

Improving Adolescent Health: Learnings from an Interventional Study in Gujarat, India

Pallavi Patel, Tapasvi Puwar¹, Neeta Shah, Deepak Saxena¹, Poonam Trivedi¹, Krupali Patel², Sandul Yasobant², Manish Fancy³, Hema Matela¹, Shital Savaliya¹, Pachillu Kalpana¹, Ritu Rana¹

Centre for Health Education, Training and Nutrition Awareness, Ahmedabad, ¹Department of Epidemiology, Indian Institute of Public Health, Gandhinagar, Gujarat, India, ²Center for Development Research (ZEF), Bonn, Germany, ³Department of Health, Government of Gujarat, Sabarkantha, Gujarat, India

Abstract

Background: There are multiple risk factors during adolescence, which become precursors of various diseases and injuries inflicting high morbidity, mortality, and disability. There are several gaps in adolescent health research in India; one among them is that programs targeting adolescent health are constrained by the absence of rigorous interventional research informing interventions for improving adolescent health. This study aims to document the effectiveness of intervention on adolescent health and knowledge change on the risk factors among adolescents in one of the selected districts in Gujarat, India. **Methods:** This was an interventional study with quasi-experimental design executed in one of the blocks of Gujarat. Baseline was conducted in 2013–2014 followed by intervention and the end line during 2016–2017. A structured validated questionnaire after pilot testing was executed to collect information on sociodemographic profile, nutrition status, menstrual hygiene practices, reproductive and sexual health, substance abuse, program awareness and utilization, and empowerment through life skills of adolescents in baseline and end line survey. Data analysis was carried out using IBM SPSS Statistics for Windows, Version 20.0. (Armonk, NY: IBM Corp). **Results:** This study documented increased awareness regarding anemia, knowledge about STD and HIV/AIDS, reduced addiction to tobacco, improved practices during menstrual hygiene and engagement with adolescent services/schemes in the intervention site. **Conclusion:** This study concludes that evidence-based interventions lead to increase in knowledge and practices; however, some improvements have also been documented in the nonintervention site. Therefore, changes due to interventions could not be attributed completely for improving adolescent health. Further long term interventional studies are required to develop a robust evidence on improving health of adolescents in India.

Keywords: Addiction, adolescent, Gujarat, India, knowledge, menstrual hygiene, nutrition, out of school, reproductive and sexual health, school going, substance abuse

INTRODUCTION

Improving health of adolescents is a key component of India's National Health Mission.^[1] Adolescents constitute over 20% of India's population. These young people face a number of problems including sexual and reproductive health (SRH) problems, including HIV.^[2,3] Empirical evidence shows that more than 33% of the disease burden and almost 60% of premature deaths among adults can be associated with behavior or conditions that began or occurred during adolescence.^[4,5]

The Government of India (GOI) has put in place various programs and policies aimed at improving overall status among adolescents. GOI has launched Rashtriya Kishor Swasthya Karyakram (RKSK) in 2014 addressing adolescent health needs.^[6] RKSK expands the scope of adolescent

health programming in India – from being limited to SRH, it now includes nutrition, injuries and violence (including gender based), noncommunicable diseases, mental health, and substance misuse. On the other hand, programs targeting adolescent health are constrained by the absence of rigorous interventional research informing interventions for improving adolescent health.^[7] Adolescent health research

Address for correspondence: Dr. Deepak Saxena, Indian Institute of Public Health Gandhinagar, Opposite Air Force Head Quarters, Near Lekawada Bus Stop, Gandhinagar-Chiloda Road, Lekawada, CRPF.P.O., Gandhinagar - 382 042, Gujarat, India. E-mail: ddeepak72@iiphg.org

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is required to validate several interventions in the country settings. However, there are several gaps in adolescent health research in India.^[8,9]

Therefore, this research study aimed to assess the change in knowledge on SRH, substance abuse, and nutritional status of adolescents with reference to intervention in one of the districts in Gujarat, India, during 2013–2017.

