

ABSTRACT

Building Health Champions Among Youth in India for Non-Communicable Disease Prevention¹

Madeleine Blunt

Director: Shelby Garner PhD, RN, CNE

Non-communicable diseases (NCDs) are a leading cause of death in India, creating a need to research strategies for preventing and recognizing these diseases. The purpose of this study is to develop and research an interactive health education program on NCDs in a rural subpopulation of Bengaluru, to build “health champions” among the youth to contribute to the prevention of NCDs in India. Students, aged 12-16, from a rural secondary school took part in a descriptive study. Participants were separated into five focus groups covering different NCDs including hypertension, diabetes mellitus, otitis media, oral cancer, and malnutrition. Each focus group was interviewed face-to-face before, during, and after all activities. Content analysis was completed using a directed approach. Findings were organized into themes that described aspects of learning that enhanced or detracted from student understanding of NCDs. The findings of this study show that creative methods have a positive impact on educating students ages 12-16 on NCDs.

¹ This thesis was written for submission to the Health Education Journal, as such citations follow the Harvard Style Guide

APPROVED BY DIRECTOR OF HONORS THESIS

Dr. Shelby Garner, Department of Nursing

APPROVED BY THE HONORS PROGRAM

Dr. Elizabeth Corey, Director

DATE: _____

Building Health Champions Among Youth in India for Non-Communicable Disease
Prevention

A Thesis Submitted to the Faculty of
Baylor University
In Partial Fulfillment of the Requirements for the
Honors Program

By
Madeleine Blunt

Waco, Texas

May 2019

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ACKNOWLEDGMENTS

I would like to express my deep gratitude to Dr. Shelby Garner, my thesis director and research supervisor for her patient guidance, enthusiastic encouragement and useful critiques of this research work. I would also like to extend my thanks to Dr. Lyn Prater for her valuable and constructive suggestions during the planning and development of this research work. I am particularly grateful for the assistance and encouragement of Dr. Caroline Elizabeth and the staff of Bangalore Baptist Hospital while in India. I wish to acknowledge the help provided by the nursing students at the Rebekah Ann Naylor School of Nursing and their vital translation support.

Finally, I wish to thank the members of my research team: Maggie Compton, Alexis Hart, Cassidy Larkin, Catherine Meinen, Krystal Norman, and Victor Silguero for offering their time and support in running the program.

CHAPTER ONE

Introduction

Those living in rural communities comprise about 70% of India's population, however; research and disease prevention strategies have been concentrated on urban populations (Little *et al.* 2016). The significant increase in unhealthy lifestyle behaviors such as physical inactivity and smokeless tobacco use in rural communities has increased communities' risks for disease (Sathish *et al.* 2017). Patients in rural areas are subject to a "triple burden" of lack of education, financial insecurity and poor access to health care and tend to delay seeking treatment (Swaminathan *et al.* 2017). The burden of non-communicable diseases (NCDs) in India "exceeds global increases" due to a lack of preventative measures (Swaminathan *et al.* 2017). Chronic conditions like diabetes are no longer "confined to urban areas of India" and have become a burden in rural communities as well (Little *et al.* 2016).

NCDs such as type 2 diabetes mellitus and hypertension have a profound impact on global health (World Health Organization 2016). The International Diabetes Federation (IDF) (2018) has stated that diabetes affects upwards of 285 million people and is projected to affect 438 million by 2030, with most cases occurring in low and middle-income countries. The IDF has also predicted the number of adults with pre-diabetes will increase to 472 million by 2030 (Hu 2011). In the impoverished areas of Bengaluru, India, NCDs such as; malnutrition, diabetes, hypertension, oral cancer, and otitis media have been noted as "top health priorities" by community health officials

(Abdi *et al.* 2018). With a high prevalence of smoking, heavy alcohol use, and increased intake of refined carbohydrates, coupled with declining levels of physical activity, India has seen an increase in NCDs, such as type 2 diabetes and hypertension (Gupta 2016; Little *et al.* 2016; WHO 2016).

The burden of NCDs is on the rise in India. The diabetes prevalence, as found by a large-scale study, has reached 7.8% with the rate of pre-diabetes trailing at 7.1% in rural India (Little *et al.* 2016). Although it varies by region, the national rural prevalence of diabetes in India has quadrupled over the last quarter century (Little *et al.* 2016). The prevalence of hypertension has been established as a quarter of rural adults (Gupta 2016). Hypertension has caused about 170,000 deaths in India every year, and an estimated 140 million people are living with high blood pressure in India currently (Johnson *et al.* 2014). Furthermore, the World Health Organization (n.d.) reports that 15.2% of the Indian population consumes less than the minimum level of dietary requirement, or are malnourished. India has been declared a “Low-Income Food-Deficit Country” (WHO n.d.). However, epidemiologic studies have shown that NCDs are mostly preventable through diet and lifestyle modifications (Hu 2011).

Diabetes has been declared a "global public health crisis," and it is fueled by poor diets and sedentary lifestyles (Hu 2011). Due to the rapid rise of NCDs, such as hypertension, the World Health Organization has begun to implement nutrition modifications in the form of a salt reduction program (Johnson *et al.* 2014). Lifestyle modifications concerning personal, dietary, and exercise habits need to be taught to the youth of the community (Kini *et al.* 2016). The epidemic of NCDs can be curbed through the advocating of healthy diets and lifestyles (Hu 2011). Therefore, it is essential to

engage with local communities and better understand their perceptions of health and priorities to develop future interventions based on their needs (Abdi *et al.* 2018).

Building Health Champions Among Youth

Health professionals and researchers in the United Kingdom (UK) have advocated for children and youth to become “Health Champions,” integral members of the community who serve as change agents to promote health (Altogether Better 2018; White *et al.* 2010). Health Champions are defined as individuals who have been trained and supported to “voluntarily bring their ability to relate to people and their own life experience to transform health and well-being in their communities” (Altogether Better 2018). Their value comes by “unlocking the assets and resources of individuals and communities” and in turn “create healthier communities” and better knowledge of health services (NHS Confederation 2012). Researchers have found that meaningful engagement with the community has resulted in better health and well-being, improved self-care of chronic illnesses, and healthier lifestyles (NHS Confederation 2012).

Researchers in the UK found that building health champions among youth transformed young people into becoming stakeholders in improving the type of wellness activities they co-designed and implemented. It also has the power to change the lives of people in the community experiencing the “poorest of health” (NHS Confederation 2012). Research suggests that there have been improved health outcomes for the children and youth involved, as well as improved health outcomes in their local communities. Through this project, children had improved self-efficacy in their role as change agents to improve community health and valued their communities more. However, no research was found on the incidence or effectiveness of youth serving as Health Champions in

India (Altogether Better 2018; White et al. 2010). On the individual level, the outcome goal of Health Champions is to use their social skills and training to engage the community and “increase their knowledge and awareness of health issues” (Altogether Better 2018). Per the NHS Confederation (2012), there is "untapped potential" in these communities, and we cannot afford to lose it.

Learning Styles of Youth in India

Gandhi believed in an education system that centered around the use of crafts as a teaching and learning strategy and stated that it would become “a bridge” between the school and home environment of the child (Guar 2018). The use of crafts in school became a source of dialogue at home, spun by the students themselves (Gaur 2018). Research has shown that if teachers use a variety of teaching methods, such as the making posters, puppets, gardening, and weaving, the students are exposed to both the familiar and unfamiliar in a way that provides "both tension and comfort" during the process (Kamboj & Singh 2015). The variety of teaching methods provides the students with more than one way to excel in their learning (Kamboj & Singh 2015). It has been found that “abstract learning, artistic and aesthetic interest” tend to achieve higher academic marks, especially in those children with a strong preference for imaginative thinking (Kamboj & Singh 2015).

