Setting research priorities for adolescent sexual and reproductive health in low- and middle-income countries

Michelle J Hindin,[a] Charlotte Sigurdson Christiansen[b] & B Jane Ferguson[b]

Objective To conduct an expert-led process for identifying research priorities in adolescent sexual and reproductive health in low- and middle-income countries.

Methods The authors modified the priority-setting method of the Child Health and Nutrition Research Initiative (CHNRI) to obtain input from nearly 300 researchers, health programme managers and donors with wide-ranging backgrounds and experiences and from all geographic regions. In a three-Phase process, they asked these experts to: (i) rank outcome areas in order of importance; (ii) formulate research questions within each area, and (iii) rank the formulated questions.

Findings Seven areas of adolescent sexual and reproductive health were identified as important: (i) maternal health; (ii) contraception; (iii) gender-based violence; (iv) treatment and care of patients with human immunodeficiency virus (HIV) infection; (v) abortion; (vi) integration of family planning and HIV-related services and (vii) sexually transmitted infections. Experts generated from 30 to 40 research questions in each area, and to prioritize these questions, they applied five criteria focused on: clarity, answerability, impact, implementation and relevance for equity. Rankings were based on overall mean scores derived by averaging the scores for individual criteria. Experts agreed strongly on the relative importance of the questions in each area.

Conclusion Research questions on the prevalence of conditions affecting adolescents are giving way to research questions on the scale-up of existing interventions and the development of new ones. CHNRI methods can be used by donors and health programme managers to prioritize research on adolescent sexual and reproductive health.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

Introduction

Adolescent sexual and reproductive health is an area in need of research and evidence-based policies. Nearly one fifth (17.5%) of the world's inhabitants are adolescents (i.e. people aged 10–19 years), and in the least developed nations, this group comprises an even higher proportion (23%) of the population.[1] In 2004, 2.6 million deaths occurred among the world's 1800 million youth between the ages of 10 and 24 years, and 97% of these deaths took place in low- and middle-income countries.[2] Over the past 50 years, the health of adolescents has improved at a slower pace than the health of younger children.[3] This is partly because early pregnancy carries a high risk of serious complications and also because approximately 40% of all new HIV infections occur in people between 15 and 24 years of age.[4] Improving the sexual and reproductive health of adolescents is essential for achieving Millennium Development Goals 4, 5 and 6.[3,5,6]

Despite governments' commitment to address the health problems commonly affecting adolescents,[7,8] little evidence has been generated on whether or not such commitment has made a difference.[9] Findings from research are important; they can provide vital information for the public, inform health policy and reinforce efforts to protect adolescents' rights. The support given by the World Health Organization (WHO) to research on adolescent sexual and reproductive health since the mid-1980s has contributed to the development of programmes in this area in many countries,[10–13] yet in a recent survey that investigated perceived research priorities in reproductive health, most respondents still put adolescents at the top of the list.[14] The exercise described in this paper is intended to help policy-makers and donors to identify those areas of adolescent sexual and reproductive health research that should be prioritized for research funding.

Methods

To help decision-makers, including donors, to effectively allocate limited resources to reduce morbidity and mortality, the Child Health and Nutrition Research Initiative (CHNRI) developed a method for ranking the relative importance of competing research options.[14] The CHNRI approach was specifically modified to identify and rank those areas of adolescent sexual and reproductive health in which research is most urgently needed. Although this paper describes the first application of the CHNRI method to health problems affecting adolescents, more than 50 similar applications have been undertaken among various populations to prioritize research outcomes in other areas of health.[15–21]

We implemented the CHNRI approach in three phases. In Phase 1, we asked research and programme experts to rank 10 health outcome areas in order of importance. In Phase 2, we asked these individuals to propose research questions for each outcome area. In Phase 3, we asked them to prioritize the research questions generated in Phase 2 using a scoring scheme based on five criteria.

Phase 1

We asked researchers and programme experts in adolescent health to rank 10 potential priority areas (Fig. 1) having to do

[a] Johns Hopkins Bloomberg School of Public Health, Department of Population, Family and Reproductive Health, 615 N Wolfe Street, Baltimore, MD 21205, United States of America.

[b] Department of Maternal, Newborn, Child and Adolescent Health, World Health Organization, Geneva, Switzerland.

Correspondence to Michelle J Hindin (e-mail: mhindin@jhsph.edu).