METHODS

This was an interventional study executed as a quasi-experimental design, with an intervention block (IB), Talod, and a control block (CB), Idar, in one of the districts of Gujarat.

Pre- and postquantitative study

This study was implemented in three phases; the baseline survey was conducted in 2013–2014, followed by intervention phase and the end line survey during 2016–2017.

The estimated sample size (adolescents of 11–18 years' age group) for baseline was 1200 and for the end line was 1340. The sample size was calculated based on an assumption of at least 10% increase in knowledge level of key indicators after the intervention. However, assuming a 20% nonresponse rate, the final sample size ended with bit higher than the estimation. Stratification was based on age group, gender, school going, and out-of-school status. The same clusters that were included in the baseline were included in the end line survey. The detailed samples recruited under each phase are described in Table 1.

Interventional phase

The intervention focused on three thematic areas of RKSK, i.e., SRH, nutrition, and substance abuse. The Centre for Health Education, Training and Nutrition Awareness, a nongovernment organization, implemented the intervention and the Indian Institute of Public Health, Gandhinagar team, provided technical support as well as carried out baseline and end line. The intervention was implemented in close collaboration with the Governmental Departments of Health and Family Welfare, Women and Child Development and Education and Literacy. The intervention package included.

Capacity building of frontline workers and local level committees

A total of 23 training workshops were organized in which 760 participants were trained on adolescent health. Details are discussed in Table 2. Pre- and posttraining assessment

was done. School classroom sessions were also organized by the teachers (who participated in the training) at schools. As a follow-up to these sessions, parents were contacted during home visits or during parent meetings to inform them about the importance of health and nutrition, especially for adolescents. Regular one-to-one meeting with village leaders was organized, especially with the sarpanch to update her/him about the program and elicit their support in implementation.

Organizing Adolescent Health Day

One hundred and seventy five Adolescent Health Days (AHDs) were organized in all 72 villages in IB reaching out to 80% (16,252) adolescents. Services provided on AHD were (a) registration, general health checkup (body mass index [BMI], anemia, and diabetes), and referral to adolescent-friendly health clinics (AFHCs) for counseling and clinical services; (b) information through appropriate Institutional Ethics Committee and interpersonal communication on nutrition, SRH, and substance abuse, specifically tobacco use; and (c) provision of commodities such as iron-folic acid (IFA) and albendazole tablets. The detailed methodology about the same has been described in one of our published articles.^[10]

At the end of the intervention, the district-level dissemination meeting was organized with district development officer, chief district health officer, taluka health officer, and other concerned officials and staff of Sabarkantha district, to present the activities of the intervention and findings of the AHD celebration, share experiences, and discuss rollout strategy at district level.

RESULTS

Quantitative findings from the pre- and postintervention Sociodemographic profile

Overall, in both the baseline and end line surveys, majority of the participants were Hindu (around 95%) and belonged to nuclear family (around 72%). More than 90% boys and girls in both the IB and CB had completed primary education. Among out of schoolboys, the highest school dropout was seen during the transition phase from secondary to higher secondary level, whereas in girls, the dropout was highest from primary to secondary level. In the baseline, among out of schoolboys, 60% worked as laborers in IB, while in CB, 37% worked on their own farm. However, in the end line in IB, 52% were not involved in any occupation and 21% were working as laborers. This difference may be a seasonal effect as end line was carried out during the summer months. Among out of schoolgirls, majority were involved in household- and agricultural-related activities in both the blocks, in both baseline and end line. The mean age was comparable for the baseline and end line among the various groups in IB and CB.