Students in the sciences tend to reject school that is “disconnected from their own lives,” where they aren’t free to explore and incorporate their imagination into the process (United Nations Educational, Scientific and Cultural Organization 2010). Despite the many attempts to revamp science education in India, it has remained a stagnant collection of facts and theories that student’s rote memory will be evaluated on

throughout the term; it lacks all creativity and discourages imagination (Mahajan 2018). However, crafting products leads to an early understanding of how the pieces of a concept fit together to create the desired end (Guar 2017). Students tend to "watch and then try to do," and they learn best "through exploration" (Kamboj & Singh 2015). Evidence suggests that students like to design, create, and build to remember items rather than by writing down notes. Students can remember pictures and images better than words and names (Kamboj & Singh 2015). Students who are given freedom to think and imagine score higher than those "who are given a 'cookbook' approach to class" (Mahajan 2017).

Previous research into youth health champions was conducted in the UK through the All Together Better Program (Altogether Better 2018; White et al. 2010). However, a gap in the literature exists concerning the effectiveness of health champions in India. Previous research studies with a focus on health champions were conducted in different cultures with different customs for health care and prevention of disease. Alternative measures to address challenges related to culture in India are needed. Therefore, to evaluate the effectiveness of youth health champions, further research is necessary for a non-western country such as India.

Purpose

Health promotion and education play an essential role in the prevention and management of NCDs. Per the WHO (2016), the probability of dying from the four major NCDs is 26% in India. The WHO (2016) also states the emergence of NCDs is responsible for 67% of India's mortality burden. The higher probability of dying from a preventable disease justifies the need for enhanced health education from a young age.

Thus, the school that participates in the recommended approach of nominating and building health champions in each grade will be able to advocate for those in their communities at risk or affected by these diseases. The overarching purpose of this research study is to develop and research an interactive health education program on type 2 diabetes and hypertension in middle and high schools in a rural subpopulation in Bengaluru, to build “health champions” among the youth and to contribute to the prevention of NCDs in India. Specifically, the aim was to identify and evaluate aspects of learning that enhanced or detracted from youth understanding of NCDs.

CHAPTER TWO

Methods

Design

A descriptive qualitative approach was used to develop and evaluate an interactive educational program on type 2 diabetes and hypertension in middle and high schools in a rural subpopulation in Bengaluru, India to build Health Champions among the students. The project encompassed the development and research of an interactive education program, including various craft activities, that provided health and nutrition education to youth to build health champions towards prevention of hypertension, diabetes, otitis media, malnutrition, and oral cancer in Bengaluru, India. The interactive health education program focused on providing students at a rural secondary school in Bangalore, India with the means necessary to become health champions to educate their own families, peers and other stakeholders to improve health outcomes in their community.

Participants and Procedures

Convenience sampling was employed to recruit rural secondary students from a subpopulation attending school in Karnataka, India. Inclusion criteria were: 1) enrolled as a student, teacher, or administrator in the selected middle or high school in the DJ Halli Slum or other Bangalore Baptist Hospital partner school in Bengaluru, India, 1) youth participant recommended/nominated by primary school teacher or administrator and 2) participant speaks and understands at least one of three languages spoken by the

translators (English, Hindi, or Kannada). Exclusion criteria included 1) those who do not meet inclusion criteria. This study took place in a government high school in the Bangalore Rural District, where 20 students attended two days of education on NCDs in June of 2018. All the students met inclusion criteria, and 70% were female, and 30% were male. 20% were age 16, 60% were age 15, 15% were age 14, and 5% were age 12. All the participants were fluent in Kannada with only one student able to speak some English. Bengaluru is the 3rd largest city in India (13 million people), and the Bangalore Rural District comprises 991,000 people (Bangalorerural.nic.in 2018).

Human Participant Protection

Informed assent was obtained from each student participant and informed consent was obtained from each teacher participant before beginning the non-communicable disease education intervention. This study received exempt status from the Institutional Review Board (IRB) at Baylor University in Waco, Texas (IRB Reference #1185311) and was approved a hospital IRB in India.

Measures

Data were collected through face-to-face semi-structured, in-depth, focus group interviews before, during, and after students were engaged in educational strategies focused on building health champion and preventing NCDs in India. The student and faculty interviews lasted 48 and 19 minutes respectfully. The student focus group was led by the principal investigator and two translators. There were 20 students who had been nominated by their teachers to be “health champions” for their schools. They were excited to get started and were laughing and telling stories throughout the interview

process. The faculty focus group was led by two faculty mentors without translators. The discussion revolved around curriculum and resources the school provided to the children such as hot lunches and bicycles.

Two days of education on NCDs were conducted in Karnataka, India. The education techniques included both didactic and hands-on crafting experiences. Didactic instruction was performed in 5 separate focus groups. Each group was taught about a different non-communicable disease including hypertension, diabetes, otitis media, malnutrition, and oral cancer. Each group of participants was then allowed to continue their learning through craft projects including; sand art, puppet shows, coloring worksheets, bracelet making, and chalk art.

The two days of education was facilitated by two nursing faculty from the US, six nursing students from the US, five nursing students from India, the Community Health Director from a local hospital, and a social worker from a local hospital. The focus groups were led by five nursing students from the US with translation from Kannada to English being facilitated by the Indian nursing students and the social worker.

The choice of schools resulted from the collaboration with the Community Health Director and social worker who had both already begun education on "life skills" in the school previously.

-
1. Please tell me what you ate yesterday from the time you woke up until the time you went to bed?
 2. How is this food healthy or unhealthy?
 3. Who prepares food in your house?
 4. What do you eat when you are at school or away from home?
 5. Where does your food come from?
 6. What is your favorite food?
 7. Can you tell me what you know about diseases such as high blood pressure or diabetes?
 8. Can you tell me about any family members or friends who have had problems with high blood pressure, diabetes, or other health problems?
 9. How can we make learning about health fun for you?
 10. What is your favorite way to learn?
 11. If you were going to teach a friend about a health topic, how would you go about it?
 12. How would you teach your family members about a health topic?
 13. Can you describe a learning activity in school that was fun in the past?
-

Table 1: Student interview excluding probing questions

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1. Can you tell me what you know about non-communicable diseases such as high blood pressure and diabetes?
 2. How do non-communicable diseases impact you?
 3. How do non-communicable diseases impact your community in Bengaluru, India?
 4. Please describe health topics that are taught in the school curriculum.
 5. How do these health topics relate to non-communicable diseases?
 6. Based on your experience, how do youth in this school learn best?
 7. Please give examples of how you might teach youth in the school about a new health topic.
-

Table 2: Faculty interview excluding probing questions

Data Analysis

The directed content analysis of quantitative data is indicated when prior research exists and allows for further exploration of the topic (Hsieh & Shannon 2005). After data is collected through interviews, directed content analysis is used to organize passages into predetermined codes related to the known phenomenon (Hsieh & Shannon 2005). Our prior knowledge is based in the UK's Altogether Better Campaign for Health Champions. Using a directed content analysis approach, verbatim transcripts were reviewed several times for familiarity. The principal investigator then identified meaningful texts and codes that appeared in research questions. A faculty expert then reviewed the data for validity. An open coding strategy was first used to determine broad concepts and create categories and subcategories of patterns within the data, specific to facilitators and barriers to health education on NCDs in India. After this, axial coding was used to explore and refine the properties and dimensions of categories and subcategories. Finally,

selective coding was used to examine the relationships between them (Hsieh & Shannon 2005). NVIVO® qualitative software was used to sort and organize the data. This method of analysis allowed the researcher to shed more light on the need for implementation of health champion programs to improve NCD related health education in India.

Descriptive statistical analysis was employed to analyze demographic data that has been expressed using measures of central tendency and dispersion.

CHAPTER THREE

Findings

Participants found a creative approach to be an effective method of delivering health education. The interest generated through the interview process remained throughout the two-day workshop. Participants were engaged in the health education activities and were considering ways they could continue teaching about health in their community after the workshop.

Two distinct categories were identified organized into themes that described aspects of education that detracted from overall understanding of NCDs and aspects of education that enhanced overall understanding of non-communicable disease.