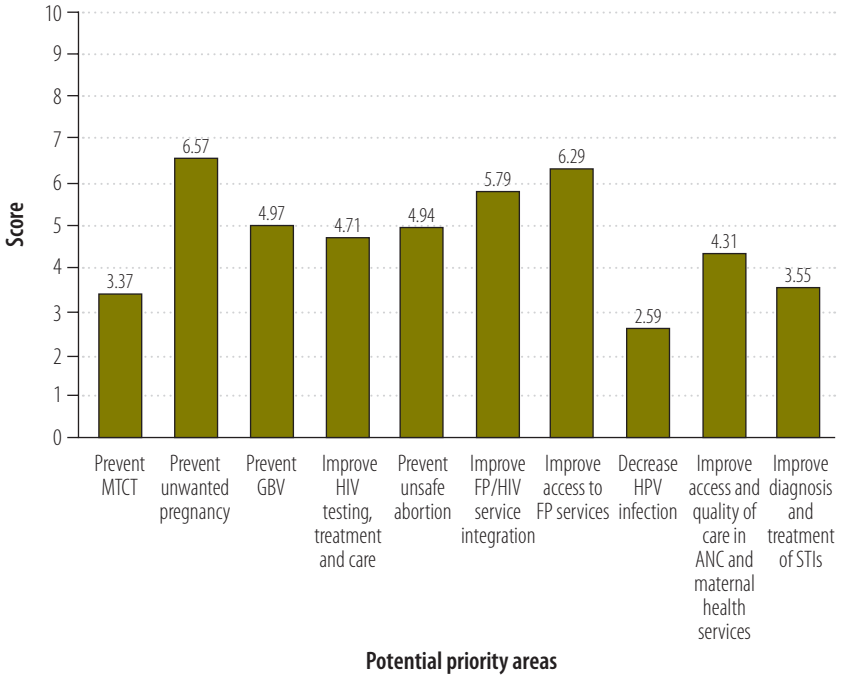
(*Submitted: 28 May 2012 – Revised version received: 8 October 2012 – Accepted: 9 October 2012 – Published online: 2 November 2012*)

with the sexual and reproductive health of adolescents, defined as people aged 10–19 years, in low- and middle- income countries. These areas were selected based on a review of the literature on the known leading causes of adolescent morbidity and mortality linked to sexual and reproductive practices in low- and middle-income countries.[2,22] We developed a survey tool using SurveyMonkey (Palo Alto, United States of America) and sent e-mails to 94 researchers and programme experts working in the field of adolescent sexual and reproductive health, our aim being to get feedback from people with international expertise in the outcome areas of interest. With these criteria in mind, we used a snowball method to try to generate 100 names but succeeded in generating 94 (64 females and 30 males). Of the experts we identified, 50 had interregional experience: 16 of them primarily in Africa; 16 in Asia; 8 in Latin America and 3 in the eastern Mediterranean region. We also requested input from 27 WHO staff members (at headquarters in Geneva, Switzerland, and in regional and country offices); 11 representatives of donor organizations from the United States and Europe; representatives of United Nations organizations other than WHO; and 14 employees of the International Planned Parenthood Federation in field offices in Africa, Asia, Europe and the Americas. As this Phase of our study was anonymous, we cannot give more details on the final pool of respondents.

We asked all individuals identified through the method described above to rank the 10 outcome areas generated from the literature in decreasing order of importance. We only allowed mutually exclusive categories to "force" respondents to provide a rank order. In addition, written surveys were administered to 13 programme managers during an International Planned Parenthood Federation meeting held in The Hague, the Netherlands, on 27 October 2011. We received 53 completed surveys (50% response rate). All responses in this Phase were anonymous.

Fig. 1 shows the mean scores resulting from the ranking of the outcome areas. Although some areas scored relatively low (e.g. prevention of mother-to-child transmission of HIV or reduction of human papillomavirus infection rates), we decided to include these lower-scoring items within other areas and this consolidation reduced the number of areas from 10 to 7 (Table 1).

Fig. 1. **Ranking of potential priority areas for research on adolescent sexual and reproductive health (Phase 1 of the research priority-setting process)**



ANC, antenatal care; FP, family planning; GBV, gender-based violence; HIV, human immunodeficiency virus; HPV, human papillomavirus; MTCT, mother-to-child transmission; STI, sexually-transmitted infection.
Note: the scoring was from 1 to 10.