Nutritional status including anemia

Overall awareness regarding anemia was low in both blocks and genders; however, there was some increase in awareness after postintervention in IB. Awareness of anemia was higher

Table 1: Sample frame of baseline and end line surveys

Groups (years)	Intervention block				Control block			
	Baseline		End line		Baseline		End line	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
11-14 school based	127	127	256	256	128	128	258	256
15-18 school based	128	128	256	254	128	128	256	257
15-18 out of school	126	128	158	160	128	128	161	160
Total	381	383	670	670	384	384	675	673

Table 2: Details of capacity building initiatives as a part of intervention package

Package of intervention	Objectives	Components
Capacity building of preraks (total training done - 1, participants - 30)	<ul style="list-style-type: none"> a. To provide information and counseling to adolescents in villages b. Training of the local mentors who could be approached by adolescent girls and boys for counseling or clarification of doubts 	<ul style="list-style-type: none"> a. In-depth information on adolescents SRH and nutrition-related aspects b. Enhancing the preraks skills on health communication and counseling
Capacity building of ASHAs and AWWs (total trainings done - 9, participants - 348)	<ul style="list-style-type: none"> a. Enhance understanding on importance of working with adolescents and young people b. Communication and counseling skills c. Orientation to RKSK program and its selected components 	<ul style="list-style-type: none"> a. Role of ASHAs and AWWs to improve access to services, gender equality, communication, and counseling, growth and development b. Nutrition and prevention of under nutrition and anemia c. SRH, menstrual cycle, and problems faced during menstruation d. RTI/STI, HIV and AIDS, contraception, and adolescent pregnancy e. NCDs including f. Substance including addiction
Capacity building of schoolteachers (total trainings done - 4, participants - 141)	<ul style="list-style-type: none"> a. Sensitize on importance of focusing on adolescent health issues b. Orientation to WIFS and RKSK; and c. Develop an understanding on life skill education and its relevance to adolescent health and development 	<ul style="list-style-type: none"> a. Changes during adolescence b. Role of the nodal teacher in SHP, WIFS, and other schemes c. Communication and counseling skills d. Teacher-student relationship e. Nutrition and anemia f. Substance abuse g. Life skills education
Capacity building of MPHWs and CRCs coordinators (total trainings done - 1, participants - 21)	<ul style="list-style-type: none"> a. Sensitize and provide information to about the intervention b. Improve understanding of the priority areas of RKSK 	<ul style="list-style-type: none"> a. Understanding adolescent health issues b. Information on intervention c. Importance of organizing AHD and convergence with other departments d. Growth and development of adolescents focusing on nutrition, anemia, SRH, safe abortion (MTP), and RTI/STI e. Mental health and NCDs f. Health communication and counseling
Capacity building of VHSNC members (total trainings done - 6, participants - 183)	<ul style="list-style-type: none"> a. Orient them on their own role in the intervention and role and responsibilities of ASHAs and AWWs b. Enhance their skills to monitor adolescent health programs and access to health and nutrition services at the village level c. Improve communication skills 	<ul style="list-style-type: none"> a. Provide information about the intervention b. Roles and responsibilities of VHSNC members toward implementation of adolescent-related programs c. Health system response and services available for adolescents from government health facilities and roles and responsibilities of ASHAs and AWWs d. Information on health and nutrition schemes for adolescents and mothers e. Orient to tools for community monitoring f. Untied fund of VHSNCs and its use g. Communication and decision-making skills and h. VHSNC meetings and reporting
Capacity building of peer educators (total trainings done - 2, participants - 37)	<ul style="list-style-type: none"> a. Handholding and building capacity of peer educators as they are integral component within the RKSK framework 	<ul style="list-style-type: none"> a. Nutrition needs of adolescents b. Communication skills and decision-making skills

SRH: Sexual and reproductive health, ASHAs: Accredited social health activists, AWWs: Anganwadi workers, RKSK: Rashtriya Kishor Swasthya Karyakram, RTI: Reproductive tract infection, STI: Sexually transmitted infection, WIFS: Weekly iron-folic acid supplementation, CRCs: Cluster resource center, AHD: Adolescent Health Day, NCDs: Noncommunicable diseases, VHSNCs: Village Health Sanitation and Nutrition Committees, SHP: School health program, MPHWs: Multi purpose health workers, MTP: Medical termination of pregnancy

in IB compared to CB in both surveys. Overall, 15–18-year school-going adolescents had better knowledge about anemia. Boys and girls had almost comparable knowledge about anemia in both surveys, in IB and CB. However, there was a significant increase in knowledge among boys in IB when compared to CB. The proportion of underweight adolescents was found to be high in both blocks across genders. However,

postintervention in IB, the decline was only documented in the age group of 11–14 years' school-going girls (19.9%) and in 15–18 years' school-going boys (2%).