By far, the most robust primary category was aspects of education that enhanced overall understanding. It captured the central objective of the study and contains 3 subcategories: “Previous creative experiences” which reflects the impact that creative learning has already had on their understanding, “impact of translation on learning” which demonstrates the necessity of accounting for native language when implementing education programs, and “implementation of the health champion” which shows the impact that two days of health education through craft projects impacted their previous knowledge of NCDs.

Aspects of Education that Detracted from Overall Understanding

Lecture-Based Learning

The health education curriculum at the school is often dictated by what was available and accessible for the learners to use. The class lacked a diversity of teaching styles and were streamlined into lecture only sections. The students acknowledged that creative learning methods were not new; they found that lecture-based classes comprised a large portion of their schooling:

“Mostly, it’s the lectures and things going on, but then being taught certain things like cleanliness and using charts, posters, which they like” (Translator 2)

Responses to follow-up questions comparing lecture-based learning and creative learning revealed that although the students have exposure to other methods of education, it is a rare enough occurrence that they are unable to compare it to the effectiveness of their regular lectures:

“I think their exposure in general is mostly lecture. So, if you ask them, they are not able to say. If you give them options, they don’t have much things to compare.” (Translator 1)

This limited view of other learning methods restricted our preliminary assessment of how creative learning strategies would affect the curriculum. Given the lack of experience with other forms of teaching the majority of students acknowledged that lectures left them confused.

Previous Knowledge of Disease Processes

Throughout our discussion with students and faculty, it became clear that a lack of understanding surrounding NCDs existed. While exploring how the students have

previously learned about preventable diseases, the students revealed their confusion associated with lectures;

“The lecture method, he’s saying he may not understand it.” (Translator 1)

As we began to dive deeper into our assessment of the students’ knowledge of NCDs, the lack of understanding related to lecture-based lessons became evident. Although the students showed evidence of some previous knowledge, they struggled to separate the disease processes from one another, especially hypertension and diabetes mellitus. The students began to list off characteristics of diseases that were associated with something else;

“She said diabetes symptoms, like those were the symptoms” (translator 2).

The faculty stated that although they knew that hypertension was high blood pressure, they didn’t truly understand it;

“I know that term hypertension, high BP” (Male Speaker 1)

“High BP. Like this, I know but-” (Male speaker 1)

“He doesn’t know” (Male Speaker 2)

Aspects of Education that Enhanced Overall Understanding

Previous creative experiences

The lesson plan gives the teacher a month to go over NCDs with their students.

This small amount of time is spent going over a single chapter in their science textbooks;

“We have a chapter about that topic and noncommunicable disease. We have that in the chapter. It’s a month to teach” (Female Speaker 3)

Although the teachers realize that using alternate forms of videos is more beneficial to the students they run into trouble with language barriers in the classroom.

The children in the school speak Kannada, a language not commonly used in health education videos;

“Videos...because the language problem is there... Kannada the children. They have videos they can't understand” (Female Speaker 3)

When the teachers use these videos in the classroom they have to translate for their students;

“if you were going to show a video you would have to interpret kind of what's going on for most of the children” (Female Speaker 2)

Impact of translation on learning

During the implementation of the health education program, this need for translation was underlined. Although many of the students had some basic understanding of English, their preferred language of instruction was Kannada. To address this issue, nursing students from Bangalore Baptist Hospital who were native speakers of the language were recruited to provide the active role of translators. Through the use of diagrams, illustrations, and direct translation, the students were able to interact with the material in a more efficiently and effectively:

"They were able to understand a lot especially because we had pictures to show them. The nursing student was a great help to understand the questions the students had." (Research Assistant 6)

“Once the translating and teaching were in sync, things ran smoothly.” (Research Assistant 2)

It is important to note that the students seemed to have a foundational knowledge of NCDs. Although they did not have a full understanding of the differences in disease processes or prevention techniques, they had been able to learn enough in their traditional classes to grasp the new content we shared with them in an effective way:

“The children knew more than I expected and supplemented what we taught them with past information they learned. They were very ready to interact and hear the information we had to give them.” (Research Assistant 6)

“It wasn’t difficult to transfer the knowledge because the students had a foundational knowledge.” (Research Assistant 3)

The students stated that most of their current knowledge of NCDs came from an animated video on NCDs developed in their native language Kannada. When we asked how they could share this knowledge with their peers, the students rejected the lecture-method, stating;

“They say even though they’re taught in lecture methods, that is fine. But when they want to teach somebody like their peers, lecture is not a good method.” (Translator 2)

The students argue that to inform their peers or families about issues they tell stories.

They feel this is more effective than just stating the facts;

“They like stories. Whatever they tell through stories, they will listen to it.” (Translator 1)

After the students struggled to tell us the symptoms of hypertension, they asked if they could instead show us the issues associated with diabetes. Their love of story-telling came out as they began to roleplay a diabetic patient's interaction with their provider;

“One is gonna be the counselor and the other is gonna be a patient and they’re gonna talk about diabetes, say what they know.” (Facilitator 2)

Implementation of the Health Champion

The students showed a strong desire to learn more about the conditions affecting their community. Four students championed one of these diseases, diabetes mellitus. They took on the task of absorbing all the information they could about the disorder

including causes, symptoms, and prevention techniques. After a crash course on the disorder, the students began organizing a puppet show for their classmates.

“The students were very receptive to crafts and teaching. My group made puppets and they really enjoyed making their own unique characters. They were able to give their characters individual personalities during the skit which makes it fun for the other students to watch and learn.” (Research Assistant 4)

Not only did the students enjoy putting together the puppet show and performing for their peers, but they also exhibited a large amount of knowledge retention from the previous day’s discussions on the disorders. They were able to communicate a comprehensive description of diabetes to their classmates and school faculty;

“The students were able to meet the objectives I set for them. They were able to talk about diabetes and include all the material taught to them in their puppet show.” (Research Assistant 4)

This ability to perform an effective teach back of the disorders was consistent throughout all five disease focus groups. Each of the groups took charge of the disease process assigned to them and showed pride in the presentation of their projects at the end of the workshop.

“I saw students take leadership which means they were confident and comfortable with the content.” (Research Assistant 3)

“The objective of the project was met; the students were able to learn the topics and teach back what they had learned from the craft activities.” (Research Assistant 5)

CHAPTER FOUR

Discussion and Conclusion

Discussion

Our study revealed the effectiveness of an interactive health education program on hypertension, diabetes, otitis media, malnutrition, and oral cancer in middle and high schools in a rural subpopulation in Bengaluru, India to build “health champions” among the youth.

NCDs are one of the leading causes of death in India and have a higher tendency to be ignored due to lack of understanding. Currently, students are taught health education through lecture-based classes in secondary school. However, the majority of students interviewed demonstrated a lack of fundamental knowledge of non-communicable disease and how to prevent them. The mechanisms through which it is most effective to teach health education remain unclear. Identification of learning methods that enhance or detract from the understanding of NCDs will facilitate the development of novel and effective health education curriculum and may improve responses to disease in the community.

In this study, we implemented various teaching strategies to identify aspects of learning that enhanced students’ knowledge and understanding of non-communicable disease. Through a combination of interviews and focused teaching groups we identified creative learning techniques a significant enhancer for student understanding. The students were able to demonstrate a comprehensive understanding of the disease assigned to their focus group by teaching their classmates in other focus groups accurately and

effectively. A previous study demonstrated that the implementation of youth health champions in the United Kingdom improved community engagement and understanding of disease (Altogether Better 2018; White *et al.* 2010). This report is consistent with our finding that youth health champions are able to share their knowledge of disease through creative measures effectively. Based on this data, we suggest that creative learning strategies and the implementation of health champions are major influencers on community understanding of NCDs.