Table 1. **Summary of revised outcome areas and responses to generation of research questions**

Outcome area	Responses received	
	Phase 2	Phase 3
1. Improve adolescents' access to and the quality of antenatal, delivery, postpartum and newborn care to prevent maternal mortality and morbidity among adolescents and to prevent mother-to-child transmission of HIV.	11	20
2. Improve adolescents' access to contraception, including emergency contraception, to decrease unwanted pregnancy.	11	22
3. Prevent and mitigate gender-based violence to reduce unwanted pregnancy and unsafe abortion among adolescents.	11	18
4. Improve testing, treatment and care for HIV to decrease the burden of disease among adolescents.	11	21
5. Prevent unsafe abortion and improve access to post-abortion care to reduce maternal morbidity and mortality among adolescents.	11	19
6. Improve strategies for the integration of family planning and HIV/AIDS to increase access to contraception to prevent unwanted pregnancies, lower HIV and MTCT rates, and prevent unsafe abortion among adolescents	12	22
7. Improve adolescents' access to interventions for the prevention, diagnosis and treatment of sexually transmitted infections (STIs), including HPV, to reduce transmission, and to prevent current and future morbidity and mortality.	9	21

AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus; HPV, human papillomavirus; MTCT, mother-to-child transmission; STIs, sexually-transmitted infections.

Phase 2

In this phase, we divided people into groups based on their expertise in the seven outcome areas in Table 1. An analysis of the people who were asked to provide input (available from the corresponding author) showed that they were mainly from low- and middle-income countries and either academics, donors, staff members of United Nations and other international nongovernmental organizations (NGOs), government officials or staff members of national NGOs. For any given area, we aimed to have at least 10 respondents propose research topics. Table 1 shows the number of responses received. To facilitate the development of research questions, we prompted participants by asking them what issues need to be addressed within each outcome area, in the near (2015) or longer term (2020), through research of the following types:

- epidemiological research (i.e. descriptive research, designed to measure burden of disease, explore risk factors and protective factors, or evaluate existing research interventions);
- operations research (i.e. development research, designed to improve the deliverability, affordability, sustainability and scale-up of existing interventions);
- discovery research: designed to develop new interventions.

During this exercise we asked the respondents to provide their names and contact information in case we needed to have their responses clarified. No limits were imposed on the research questions the respondents could suggest.

After receiving the responses, we synthesized the results in three steps. In the first step, two independent coders per area developed clearly-worded research questions from the respondents' textual replies. In the second, one member of the team (who did not participate in the first step) harmonized the questions between the two coders. Third, one member of the team streamlined the questions, removed redundancies, repositioned those that belonged under different outcomes (e.g. abortion questions that appeared under contraception) and eliminated those that would not lead to valuable research outputs. The goal was to have a maximum of 40 questions per outcome area.

After the questions were synthesized, we created a web site where the respondents who generated questions could review them in their totality for a given outcome area and suggest rewording, removing or adding questions. This web site was viewed by 45 people from countries in Africa, Asia, Europe, Latin America and the Caribbean, North America, and Oceania. Individuals spent an average of 7.5 minutes on the site, which was monitored by Google Analytics®. We revised the questions based on the suggestions received.

Phase 3

In this phase, we selected five criteria for ranking the research questions generated in Phase 2. We based these criteria on previous applications of CHNRI processes[10–16] and on what made sense for adolescent sexual and reproductive health research.

The criteria were:

i) Clarity: Is the question well framed and are its end-points clear?
ii) Answerability: Can the question generate important new knowledge in an ethical way?
iii) Impact: Would the answer to this question result in an effective intervention?
iv) Implementation: Would the answer to this question result in an intervention or a strategy with a strong likelihood of being affordable and sustainable in most low- and middle-income countries?
v) Equity: Would the answer to this question help to reduce inequity in disease burden over the next 10 years?

To diversify the set of rankings, we assigned potential respondents to the areas in which their expertise was strongest, as we did in Phase 2, and we also randomly assigned them to a second area. Using anonymous SurveyMonkey surveys, we invited 296 people to participate. Most of these people were on our previous list of experts and some were identified by a snowball technique. For each of the seven outcome areas we asked respondents to state whether the research question did or did not meet a given criterion (yes or no) or if they were undecided regarding this point.

Our goal was to get at least 17 responses per outcome area. This is thought to be the minimum number needed to achieve consensus at this stage (Igor Rudan, personal communication, May 2012). Table 1, third column, shows the number of Phase 3 respondents in each area.

Results

The main results from this exercise come from Phase 3. For the analysis of the rankings, we exported all of the responses into an Excel spreadsheet. For each of the five criteria, we used the standard CHNRI scoring system: yes = 1; no = 0 and undecided = 0.5. In this way we developed a mean score on each criterion for each question, and by adding these scores and dividing by five we obtained each question's mean overall score. We weighted all criteria equally.

