient-provider conversations challenged provider's assumptions about women's pregnancy plans and changed the way they provided education and support. Overall, both women and providers found the RLP tool had the potential to improve reproductive health counseling and that it was acceptable to implement in primary care [38]. Dunlop *et al.* [39] also explored the acceptability of integrating RLP into primary care, again in a clinic that served women who experienced disadvantage, but this time in Atlanta, USA. In this study, both men and women were recruited. Interestingly, 82% of women reported that RLP was important to their encounter, compared to only 42% of males. All female (19.4%) and male (8.3%) participants who wanted to have a child in the next year considered RLP to be important while only 65% of women and 30% of men who reported never wanting a child considered it to be important. Considering that approximately 83% of

women and 89% of men experience parenthood at some stage [42], this finding highlights an important challenge when planning public health messages around the relevance of RLP for all people, regardless of pregnancy intentions.

Henderson *et al*. [43] examined provider perceptions of RLP in postpartum care. Outcomes measured in this study were providers' evaluation of the feasibility, acceptability, and level of comfort with the use of RLP to initiate discussions of birth spacing and contraception needs with women during the postpartum period. Providers reported that overall, RLP was easy and acceptable to implement in this clinical setting and that women appeared comfortable in discussing their contraceptive needs.

Other individual studies have also shown that RLP is feasible in both HIC and LMICs [44,45]. While the aforementioned studies indicate that RLP interventions are acceptable and feasible to health providers and patients, more research is required to explore potential benefits in adolescent populations, specifically.

There is emerging evidence of the acceptability of RLP interventions in adolescents. The online conversational agent 'Gabby' was tested in African American women aged 15 to 22 years and was found to be acceptable in this population group [30]. 'Gabby' was also further tested in women in Australia. While the study recruited women aged ≥ 18 years, one of the key findings was that this tool could be targeted to those at school because of ease of access and use of information technology [46,47]. On the other hand, midwives in contraceptive counseling clinics in Sweden reported RLP was a useful and acceptable health promotion tool that facilitated broader health conversations with women [48] but had mixed views about the appropriateness of using RLP with adolescents. The reasons for this were not explained.

*Does RLP lead to increased knowledge of sexual and reproductive health and family planning?*

There is some, albeit limited, evidence that RLP interventions have a positive impact on individuals' knowledge of reproductive health. However, the quality of this evidence is low due to the nature of the study designs, self-reporting and small samples sizes [37]. In HICs, RLP interventions have been shown to increase women's knowledge. For example, women living with obesity, diabetes and/or hypertension who participated in a RLP intervention in the USA reported an improved understanding of the risk of pregnancy associated with their condition [49]. This increased knowledge led to increased feelings of self-efficacy in initiating positive health behaviors related to their sexual and reproductive health. However, whether this increased knowledge and self-efficacy led to behavior change was not assessed.

There is limited assessment of RLP interventions in LMICs. One study of a modified RLP intervention delivered to adult women in Eswatini, South Africa, by community workers called Mentor Mothers reported increased knowledge and confidence to facilitate RLP conversations with women in the Mentor Mothers [45]. Whether more knowledgeable and confident Mentor Mothers increased women's knowledge or changed health behaviors was not explored but there was reported increased contraception uptake.

Overall, the variation in study settings, target population demographics and assessment tools make it difficult to make generalizable conclusions regarding the impact of RLP on individuals' knowledge.

The evidence around whether RLP interventions increase adolescents' knowledge of sexual and reproductive health and family planning is even less conclusive. The READY-Girls [36] RLP intervention involved self-directed learning and nurse consultations for girls with type 1 diabetes (Table 2). This intervention improved participants' knowledge but did not increase contraceptive use. This may have been because most of the participants were aged ≤ 17 years and many of them were not yet sexually active. The READY-Girls intervention was

specifically targeted to adolescent girls with type 1 diabetes and not a general adolescent population. Adolescence is a time of rapid growth and development and young people at this stage of life have specific learning needs. Schools may offer an alternate opportunity for more adolescents to access to RLP support. Unfortunately, the delivery of sexual and reproductive health education in schools in both HICs and LMICs has been labelled inconsistent and inadequate, with teachers acknowledging that they need additional training and support in this area [50].