This study also revealed how youth perceive their current food choices in comparison to diets used for disease prevention. Through our interview process and discussions with the students, we identified that despite their common meals lacking fruits and vegetables and persisting of mostly grains and starches the students believed their diets to be “healthy.” Previous studies have declared poor diets and sedentary lifestyles to be a catalyst for diseases such as diabetes (Hu 2011). This argument along with our findings that youth lacked understanding of health-conscious diets confirmed that further education was needed on disease prevention. Based on these findings, lifestyle modifications such as dietary habits need to be addressed in the health education curriculum.

Strengths and Limitations

The authors recognize several limitations to the study. The interviews and focus groups were delivered in English and then translated to the students in their native language. Although the students were receiving the questions and instruction in their primary language, Kannada, the need for translation could influence their understanding of the interview questions and information received in the focus groups. This was also the

first time that Health Champions had been implemented in India. Additionally, sampling methods used limited the geographical location of participants to one village in South India. Ideally, the workshops would have been conducted in different geographical locations so the results could be compared.

Conclusion

This study highlights the powerful influence of interactive and creative health education programs on NCDs. This underlines the significance of creative science curriculum and emphasizes the need to address how health champions can be established in other communities effectively. In the absence of strong health education, youth health champions are tasked with sharing their knowledge with their communities to prioritize non-communicable disease prevention. Targeting students who are recommended by their faculty or peers may be especially important, given their already established role in the community and motivation to learn.

The findings also reinforce the importance of health education presented in the native language of the learner. This highlights the need for access to translators in order to support staff in implementing an effective learning environment. Given the limited availability of resources, organized games or activities that are common in the community should be utilized. Before implementing health champions in a school, researchers should establish what natural and cost-effective alternatives to craft supplies are available in the community. Future research should focus on developing and testing strategies to maximize implementation of health champions in nearby rural and urban community schools.

Ethical Approval

All procedures performed in studies involving human participants were conducted in accordance with the ethical standards of the institutional research committee approving the study and the 1964 Helsinki Declaration and its later amendments.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by the Baylor University Undergraduate Research and Scholarly Achievement Program, Baylor University, Waco, Texas.

APPENDICES

APPENDIX A

Grant Award Letter

Dear Dr. Garner,

I am happy to inform you that the above-referenced proposal to the Undergraduate Research and Scholarly Achievement (URSA) Small Grant program has been funded by the Office of the Vice Provost for Research (OVPR) in an amount not to exceed \$4970. The project period for this award is June 1, 2018 through May 31, 2019. Please indicate your acceptance of the award conditions listed below by replying to [Sherri Honza](#). Sherri Honza will notify the Office of Sponsored Programs to contact you and establish your grant account.

Please note the following terms and conditions of this award:

1. Expenditures. Your grant account will be administered through the OSP. If you need training on TRAX (the Baylor Financial Transactions System), training sessions are available through ITS. If your approved budget includes equipment, please prepare the requisition(s) promptly. Any unexpended funds remaining in your grant account at the end of the project period will revert to the OVPR and the URSA faculty steering committee. You will be expected to reimburse the university for expenditures that exceed the total amount awarded.
2. URSA Small Grant Program Forum. Awardees are required to participate in the URSA Small Grant Program Forum. As part of this requirement, funded faculty and

students may be asked to participate during the spring of 2019 in an open forum for faculty and students interested in applying for an URSA small grant. The URSA faculty steering committee in collaboration with OVPR staff will coordinate this effort with faculty schedules and arrange for participation in the forum.

3. Final Report. You are required to submit a final project report to the OVPR no later than 60 days after the project expiration date. The final report form is available on the URSA link on the VPR's internal grant website. You will not be eligible to apply for any future funding from URSA or the OVPR until a final project report is on file in this office.
4. Published Work. Any published work that was supported in whole or in part by these funds should acknowledge such support in the publication. An example of such acknowledgement is: "This study was supported in part by funds from the Baylor Undergraduate Research and Scholarly Achievement Small Grant Program and the Vice Provost for Research."

Congratulations once again on your successful grant proposal. Please let me know if my office can provide assistance in any of your future grant writing endeavors. As always, thank you for your support of research at Baylor University.

Sincerely,

Truell W. Hyde, Ph.D.

Vice Provost for Research

APPENDIX B

IRB Approval Letter



BAYLOR
UNIVERSITY

INSTITUTIONAL REVIEW BOARD – PROTECTION OF HUMAN SUBJECTS IN RESEARCH

NOTICE OF EXEMPTION FROM IRB REVIEW

Principal Investigator: Shelby Garner
Study Title: Building Health Champions Among Youth in India for Non-Communicable Disease Prevention

IRB Reference #: 1185311
Date of Determination: 03/15/2018
Exemption Category: 45 CFR 46.101(b)(2)

The above referenced human subjects research project has been determined to be EXEMPT from review by the Baylor University Institutional Review Board (IRB) according to federal regulation 45 CFR 46.101(b):

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

The following documents were reviewed:

- IRB Application, submitted on 01/27/2018
- Protocol, dated 03/04/2018
- Parental Permission Form, dated 03/04/2018
- Child Assent, dated 03/4/2018
- Consent log, submitted on 03/04/2018
- International Research supplemental form, submitted on 01/19/2018
- Vulnerable Populations supplemental form, submitted on 01/19/2018
- Letter of Support, submitted on 03/10/2018

This exemption is limited to the activities described in the submitted materials. If the research is modified, you must contact this office to determine whether your research is still eligible for exemption prior to implementing the modifications.

If you have any questions, please contact Deborah Holland at (254) 710-1438 or Deborah_L_Holland@baylor.edu.

Sincerely,

OFFICE OF THE VICE PROVOST FOR RESEARCH

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APPENDIX C

Parental Consent Script

“Your child (_____ Community health worker to insert name of youth here) is invited to take part in a research study to find out help your child teach others about two diseases that affect our community, high blood pressure and diabetes. We are calling these children who were nominated by their teachers “Health Champions”. As part of this research, we will interview your child to determine what they know about the disease, how they learn best and we will help them come up with ways to teach others in your community about the diseases to help prevent them in the future. The research will take place at the child’s school and will last about 3 days. Your child’s name will not be used as part of the research and his or her responses during the interviews will be kept confidential. Your decision to let your child take part in this research will not affect your relationship with the school, teachers, or with Bangalore Baptist Hospital or Baylor University and will not affect any medical care you receive from Bangalore Baptist Hospital now or in the future. If you have any questions or concerns about it, please ask your Bangalore Baptist Hospital Community Health Worker to contact the ethics review officials. If you give your child permission to take part in this research, please tell the community health worker now.

APPENDIX D

Youth Assent Script

“You have been invited to take part in a research study to help you teach others about two diseases that affect our community, high blood pressure and diabetes. You were nominated to be a “Health Champion” by one of your teachers”. As part of this research, we will interview you to determine what you know about the disease, how you learn best and we will help you up with ways to teach others in your community about the diseases to help prevent them in the future. The research will take place at your school and will last about 3 days. Your name will not be used as part of the research and your responses during the interviews will be kept confidential. Your decision to take part in this research will not affect your relationship with the school, teachers, or with Bangalore Baptist Hospital or Baylor University and will not affect any medical care you receive from Bangalore Baptist Hospital now or in the future. If you have any questions or concerns about it, please ask your Bangalore Baptist Hospital Community Health Worker to contact the ethics review officials. If you give your permission to take part in this research, please tell the community health worker now.

APPENDIX E

Teacher/Administrator Consent Script

“You have been invited to take part in a research study to help you teach children about two diseases that affect our community, high blood pressure and diabetes. As part of this research, we will interview you to get your ideas on ways children in India learn best and to find out who you might recommend to become a “Health Champion” which is a child who will teach others about disease prevention. The research will take place at your school and will last about 3 days. Your name will not be used as part of the research and your responses during the interviews will be kept confidential. Your decision to take part in this research will not affect your relationship with the school, teachers, or with Bangalore Baptist Hospital or Baylor University and will not affect any medical care you receive from Bangalore Baptist Hospital now or in the future. If you have any questions or concerns about it, please ask your Bangalore Baptist Hospital Community Health Worker to contact the ethics review officials. If you give your permission to take part in this research, please tell the community health worker now.