Menstrual hygiene practices

Majority of girls in both blocks used readymade cloth available in the market, which reduced by 17.6% among 15–18 years' out-of-school adolescents and 30.6% among 11–18 years'

Table 3: Summary of change in knowledge and practices among adolescents in one of the districts of Gujarat, India during 2013-2017

Dimensions	Intervention			Control		
	Baseline	End line	Percentage difference	Baseline	End line	Percentage difference
Awareness about anemia						
Girls	24	28.1	4.1	10.9	14.2	3.3
Boys	25.3	27.4	2.1	18.5	14.1	-4.4
Underweight status						
Girls	66.6	65.8	-0.8	70	74.3	4.3
Boys	61	63.2	2.2	59.37	57.1	-2.27
Awareness about STI						
Girls	29.2	32.8	3.6	23.7	21	-2.7
Boys	58.5	67.8	9.3	50	39.5	-10.5
Awareness about HIV/AIDS						
Girls	41.5	44.2	2.7	37.8	32.3	-5.5
Boys	64.7	69.3	4.6	61.7	48.5	-13.2
Knowledge about contraception						
Girls	21.3	23.4	2.1	13.2	25.8	12.6
Boys	43.8	69.1	25.3	54	49.5	-4.5
Self-reported substance abuse						
Girls	2	3.4	1.4	0.3	1.2	0.9
Boys	11	6	-5	20	8.8	-11.2
Use of sanitary napkin	13.8	18.4	4.6	13.8	20.8	7
Practice of reusing absorbent	89.3	80.7	-8.6	84.9	60.2	-24.7
Open defecation practices	54.3	28.1	-26.2	34.4	16	-18.4
Toilet facility	45.5	70.9	25.4	65.6	82.6	17

STI: Sexually transmitted infection

school-going adolescents in IB in postintervention phase. Among 11–18 years' school-going adolescent girls, it was observed that postintervention, there was an increase in the use of sanitary napkins in IB and CB, by 4.6% and 7%, respectively. In addition, there was a decline in the practice of reusing absorbent by 8.6% and 24.7% in IB and CB, respectively. Although the practice of reusing the same cloth for next time was found to be high in IB, there was moderation in the reuse of the cloth for multiple cycles. Among 15–18 years' out-of-school adolescent girls, it was observed that postintervention, there was an increase in the use of sanitary napkins in IB and CB by 16.5% and 15.4%, respectively. There is also a decline in the use of readymade cloth as an absorbent in IB by 17.6% and in CB by 7.9%. In addition, there is a decline in the practice of reusing absorbent by 13.8% and 5% in IB and CB, respectively. In terms of frequency, there is moderation in reusing absorbent beyond 2–3 cycles.

An increase in the use of sanitary napkins among out-of-school adolescents by 16.5% in IB and 15.4% in CB was documented during the end line survey. There were issues on knowledge about disposal of sanitary napkins as 52% treated it as general waste. More than 85% of school-going girls go to school during menstruation. However, 80% do not prefer to change cloth or sanitary napkins in the school. Reasons given for not changing cloth or napkins at schools were no need to change (88%), feel shy (10%), and go home during breaks for changing as home is nearby (5%). Less than 5% mentioned no toilets in the schools or toilets without water facility in the school as a reason for not

changing cloth or napkin in school. The most common health problem during menstruation was dysmenorrhea (55%). The most common menstrual disorder was short cycles (35%), irregular menses (23%), and heavy bleeding (12%). However, the health-seeking behavior for menstrual disorders was poor in both blocks.