*Does RLP lead to behavior change that optimizes sexual and reproductive health and family planning?*

Whilst reproductive health knowledge has been shown to improve with RLP interventions, the question of whether RLP interventions lead to behavior change remains unanswered [37]. Perhaps the most compelling evidence that RLP interventions may improve lifestyle behaviors associated with sexual and reproductive health is found with the online conversational agent Gabby (Table 2). This intervention was tested in a randomized controlled trial (RCT) of 528 African American women aged 18-34 years across the USA [31,51]. After completing the comprehensive risk assessment that generated a tailored 'My Health To-Do List', participants in the intervention group worked through their list of identified risks over one year. Women in the intervention group reported reaching the action or maintenance stage of change for significantly more risks than the control group. While this intervention was not solely based on RLP, the questions in the risk assessment prompted participants to consider family planning and their behaviors that impact on sexual and reproductive health. The online nature of Gabby may appeal to even younger audiences and therefore, support adolescents to access evidence-based information and support regarding RLP.

*Challenges in implementing RLP interventions in adolescents and future directions*

Reproductive life planning interventions benefit individuals and communities, however, empirical evidence in adolescents, specifically, is absolutely lacking. The majority of reported RLP interventions, to date, are across urban and rural settings in HICs and have included adult women from culturally and linguistically diverse backgrounds [37]. Further research in adolescents with a particular focus on those who are most at risk is required.

Rapid repeat pregnancy, defined as a pregnancy within two years of a previous pregnancy, occurs among nearly 35% of recently pregnant adolescents [52] and in the first 12 months of the postpartum period, there is higher susceptibility to unintended conceptions [53]. Amongst adolescents, a range of strategies have been trialled to reduce the risk of repeated unintended pregnancy. Such strategies include psychosocial interventions conducted via home visits, community interventions or over the telephone [54], cash payments, educational strategies [55] and the provision of long acting reversible but highly reliable contraception immediate following an abortion or birth [56,57]. The degree to which RLP, either within the health system or other community settings including schools may be of assistance in this teenage mothers is unknown. Considering that these adolescents may be a little more engaged with the health system or social services, at least in the few months postpartum, and the increased risk of a rapid repeat pregnancy, the population should be considered a priority.

The Mentor Mothers modified RLP intervention [45] commented on social, cultural and financial barriers to women having autonomy in family planning. These included partners using conception as a form of control over one another, stigma, taboos around RLP discussions outside of families, men being disengaged with RLP conversations and decisions. Undertaking programs that work mainly with the individual and not the broader socioecological context of family, economic support and access to health care will limit the ability for women to enact behavior change even with increased knowledge and awareness.

Additional service and financial supports may support behavior change as will broader improvement in sexual and reproductive health literacy.

Cultural, social, economic and geographic barriers to behavior change and optimising sexual and reproductive health in adolescents are important considerations in the development of RLP interventions. An example of where these factors were considered is CyberRwanda [58], an intervention that will give adolescents private access to sexual and reproductive health information and streamlined access to contraception and other essential products through an online ordering platform. The first phase of this intervention involved human centred design where young people and other key stakeholders developed the intervention aimed individuals aged 12 to 19 years. CyberRwanda supports young people to answer medically-relevant questions, read information about contraception and place online orders before discreet in-person collection at participating pharmacies. The second phase of this research, a cluster RCT to evaluate the implementation of CyperRwanda is underway. The CyberRwanda intervention demonstrates the importance of co-designed, pragmatic, and multifaceted interventions to address the complexities involved in RLP in adolescents [58].

Globally, young people are increasingly using digital platforms for health information. Therefore, innovative online RLP interventions are likely to be a key component of reaching adolescents with RLP interventions. The online conversational agent Gabby has already been tested in African American Women in the USA [30,31], where it has been proven to promote behavior change, was tested and found to be acceptable to women living in Australia [46,47] and is currently being tested in women living in Lesotho. Women appreciated the rapport they were able to build with Gabby as well as woman centred and culturally tailored advice that was easily accessible to them online [46]. Compared with face-to-face medical check-ups, online risk assessments and health education can break down barriers to identifying sensitive health issues, including those around sexual and reproductive health.