APPENDIX F

Transcription of Student Interview

Translator 1: She said that we're going to ask some questions and then if you want to answer, you can just one by one – you can always [inaudible] [00:00:21]. Everybody will get a turn. They can all answer whatever they want. There are no right or wrong answers.

Facilitator 1: Okay. So, my name is Madeline. I'm from the US. I'm here to help the health specialist. So, I'm just gonna ask you a few questions. And then tomorrow, we'll do a few craft projects and things like to teach you about the diseases, but first, we're gonna see how best you learn and what you think of the diseases already. How can we make learning about health fun for you?

Translator 1: They say games and songs, they could learn about them.

Facilitator 1: What is your favorite way to learn in general in the class?

Translator 1: Just lecture method.

Facilitator 1: They like lecture method best?

Translator 2: Do they like it or there's anything better?

Translator 1: They like lecture better, but a different way, if you teach, we will learn. So, that is what they said.

Facilitator 1: Okay. If you're going to teach a friend about a health topic, how would you go about it?

Translator 1: Okay. The lecture method, he's saying he may not understand it.

Translator 2: They say even though they're taught in lecture methods, that is fine. But when they want to teach somebody like their peers, lecture is not a good method.

Facilitator 1: How would you teach your family members about health?

Translator 1: They like stories. Whatever they tell through stories, they will listen to it.

Facilitator 1: Through stories? Can you describe a learning activity in school that was fun in the past?

Translator 1: So, it was on cleanliness mainly and on communicable diseases.

Facilitator 1: Okay. So, now...

Translator 2: Mostly, it's the lectures and things going on, but then being taught certain things like cleanliness and using charts, posters, which they like.

Translator 1: I think their exposure in general is mostly lecture. So, if you ask them, they are not able to say. If you give them options, they don't have much things to compare.

[Crosstalk]

Facilitator 1: So, if we brought some art projects and things like that to teach you, if we added stories to that, would it help you learn better about the health topics?

Translator 1: Yes. Good.

Facilitator 1: Okay. So, now, I'm gonna ask a little bit about your home life, your food, how it's prepared. So, please tell me what you ate yesterday from the time you woke up to the time you went to bed.

Translator 2: Can we do it [inaudible] [00:08:38] and then we'll pick up and ask some questions, like maybe two, three responses.

Facilitator 1: Yes. That's a good point. They'll call out and then we'll have a student choose a number.

Facilitator 2: So, start one... 21. Okay. So, can you choose a number between 1 and 21?

Who's number 10? Okay. So, we'll let you answer these.

Facilitator 1: Okay. Tell me what you ate yesterday from the time you woke up to the time you went to bed. Okay. Thank you.

Facilitator 2: Victor, can you pick a number? Number 16.

Facilitator 1: Two responses for each question.

Translator 1: So, night, she had rice and [inaudible].

Facilitator 1: Thank you.

Facilitator 2: Okay. You want to pick a number, Maggie? Number four.

Facilitator 1: Is the food they were describing healthy or unhealthy?

Translator 2: It is mostly vegetables and then they don't use much of oil or fried rice.

That's why they're saying all food is healthy. That's what they said.

Facilitator 2: Thank you.

Facilitator 1: Thank you.

Facilitator 2: Okay. Crystal, what number? 20.

Facilitator 1: Who prepares the food in your home? Is everyone mother? What do you eat when you're at school or away from home?

Translator 2: They eat rice and sometimes they like to eat chocolates. That's what they said.

Facilitator 1: I'll ask the same question to someone else. That's it.

Facilitator 2: So, which number?

Facilitator 1: He volunteered.

Facilitator 2: Never mind.

Facilitator 1: The same question.

Translator 1: If they go out, they just eat rice and supper, vegetable curry.

Translator 2: Okay. If I give you 100 rupees to buy whatever you like, what would you buy?

Translator 1: He says if he gets 100 rupees, he will go to a hotel and he will have this curry with –

Translator 2: Chicken curry.

Translator 1: [Inaudible] [00:17:18] or something like that, just the curry with [inaudible]. So, this is what he would like to eat if he goes out.

Facilitator 2: They all like chips, they say.

Translator 2: They all like chips.

Facilitator 2: Poppers.

Translator 2: And whatever, Coca Cola.

Facilitator 1: Okay. That's it. Thank you.

Facilitator 2: Thank you.

Facilitator 1: You want me to ask the vegetarian question? How many of you only eat vegetables or vegetarian?

Translator 1: They're not vegetarians.

Facilitator 1: They're all non-vegetarians? Okay.

Facilitator 2: So, all would eat chicken.

Translator 2: That means they can eat non-vegetarian but that doesn't mean they're eating every day non-vegetarian.

Facilitator 1: Sure.

Facilitator 2: But they could if they...

Translator 2: Usually, their houses, how often do they [inaudible] [00:19:21]. Once in a week, mostly Sunday, he has [inaudible] in his house. Three days in a week, he has [inaudible].

Facilitator 1: Where does your food come from? How do they buy it?

Translator 1: So, some, they get it from [inaudible] and they get food for discotheque, others from other [inaudible].

Translator 2: The rest of them are buying from [inaudible] shops. The vegetables, where do the vegetables come from? All the vegetables from the market, the [inaudible] gives the rice and wheat to make [inaudible], limited prices subsidized store. All the vegetables, they have to buy from the nearby market.

Facilitator 2: Can we have them raise their hand if they get their food from the government store? 21. Okay.

Translator 1: They get it from some – some, I think, they go [inaudible].

Translator 2: If you hold [inaudible] [00:22:40] card you get it free, there's a food ration for it, but if you have above [inaudible], you have to pay someone money and get it, but it's one person, 25 [inaudible]. If you want [inaudible], you will not be getting it. So, this is our arrangement, but otherwise, when you go out to buy it, it would be like two rupees versus 30 rupees, something like that.

Facilitator 1: Okay.

Facilitator 2: Do they grow any of their own vegetables at home?

Translator 1: They grow the potatoes, tomatoes, then some of the spinach items, and the curry, certain things they grow at home.

Facilitator 2: Can we have them raise their hand if they grow at home?

Translator 1: [Inaudible], they're not knowing they are buying it [inaudible].

Facilitator 2: Do you also get to eat it and then you sell some?

Translator 1: Yes.

Facilitator 2: Okay. Onion, beet root, cabbage...

Translator 1: Maybe they send [inaudible], onions, potatoes, beet root, carrots.

Translator 2: How much is the quantity that they sell? Is it like substantial or is more like [inaudible]?

Facilitator 1: Okay.

Facilitator 2: You want a new number?

Facilitator 1: Yeah. Actually, these are the disease questions. We should probably [inaudible].

Facilitator 2: I'm sorry?

Facilitator 1: These are the disease ones, but we should probably [inaudible] because they're like talking about blood pressure things.

Facilitator 2: We can still do it as a group and just pull it up. We still haven't assigned the groups yet, so...

Facilitator 1: No, I'm saying instead of having them sit here, like have them respond. I don't know if everyone will have an opinion.

Facilitator 2: Have them raise their hand? Okay. We can have them raise their hand if they know the answer to these questions and then we'll choose who to respond.

Facilitator 1: So, how many of you have family members with high blood pressure?

Facilitator 2: Three?

Facilitator 1: Four.

Facilitator 2: Four with high blood pressure.

Facilitator 1: How many with family members with diabetes?

Facilitator 2: Nine with diabetes.

Facilitator 1: How many with both? How many have family members with both?

Facilitator 2: Three with both.

Facilitator 1: And then can you tell me what you know about hypertension?

Facilitator 2: Raise your hand if you can tell us.

Translator 1: He's saying when there's a lot of tension, BP will rise.

Translator 2: Heart attack – if it is under-controlled, blood pressure can lead to heart attack.