Knowledge about HIV/sexually transmitted diseases

Survey findings indicate improvement in knowledge on sexually transmitted disease (STD) and HIV/AIDS in IB when compared to CB. Boys had significantly more correct information and knowledge about STDs and HIV than girls in both the blocks. Out-of-school boys and girls of 15–18 years of age had comparatively poor knowledge about STD and HIV. Overall awareness about contraceptives among boys was more in IB than CB. Postintervention, the knowledge of contraception among nonschool-going girls and boys also increased when compared to school-going girls and boys. Postintervention, there was almost no change in awareness on any STIs among 11–14 school-going girls and 8.6% increase in 15–18 years' school-going girls in IB. However, there was a significant improvement (around 15%) among 15–18 years' school-going and out-of-school boys in IB. In contrast, there was a decline in overall awareness in the CB.

Around 1 in 4 adolescent girls in the age of 15–18 years reported symptoms of urinary tract infection. This proportion increased during end line survey that could be possibly attributed to intervention led increase in knowledge.

Engagement with adolescent services and schemes

Increase in awareness about weekly iron-folic acid supplementation (WIFS) was observed in the end line in the IB. Overall, there was also an increase in compliance to IFA in the IB compared to the CB. Distribution of deworming tablets, which is also a component of WIFS program, was found to be poor. Issues in the supply of IFA and deworming tablets were also reported. There was improved awareness regarding MTA program in the IB and decline in awareness in the CB. Decline in IFA compliance and THR (take-home rations) utilization was also documented in both the IB and CB. There were poor knowledge and access to AFHC in both the intervention and CBs, in the baseline and end line. Further, AHD is reflected only in the end line in the IB. About 73% school-going and 46% out-of-school adolescents participated in the AHD in the IB.

Substance misuse

Overall, the addiction to tobacco (most common) in IB was more among boys (11%) during baseline which reduced to 6% during end line survey. However, the similar pattern has been observed in CB where the reduction was 11.2%. The present survey also highlights increased substance abuse in 11–14 years' school-going boys suggesting their vulnerability to addiction at younger age and hence the need for interventions in younger age groups. One or two out-of-school adolescent boys were also addicted to alcohol. One of the common reasons cited for addiction was peer influence; hence, addiction among peer group is used as a proxy indicator. Overall, there is a reduction in peer addiction as well. Addiction of tobacco among peers of male participants had reduced by 16% in intervention and 5.6% in CB.

Substance abuse among females was very low when compared to boys. Addiction was only found in out-of-school girls in the baseline in both the blocks. However, end line survey shows an increase in self-reported substance abuse between both school-going and out-of-school girls (1.4%) in IB. Overall, addiction in peer group of girls was also found to have increased to around 10% in the IB. The details are shown in Table 3.

DISCUSSION

One of the major gaps in literature is interventional research on the effect of behavior change communication programs at the community level to increase awareness among adolescents. The study conducted by Mahanta *et al.*^[11] demonstrated that social and behavior change communication was effective in increasing awareness on key nutrition and reproductive and sexual issues among adolescents; however, it captured few practice/behavior indicators and no outcome indicator. This study adds evidence on the intervention design and change in knowledge status of adolescents from Gujarat.

The present study revealed that poor knowledge existed among adolescents before the intervention. After intervention, a significant change was noted in the knowledge in various domains of adolescent health. Pratinidhi *et al.*^[12] in Pune observed that the change in knowledge was 8 marks and 19.05%

increase in percentage between pre- and posttest. However, in our study, we found a mixed observation and change in knowledge status and attitudes on postintervention. In literature, various studies have shown that the knowledge, attitude, and practices of adolescents are moving in a desirable positive direction on posthealth education;^[13–15] however, in our study, we found that this phenomenon is not always true for each category.