In Table 2 we show the highest-ranking research questions by outcome area. We provide each question's mean overall score and its score on each criterion (ranging from 0 to 1). In general we show the top five questions, but in one outcome area (sexually transmitted infections and infection with the human papillomavirus) we present the top six because two scores were tied (a full set of scores can be obtained from the corresponding author).

We found a high level of agreement on the most important research questions in each of the seven outcome areas, with total mean scores ranging from 0.84 to 0.97 (out of a possible 1.00). The scores on individual criteria differed depending on the research question, both within and across outcome areas.

In Phase 2, questions initially showed substantial overlap across different outcome areas, particularly contraception and abortion. However, in the final ranking of the questions these overlaps were minimal, although contraception was mentioned under three areas: maternal health, abortion and integration of family planning and HIV services.

Although we did not take the three prompting questions about research type into account when weighting the mean scores, two coders took note of the type of research needed to address each research question. Table 2 (second column) shows the type required to address the top-ranking research questions. If we consider the full set of questions, descriptive research was the type most frequently required, but development research was the type most commonly needed to address the five top-ranking questions in each outcome area (data not shown).

Table 2. **Summary of research questions that ranked highest when scored in accordance with five criteria, by outcome area**

Outcome area	Type of research[a]	Total score[b]	Clarity score[b]	Answerability score[b]	Impact score[b]	Implementation score[b]	Equity score[b]
Maternal health (*n* = 20)							
What strategies can improve the use of antenatal care, skilled birth attendants, PMTCT and postnatal care by adolescents in resource-poor settings?	B	0.95	0.92	0.97	0.97	0.92	0.97
What factors (including barriers and facilitators) are associated with the utilization of maternal health services (antenatal, intrapartum, postpartum) and neonatal care by adolescents in different settings?	A	0.92	0.98	0.95	0.93	0.85	0.90
What pregnancy outcomes (maternal and neonatal) among adolescents are related to mode of delivery, presence of a skilled birth attendant at delivery and care of infants up to 6 months of age?	A	0.92	0.84	1.00	0.94	0.89	0.92
Do programmes that promote postnatal family planning for adolescent mothers reduce subsequent unwanted pregnancies in this group?	A	0.92	0.95	0.92	0.92	0.89	0.89
Do adolescent girls and adult women receive different antenatal, delivery and postnatal care? If so, how and why?	A	0.91	0.87	0.97	0.92	0.89	0.89
Contraception (*n* = 22)							
What strategies can delay first births among married adolescents?	A	0.94	1.00	0.95	0.89	0.91	0.93
Through what mechanisms can the provision of regular and emergency contraceptives to adolescents be financed or subsidized?	B	0.94	0.93	0.95	0.95	0.93	0.91
What strategies can increase consistent and effective condom use among both male and female adolescents?	B	0.91	0.95	0.98	0.95	0.82	0.86
What barriers do health-care providers face when trying to offer contraception services to unmarried adolescents?	A	0.90	0.95	0.91	0.89	0.83	0.91
In settings with high rates of pregnancy in adolescence, what factors protect adolescents from unwanted and/or unsafe pregnancy?	A	0.89	0.86	0.95	0.91	0.84	0.86
Gender-based violence (*n* = 18)							
How do programmes that aim to keep girls in school longer through measures such as conditional cash transfers affect the prevalence of gender-based violence?	A	0.97	1.00	0.97	0.97	0.86	0.94
What interventions can be integrated into community settings (e.g. schools) to address gender-based violence and its related reproductive outcomes?	B	0.89	0.89	0.92	0.89	0.89	0.89
What strategies might reduce gender-based violence among adolescent sex workers?	B	0.88	0.89	0.94	0.94	0.79	0.85
How feasible, effective and sustainable is the training of community-based health workers on identification and referral of cases of gender-based violence?	B	0.88	0.83	0.89	0.92	0.89	0.89
What is the impact of "healthy schools" initiatives on the reduction in gender-based violence?	A	0.87	0.83	0.94	0.92	0.86	0.91

(*continues. . .*)

(. . .*continued*)