Translator 1: They have a problem with speech.

Translator 2: Stroke.

Facilitator 2: Did they watch the video, the cartoon?

Translator 1: Yeah, they watched it.

Facilitator 2: That's good to know.

Translator 1: If you eat a lot of salt, it leads to high blood pressure. Eat a lot of spinach.

Facilitator 2: That's okay, just say what she said.

Translator 2: She said diabetes symptoms like [inaudible] [00:34:15], like those were the symptoms.

Facilitator 1: So, the same for diabetes now.

Translator 2: The person can just [inaudible] or something and others [inaudible].

Facilitator 2: And how long ago did they watch the video, the cartoon?

Translator 2: Maybe a month?

Facilitator 2: The cartoon they watched on hypertension was one month ago?

Translator 2: Yeah.

Facilitator 2: One is gonna be the counselor and the other is gonna be a patient and they're gonna talk about diabetes, say what they know. Can you ask them to also pause to translate for us? Okay.

Translator 1: She's the doctor and she's the patient now. So, she just says what is happening. She has increased urination, increased hunger, increased thirst, she feels really weak and lost weight also. She has a wound. She had a fall and that wound is not healing. She said do a checkup.

Facilitator 2: Maggie, are you all taking some pictures and stuff? They're doing a role play, so get one...

Translator 1: Okay. She's saying that you have sugar – you have more than 200. So, you must do whatever I'm going to say. I give you the guidance for this following week. You don't eat those foods that grow underground like carrot and beet root. Those things should be avoided. Also, with the [inaudible], it has to be limited. She's saying you must eat the white portion of the egg and morning, you have to walk for at least 30 minutes, exercise and walk.

So, she's saying like, for example, you're gone for a function and you're eating everything. Don't think for a function, you can [inaudible] habits, that should not be done. They need to come for follow-up. You have to come back for checkup. That is what she's saying.

Facilitator 2: She should be in the diabetes group. I was thinking after we finish the questions, we'll tell them about – have them [inaudible] [00:39:43].

Facilitator 1: I'm done with the questions.

Facilitator 2: So, we thought we would tell them the five things we're gonna do tomorrow and give them a choice. We can say all five and then say them one by one to raise their hands. We'll let you all pick. It would be four in each group. We have five different groups.

Translator 2: There will be four in each group, so when they tell each specific activity they're interested, they can [inaudible].

Facilitator 2: First, we'll say all five, then we'll go back and say each one. Then we'll go back and pick four for each one.

Facilitator 1: So, hypertension is [inaudible] and then [inaudible], oral cancer, oral care, and then middle ear infections, and then malnutrition, diabetes is a puppet show.

Translator 2: What we can do is just make them into groups. If we ask them, they don't know these things.

Facilitator 2: Okay. We'll just make them. Should we just wait until tomorrow? We'll put them in groups today so they can each talk to them about –

Facilitator 1: Should we just have them choose based on the disease?

Translator 2: What we can do, we can say one, two, three, four, five and then we can see what disease.

Facilitator 2: So, they'll number off one to four. There's five groups, so there's 20 of them, so, 1 to 4. We have 5 groups. We just need to do one to four.

Facilitator 1: You need to count out one to five if there's five groups.

Facilitator 2: That's fine.

Facilitator 1: What time are we going to?

Facilitator 2: Until 1:30.

Facilitator 1: Okay.

Facilitator 2: Let's pair them off with a person. So, you say all ones go with – do that for everybody and get them in groups.

Facilitator 1: Guys, can you like spread out.

Facilitator 2: Everybody get in a different corner.

Facilitator 1: That's good.

Facilitator 2: Okay.

Facilitator 1: All the ones should be with [inaudible] [00:43:21].

Facilitator 2: Maybe come over here so you're separate from... Okay. They just numbered off and are in groups. So, now, maybe whoever can translate, if they can go to each group and let the person just tell them what we're going to do tomorrow as to how they can incorporate the disease and the craft together.

Translator 1: So, basically, there will be a [inaudible] for each group and a craft for each group. Tomorrow, they're going to sit together and make some craft, right?

Translator 2: And they learn the disease.

Facilitator 2: Madeline, if you'll go with [inaudible], he's gonna talk to some of the groups and translate and I'll go with her. Okay?

Facilitator 1: Okay.

Facilitator 2: Alright. So, we'll start here. She's just gonna translate for us, you tell her what disease you have and what craft or activity and we want to also get your ideas of how we can incorporate that tomorrow. She said we're gonna go ahead and start making

them today, so in a few minutes, go and get your stuff and we'll start making them. She said that we have time to go ahead and start today.

But they can – if they have any – they can be thinking of any ideas. We'll go to another group and talk to them. You want to tell her what diagnosis and what craft you have.

Female Speaker: Sure. This is what we talked about earlier. We [inaudible]

[00:46:36] and we're gonna do the beads for malnutrition.

Facilitator 2: So, you want to tell her what diagnosis and what...

Facilitator 1: So, high blood pressure and we're gonna do sand art. It will start with different colors and go out. They can decorate as much as they want however they want and I'll just tell them about each color and what it represents and how they can teach it to someone else.

Translator 1: So, maybe we can get the supplies.

Facilitator 2: Yeah.

[End of Audio]

Duration: 48 minute

APPENDIX G

Transcription of Faculty/Administrator Interview

Female Speaker 1: Okay. So, the first one we want to know about is, tell us what you know about NCDs such as high blood pressure and diabetes.

Male Speaker 1: Me?

Female Speaker 2: Yes.

Female Speaker 1: Yeah.

Male Speaker 1: No, no, no.

Female Speaker 1: Do you have any –

Female Speaker 2: You don't know?

Male Speaker 1: I don't have.

Female Speaker 1: Okay. Okay.

Female Speaker 2: You don't have?

Male Speaker 1: No.

Female Speaker 2: Okay. Have you ever been taught anything about what those are, or have you heard of those diseases?

Male Speaker 1: Which? Hypertension and –

Female Speaker 2: Yes.

Male Speaker 1: I know that term hypertension, high BP.

Female Speaker 1: High BP.

Female Speaker 2: Yes.

Male Speaker 1: High BP. Like this, I know but –

Male Speaker 2: He doesn't know.

Female Speaker 1: He does not know.

Female Speaker 2: Okay.

Female Speaker 1: Okay. Do you have any friends or family that have high BP or diabetes?

Male Speaker 1: No, no, no.

Female Speaker 2: I think this is the student questions?

Female Speaker 1: No.

Female Speaker 2: Oh, okay.

Female Speaker 1: It says –

Female Speaker 2: Okay. Okay.

Female Speaker 1: Okay? Do you know if it is a problem in your community? In the community health of your community?

Male Speaker 1: It is a problem knowing this because of change of lifestyle.

Female Speaker 2: Change of lifestyle.

Male Speaker 1: Because of change of lifestyle [inaudible] [00:01:25].

Male Speaker 2: Hypertension.

Male Speaker 1: Yeah. Hypertension.

Female Speaker 1: Can you tell us if there are health topics –

Male Speaker 1: Yeah. In the curriculum.

Female Speaker 1: – that you teach in your curriculum?

Male Speaker 1: Yeah, yeah. There is. There is.

Female Speaker 1: What are they? What health topics do you teach in –

Male Speaker 1: Communicable diseases.

Female Speaker 1: Okay. Communicable diseases.

Male Speaker 1: Noncommunicable, just like high blood pressure, BP.

Female Speaker 1: Okay.

Female Speaker 2: In what type of class do you teach those?

Male Speaker 1: I teach eight through ten class. I teach eight to ten [inaudible]
[00:02:06]

Female Speaker 2: Oh. Eight to ten.

Female Speaker 1: Eight to ten. Okay.

Male Speaker 1: But I am not their biology teacher. I am a physics and mathematics teacher.

Female Speaker 1: Oh. Okay.

Female Speaker 2: Wow. Very smart.

Male Speaker 1: Oh, thank you.