*Future directions*

This overview of RLP interventions highlights not just gaps, but chasms, in RLP interventions for adolescents. Further research is required to determine the efficacy of RLP interventions for adolescents in different settings, including the short-term and long-term outcomes. How best to frame the purpose of RLP to adolescents, how to deliver RLPs with non-judgemental and person centred support, who should be involved and the barriers and enablers of RLP in this group should be clearly described. Identifying how best to reach and engage adolescents is vital and RLP interventions based in digital platforms will likely be one of the key ways to reach adolescent populations with youth driven design important to ensure any tools are engaging, educational and impactful.

## CONCLUSION

A range of RLP tools are available for use in settings where adolescents access education, health care and social support. Health professionals and individuals report RLP to be acceptable and feasible across a range of settings however, the majority of these opinions were expressed by health professionals and adult women living in HICs. There is emerging evidence of how RLP can positively impact on the knowledge and behaviors of adults and adolescents, at least in the short term, but little evidence to date of an impact on contraception use and improved pregnancy planning. Certainly more work is required to address socio-ecological contexts that challenge behavior change, particularly in adolescents who may be more vulnerable to repeated unplanned pregnancies. Making use of emerging online platforms and information technology is likely to promote reach and implementation of RLP interventions in adolescents.

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**Table 1:** Reproductive life planning questions [19]

| **Question** | **If response is, 'Yes'** | **If response is, 'No'** |
|---|---|---|
| Do you plan to have any (more) children? | How many children do you hope to have?<br>How long do you plan to wait until you (next) become pregnant?<br>How much space do you plan to have between your future pregnancies?<br>What do you plan to do to avoid pregnancy (until you are ready to become pregnant)?<br>What can I do today to help you achieve your plan? | What are you planning to do to prevent becoming pregnant (again)?<br>What can I do today to help you achieve your plan? |

**Table 2:** Reproductive life planning tools

| **Tool, country** | **Aim** | **Method of implementation** |
|---|---|---|
| One Key Question®, USA [24] | Build standardized screening into standard women's health care. | • Forthright conversation between patient and provider.<br>• Clinical support for all women regardless of social status. |
| Pregnancy Attitudes, Timing and How important is pregnancy prevention (PATH), USA [25,26] | Associate pregnancy timing and selection of contraceptive methods. | • Contraceptive counseling based on evidence-based practices.<br>• Assesses women's emotions.<br>• Online version, My Path, has been tested in women veterans [32]. |
| Family Planning Quotient (FPQ) and Reproductive Life Index, USA [27] | Facilitate the discussion of family planning and reproductive life goals between patients and providers. | • Direct communication between patient and provider about goals.<br>• Education about contraception. |

| | | |
|---|---|---|
| The Desire to Avoid Pregnancy Scale, USA [28] | Identify women who could benefit from contraceptive care. | • Use of psychometric tools that support women to avoid unintended pregnancy. |
| Attitude Toward Potential Pregnancy Scale, USA [29] | Examine associations between contraceptive effectiveness, pregnancy attitude, attitude toward motherhood, intimate partner relationship characteristics, and social dynamics. | • Assess multiple emotions, allowing for wanting and not wanting a pregnancy. |
| Online conversational agent 'Gabby', USA [30,31] | Support women with lifestyle behavior changes to optimize preconception health. | • An online conversational agent, 'Gabby' supports women to complete a comprehensive risk assessment and address identified risks. |
| TeenSource, USA [33] | Provide 'teen-friendly' sexual and reproductive health information | • An online resource with a range of information regarding RLP.<br>• Adolescents can 'hook up' with RLP service providers. |

| | | |
|---|---|---|
| My Life My Plan, Canada [34,35] | Support adolescents with planning several aspects of their lives, including RLP. | • A downloadable booklet that adolescents can fill in as they plan several aspects of their lives including RLP. |
| READY-Girls, USA [36] | Increase preconception awareness and advice-seeking behaviors in adolescent girls with type 1 diabetes | • Two CD-ROMS, a booklet and nurse counseling sessions. |