Outcome area	Type of research[a]	Total score[b]	Clarity score[b]	Answerability score[b]	Impact score[b]	Implementation score[b]	Equity score[b]
HIV treatment and care (*n* = 21)							
What factors facilitate uptake, retention and adherence and minimize treatment failure among adolescents?	B	0.95	0.98	0.95	0.95	0.95	0.93
How do user fees affect access to, use of and retention in treatment among adolescents living with HIV?	B	0.95	1.00	0.93	0.95	0.95	0.93
What factors influence the disclosure of HIV status to others among adolescents?	A	0.92	0.98	0.93	0.93	0.95	0.81
What proportion of young women who test positive for HIV in antenatal or delivery care: (i) receive and take drugs for PMTCT; (ii) are assessed to determine if they need lifelong HAART; (iii) are started on lifelong HAART if clinically indicated?	A	0.92	0.95	0.95	0.95	0.88	0.88
What aspects of the delivery of HIV testing and counselling services are most important from the perspective of adolescents: the speed of the results; confidentiality and anonymity; the social and health services offered; the counselling offered; whether or not they are integrated into the health system?	B	0.91	0.95	0.90	0.93	0.88	0.88
Abortion (*n* = 19)							
How does the provision of contraceptive methods (especially long-acting, reversible methods) as part of post-abortion care affect unintended pregnancy and repeat abortion rates among adolescents?	A	0.95	0.97	0.92	0.97	0.92	0.95
What interventions are effective for informing adolescents about the availability and safe use of misoprostol?	B	0.94	1.00	0.95	0.95	0.89	0.92
How does cost influence adolescents' abortion-seeking behaviour?	B	0.91	0.87	0.97	0.89	0.87	0.87
How much awareness of abortion law, access to safe abortion services and post-abortion care exists among adolescents?	A	0.91	0.89	0.97	0.89	0.89	0.89
What do adolescents know about less invasive procedures for pregnancy termination and post-abortion care (e.g. misoprostol), and to what extent do they have access to them or use them?	A	0.88	0.92	0.92	0.84	0.82	0.88
FP and HIV service integration (*n* = 23)							
What modalities for delivering integrated HIV/FP services to adolescent boys work best?	B	0.90	0.83	0.89	0.89	0.81	0.96
Does the provision of comprehensive sex education at school: (i) reduce adolescent pregnancies, (ii) increase health-care seeking behaviour among adolescents, or (iii) reduce the incidence of STIs, including HIV infection?	A	0.88	0.93	0.87	0.87	0.83	0.89
What are the most effective and affordable models for delivering integrated contraception and HIV services and information to young married couples?	B	0.88	0.91	0.93	0.87	0.83	0.85
What female-controlled methods for preventing both STIs and pregnancy can be developed and tested?	C	0.88	0.86	0.95	0.90	0.85	0.85
How much do young female sex workers and injecting drug users need and use contraceptives??	A	0.85	0.93	0.78	0.85	0.78	0.91

(*continues. . .*)

	Type of research[a]	Total score[b]	Clarity score[b]	Answerability score[b]	Impact score[b]	Implementation score[b]	Equity score[b]
ine delivery in low-resource settings?	C	0.93	1.00	0.93	0.98	0.83	0.90
es for STI counselling and testing, HPV	B	0.90	0.90	1.00	0.90	0.86	0.83
s to deliver vaccination against HPV?	B	0.86	0.81	0.93	0.88	0.79	0.88
s (e.g. conditional cash transfers, mobile	B	0.86	0.86	0.93	0.93	0.76	0.81
mmes among adolescents at highest risk?	B	0.84	0.86	0.83	0.81	0.83	0.88
natemal health services be optimized to creened and treated?	B	0.84	0.76	0.90	0.88	0.79	0.86

/, human immunodeficiency virus; HPV, human papillomavirus; PMTCT, prevention of mother-to-child transmission; SRH, sexual and reproductive health; STI, sexually-transmitted

escriptive: epidemiological research/evaluation of existing interventions; B – development: operations research/scaling up of existing interventions; C – discovery: new interventions.

Discussion

Using a modified version of the priority-setting method developed by the CHNRI, we sought input from nearly 300 experts in adolescent sexual and reproductive health to identify priority outcome areas and research questions. The experts we consulted, who included researchers, programme managers and donors, came from all parts of the world. The CHNRI process is rigorous; it gathers input from a wide range of sources and ultimately attains a high degree of consensus on research priorities.

A key limitation of our exercise is that some of the experts we approached failed to respond to our questions. Although we used several methods to try to generate responses, we cannot rule out the presence of non-response bias. Nonetheless, we are confident that the questions generated by our experts are valid, since during each Phase of our exercise we had a greater number of respondents than the minimum required by the CHNRI method. In addition, we used Google Analytics* and other methods to verify that we had correctly interpreted the input provided by the experts. We also used multiple coders to generate and frame the research questions, and in the final Phase of the study, when experts ranked the research questions, we randomized the respondents to different outcome areas and changed the order of the questions.

The outcome areas featured in this exercise have to do with the prevention of health problems stemming from adolescents' sexual behaviour, which is often impulsive and unplanned, and with adolescents' access to effective interventions, which various factors can hinder.[23] The top-ranking research