Female Speaker 1: Okay. Alright. Okay. So, based on your experience, how do the youth in this school learn best? What teaching strategies do you find helps the student learn best?

Male Speaker 1: Regarding what though?

Female Speaker 2: Any. Any subject.

Male Speaker 1: Any subject?

Female Speaker 1: Really just teaching and learning. Thinking about teaching and learning.

Male Speaker 1: I guess our new system is because of the 5Es [inaudible]. Deliver teaching in [inaudible] five steps. Delivery is like, compartmentalized into the 5E method.

Female Speaker 1: 5E method.

Male Speaker 1: 5E. 5E is engage –

Female Speaker 1: Oh, yeah. Okay.

Male Speaker 1: 5Es. Engage, explore.

Female Speaker 2: Okay.

Male Speaker 1: Explain.

Female Speaker 1: Explain. Okay.

Male Speaker 1: And elaborate.

Female Speaker 1: Okay. Oh, I like that.

Male Speaker 1: Evaluation. The five steps of teaching all this. We have a [inaudible] [00:03:34]. I believe we are teaching in five steps.

Female Speaker 1: Wonderful. Okay. So how – using maybe this format or another format, some examples of how you might teach youth in the school about a new health topic. I know you don't teach health, but if you were going to – like, if someone said we need you to teach about –

Female Speaker 2: High BP.

Female Speaker 1: – high BP or stop using the beetle route?

Male Speaker 1: Yeah.

Female Speaker 1: Beetle is the –

Female Speaker 2: [Inaudible].

Female Speaker 1: Yeah.

Male Speaker 1: It causes cancer. It's going to be a big problem.

Female Speaker 2: Yeah.

Male Speaker 1: [Inaudible]. A problem [inaudible]. It causes cancer. I'll show you some pictures, for example, [inaudible] presentation showing video clippings –

Female Speaker 1: Of patients that have –

Male Speaker 1: Yeah. Patients. It's just of patients –

Female Speaker 1: With oral cancer?

Male Speaker 1: I can – I explain here [inaudible].

Female Speaker 1: Would some of their parents have this problem?

Male Speaker 1: No, no, no. I did not come across any that –

Female Speaker: You don't – in this community?

Male Speaker 1: No, no.

Female Speaker 1: No?

Male Speaker 1: No.

Female Speaker 1: Okay.

Male Speaker 1: Like, maybe. Maybe I've heard of some people have –

Female Speaker 1: Yes.

Male Speaker 1: – that cancer because of [inaudible] [00:05:19].

Female Speaker 1: Okay, but the students probably don't see it.

Male Speaker 1: Students haven't. Students haven't.

Female Speaker 1: Okay. Is there anything else about teaching and learning related to health topics that you think would be good for us to know about how students learn about health topics?

Male Speaker 1: Cleanliness. Teaching cleanliness.

Female Speaker 1: Yes.

Female Speaker 2: Cleanliness.

Male Speaker 1: Prevention is better than curing all. By teaching cleanliness.

Female Speaker 2: Okay. Important.

Female Speaker 3: Sanitation.

Male Speaker 1: Sanitation. Cleanliness. Sanitation.

Female Speaker 3: [Inaudible]. Personal hygiene is very important.

Female Speaker 2: Personal hygiene.

Female Speaker 3: [Inaudible] [00:06:09].

Male Speaker 1: For example, brushing their teeth.

Female Speaker 3: Everything. Grooming. Everything.

Male Speaker 1: Grooming.

Female Speaker 3: [Inaudible] the boys [inaudible] everything.

Female Speaker 1: So, is it typical that the students would bathe every day, or every week, or what's a typical – in the homes, how often?

Male Speaker 1: Yeah, yeah. They'll bathe periodically. Not daily [inaudible].

Female Speaker 3: Once in three days.

Female Speaker 2: Once in three days.

Female Speaker 3: [Inaudible] – but not the boys.

Female Speaker 2: But not the boys.

Female Speaker 3: Boys? They're not good. Girls much better at [inaudible].

Female Speaker 2: And how long have you been teaching?

Male Speaker 1: This is the 31st year.

Female Speaker 2: Wow. The 31st year. Congratulations.

Male Speaker 1: Thank you much.

Female Speaker 2: That's a very good way to spend your life; to honor other people.

Female Speaker 1: Yes.

Female Speaker 3: [Inaudible] nutrition.

Female Speaker 2: Nutrition is so important. What kind of class do you teach about nutrition?

Female Speaker 3: Well, we have chapters about them.

Female Speaker 2: You have chapters?

Female Speaker 3: Yeah.

Male Speaker 1: [Inaudible] [00:07:24].

Female Speaker 3: [Inaudible] you talk to them they will make the meals. When they make the meals. Every day I ask about what nutrient you got from that.

Female Speaker 2: Yes.

Female Speaker 3: They need carbohydrates, protein, vitamins, minerals [inaudible] [00:07:38].

Female Speaker 2: Thank you. This is just a consent form for us to interview you if you don't mind signing. I didn't realize she had a consent form for that you can read. So,

do children here bring their lunch to school or do they just eat in the morning and the evening?

Male Speaker 1: No, no, no. We are providing the meals.

Female Speaker 2: Oh. You provide meals?

Male Speaker 1: We prepare here only but then they'll [inaudible]. Provide them –

Female Speaker 2: One meal every day they have here for lunch?

Male Speaker 1: Yeah.

Female Speaker 2: Okay. Good.

Female Speaker 1: Provide lunch at school?

Male Speaker 1: Yeah, and they'll provide milk.

Female Speaker 1: Milk?

Male Speaker 1: Milk [inaudible].

Female Speaker 2: What would be a typical lunch they would have here?

Male Speaker 2: 1:30.

Male Speaker 1: 1:30, 1:15.

Female Speaker 2: 1:30? And what would they eat?

Male Speaker 1: Normally there's mayonnaise. Actually, there is rice and –

Female Speaker 2: Rice?

Male Speaker 1: – sambar.

Female Speaker 2: Sambar.

Male Speaker 1: Sambar.

Female Speaker 2: Rice and sambar.

Female Speaker 1: Sambar. Okay. Yeah.

Female Speaker 2: Yeah. Okay.

Female Speaker 1: That's a good meal. That's good.

Male Speaker 1: On the sambar [inaudible] [00:08:42].

Female Speaker 2: Yes. Okay. Thank you very much.

Female Speaker 1: Thank you so much.

Female Speaker 3: And also, the sterilization about this.

Male Speaker 1: There is plenty of sterilization [inaudible].

Female Speaker 3: [Inaudible].

Female Speaker 2: Oh, yes.

Female Speaker 1: Personal hygiene.

Female Speaker 2: Would you have time for us to interview you as well?

Female Speaker 3: Yes.

Female Speaker 2: Oh, okay.

Male Speaker 1: She teaches biology.

Female Speaker 2: Biology. Oh. So, it's very applicable to what we're talking about.

We're –

Male Speaker 1: [Inaudible] [00:09:16].

Female Speaker 2: We're here from Baylor University with Bangalore Baptist Hospital. They've been coming in doing some health teaching, and our students are upstairs doing a project with the students on different health topics like hypertension, and diabetes, oral cancer, ear infections. So, they're teaching them, so they can then teach the class. So, we wanted to interview some of the teachers to get your ideas of if we do this again, how we can best help the students and how we can teach according to the culture

here and how they learn best. So, do we have your permission to ask you a few questions? We have a consent form if you're willing to answer questions.

Female Speaker 1: I want to take a picture of the beetle. Is it okay if I take a photo of the beetle?

Female Speaker 2: Yeah. You can take a picture of that.

Female Speaker 1: It's so beautiful.

Female Speaker 2: We don't have this color at home. Ours are all brown. We don't have green.

Male Speaker 1: Yeah, yeah, yeah. We like to learn [inaudible] [00:10:19].

Female Speaker 2: Oh, yeah.

Female Speaker 1: It's so beautiful. My grandchildren will like to see.