Awareness about anemia among girls increased in both IB and CB; however, for boys, awareness increased only in IB. This study also found high number of underweight in both the blocks across the genders; this may be because this project intervention focused mainly on providing information on the importance of nutrition in adolescence and its significance and 2 years is a short time for any knowledge-based nutrition intervention to result in nutrition improvement in terms of BMI. Another point for policy debate is that there are no clear guidelines on how to interpret BMI for adolescents. The World Health Organization and Indian Academy of Pediatrics have adolescent references, but the operational guidelines of RKSK suggest using adult BMI standards. Hence, there is a lack of clearly defined standards for BMI for adolescents in India, which has been already highlighted in published research.^[16]

One among the other significant changes that have been observed in the awareness about STI and HIV/AIDS, which has only increased in the IB, however, decreased in the CB. Other positive findings observed are decrease in open defecation across the sites and improved toilet facility usability during the study period. All these changes are greater improvement in the IB than the CB. This indicates that the intervention that has been designed in collaboration with the health system remained effective for the improvement of knowledge and awareness level for these adolescents. However, to be in practice such as reusing absorbent during menstruation, the change is in the negative direction, which indicates that there need to be long-term sustainable programs to change these behaviors. Thus, the system-oriented intervention should always focus the behavior change and communication of the target population on a long-term goal. One of the striking finding in our study is within the age group of 11–14 years of adolescents; there has been reportable increased use of substance abuse in the IB. The main reason for this striking increase might be the overall increase in knowledge, thus reporting might have increased as compared to other subgroups.

Recommendations

Adolescent health strategies

- a. Need to develop differential strategies to be planned for adolescents who are school going, nonschool going, married, unmarried, living in rural and urban areas, or are migrants
- b. Need to develop different strategies for increasing outreach to nonschool-going adolescent girls and boys. With increasing school enrollments, it is imperative that adolescent programs include school-going adolescents, and training of teachers becomes critical to ensure their active participation

- c. Need to integrate the component of empowerment and gender equality within the health education program and promote community and stakeholder participation for improving effectiveness of programs.

Adolescent health programs

- a. Need to make information and services accessible to adolescents by allocating designated human resource at village level. It has been observed that peer educators approach may not be ideal to disseminate information at village level
- b. Financial allocation and human resource for the training should be a priority for the state and cannot be a onetime event as it needs to be planned on a regular basis
- c. There has been a significant improvement in knowledge on major issues related to adolescent health among frontline workers, especially accredited social health activists. However, to sustain this knowledge and practice, hand-holding will be required through periodic refresher trainings and assistance. Medical officers and supervisors can do require hand holding
- d. Although knowledge regarding RKSK and adolescent health also improved among school teachers, it was observed that they have prefixed and strict perceptions on topics such as contraception. This might require reinforcement training and engagement with them over longer period of time
- e. Need for focus of Village Health Sanitation and Nutrition Committee (VHSNC) members on their roles and responsibility and that they should be involved in organizing AHD and monitoring Mamta Taruni Day and Mamta Day. Postintervention, the district officials have started recognizing the importance of VHSNC members and initiated their involvement for improving adolescent health. In addition, an adolescent was included as an additional member in the VHSNC for optimal representation in the IB.

Improving knowledge on adolescent health

- a. Conducting or organizing health awareness program after the school for school-going adolescents is not practical, and it needs to be institutionalized in the school through active involvement of teachers
- b. Capacity building of frontline workers and other young leaders can also help promote access to health information and counseling at village level. However, capacity building of frontline workers would need to be done on a regular basis and strategically.

CONCLUSION

While major changes in knowledge and practices were documented in the intervention area; some change was also documented in the nonintervention site. Therefore, improvements could not be attributed completely to interventions. Long-term interventional studies, with robust control over confounders and spillover effect, are required to develop robust evidence on improving health of adolescents in India.

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Conflicts of interest

There are no conflicts of interest.

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