Female Speaker 3: [Inaudible] I got it.

Male Speaker 1: Somebody stepped on it.

Female Speaker 2: What is the name of it?

Female Speaker 3: Beetle.

Female Speaker 2: Just a beetle.

Male Speaker 1: Beetle.

Female Speaker 3: Beetle.

Female Speaker 2: So, typical beetle?

Male Speaker 1: Yeah.

Female Speaker 1: Does it bite?

Female Speaker 3: No.

Male Speaker 1: In our language – no, no. In our language it is called a Jirunde.

Female Speaker 2: Jirunde? In Kannada? Is that –

Female Speaker 3: In Kannada.

Male Speaker 2: You know [inaudible] [00:10:52].

Female Speaker 2: Sanskrit. Yeah. Sanskrit.

Male Speaker 1: [Inaudible].

Female Speaker 2: No, I don't. [Speaking foreign language] is the only word I know.

Male Speaker 1: [Inaudible] Shakespeare.

Female Speaker 2: Indian Shakespeare.

Male Speaker 1: Yeah.

Female Speaker 2: Oh, wow. Wow. I'm going to – I'll ask her some of these, but I'm going to start with the lower ones first.

Female Speaker 1: Yeah. I think so. Yeah. So –

Male Speaker 1: They are practicing yoga. Even the students practice yoga.

Female Speaker 2: They're practicing yoga for health as well. Physical education.

Male Speaker 1: All they do these days the medicine. Yoga. Yoga is the best place.

Female Speaker 1: Do they have a time at school? A session?

Male Speaker 1: Yoga session.

Female Speaker 1: At the school?

Male Speaker 1: Yeah, yeah, yeah. Yoga and meditation.

Female Speaker 1: Okay. Every day the students –

Female Speaker 3: Not every day. We do once.

Female Speaker 2: Once a week. Oh, I see.

Male Speaker 1: They just practice a little bit. Early in the morning we do different yoga and we practice in the morning.

Female Speaker 1: And what time does your school start in the morning?

Male Speaker 1: 10:00.

Female Speaker 1: 10:00. Ten, and it finishes at?

Male Speaker 1: 4:30.

Female Speaker 2: And about how many – it goes from grades 7 to 12 or what grades?

Yeah. Grades.

Male Speaker 1: Grades eight to ten.

Female Speaker 2: Eighth through tenth grade?

Male Speaker 1: Yeah. [Inaudible] [00:12:45].

Female Speaker 2: About how many kids from eighth through tenth grade?

Male Speaker 1: Approximately 285.

Female Speaker 2: Two eighty-five.

Male Speaker 1: Two eighty-five.

Female Speaker 2: Okay. Good. And, madam, how long have you been a teacher? For a long time?

Male Speaker 1: She's thirty years.

Female Speaker 2: Thirty? Wow. And you teach biology?

Male Speaker 1: At the same time.

Female Speaker 3: We all came on the same day.

Female Speaker 1: You came on the same day?

Female Speaker 3: Yeah.

Female Speaker 2: Wow. Congratulations.

Male Speaker 1: Actually, we came [inaudible] [00:13:20].

Female Speaker 2: Wow. That's incredible to devote your life to.

Male Speaker 1: She likes teaching.

Female Speaker 1: Thank you for your service to the children.

Female Speaker 2: Yes. It's a good way to spend your life.

Female Speaker 3: We like it. Yeah. We like it.

Female Speaker 2: So, if you were going to teach a health-related topic, how do you think the children learn best here in India?

Female Speaker 3: Videos are best.

Female Speaker 2: Videos? Is that what you said?

Female Speaker 3: Videos. [Inaudible] because the language problem is there.

[Inaudible] Kannada the children. They have videos they can't understand. They are not talk.

Female Speaker 2: Yes. Do you have access to very many health videos in Kannada? They don't make too many? No.

Female Speaker 1: So, when you teach health you teach it – you teach in Kannada in the school?

Female Speaker 3: Yeah. That's correct.

Female Speaker 2: So, if you were going to show a video you would have to interpret kind of what's going on for most of the children?

Male Speaker 1: That because –

Female Speaker 3: We have newspapers and cartoons we get [inaudible] [00:14:50] comes in the magazines. Whatever is relevant to the chapter and the topic and even we have some [inaudible] videos. So, you would have to see them.

Male Speaker 1: The problem is there is no –

Female Speaker 3: We have projector. We can project pictures.

Male Speaker 1: – video. We use computer.

Female Speaker 1: So, you have a projector.

Female Speaker 2: Okay. Projector. So, you can use the computer. Do you have Internet access?

Male Speaker 1: Yeah.

Female Speaker 3: Always we can put it in [inaudible].

Female Speaker 2: Oh, okay. NCDs like hypertension and diabetes, do you have either of those problems?

Female Speaker 3: I have.

Female Speaker 2: You have? And any of your family members have?

Female Speaker 3: My [inaudible].

Female Speaker 2: Yeah, and then the community? Is it something you see a lot here in the community? We have a lot of it in the U.S. We have a lot of hypertension and diabetes. You told us a little bit already about some of the health topics taught in the school like you said –

Female Speaker 3: Yeah, yeah.

Female Speaker 1: Nutrition.

Female Speaker 2: – nutrition.

Female Speaker 3: We have a chapter about that topic and NCDs. We have that in the chapter. It's a month to teach.

Female Speaker 2: And that's in the biology class?

Female Speaker 3: Yeah.

Female Speaker 2: Good. Good. Very good.

Female Speaker 3: [Inaudible] [00:06:22] my book.

Male Speaker 1: We have coffee or tea?

Female Speaker 2: Oh, no thank you. I think we have some upstairs. Thank you though.

Male Speaker 1: Some milk? Water?

Female Speaker 2: Oh, no. That's okay. Thank you, or unless you – would you like tea or coffee?

Male Speaker 1: Coffee? Tea?

Female Speaker 1: I would love some tea if you have tea.

Male Speaker 1: Okay.

Female Speaker 2: I'll have tea, too. Tea. Thank you.

Female Speaker 1: Tea would be lovely. Thank you.

Female Speaker 1: Right. So, you teach the girls about –

Female Speaker 3: Hygiene, also? Yeah.

Female Speaker 1: Yes. That's good. Very good.

Female Speaker 1: That's great.

Female Speaker 2: Well, thank you. I know you are very busy. So, thank you for spending time and answering our questions. We've been very impressed with the students; how much they know, and they're excited about learning.

Male Speaker 1: How do you find them?

Female Speaker 2: Oh, they're very nice. Very well behaved and very wanting to learn. So, it's been very good. Yes. Very good.

Male Speaker 1: [Inaudible] I think is [inaudible] bicycle. Free text books and uniforms.

Male Speaker 2: Uniforms.

Female Speaker 2: Uniforms. That's good.

Male Speaker 1: Shoes is –

Female Speaker 2: The government provides all –

Male Speaker 2: Bicycles.

Female Speaker 2: Bicycle. Yes.

Male Speaker 1: Each student will get their bicycle and [inaudible] [00:17:58].

Female Speaker 2: Oh, wow. Okay. That's good. And do they have to have a minimal income to come here or –

Male Speaker 2: No, no, no.

Female Speaker 2: – to get that anybody could come?

Male Speaker 2: No income [inaudible].

Female Speaker 2: Okay. No income there.

Female Speaker 1: So, any child in the community could come.

Male Speaker 3: Anybody.

Male Speaker 2: Then some students will get scholarships.

Male Speaker 1: Scholarships.

Female Speaker 2: To keep going.

Male Speaker 2: Those are like [inaudible] scholarships.

Female Speaker 2: Scholarships. Wow. That's good.

Male Speaker 1: Some of them will get 15 to 20,000 [inaudible]. If it costs more than 60 percent you will get 15,000, 20,000.

Female Speaker 3: [Inaudible] percent they will give 10,000. Below 70 they get 10,000, 7000. [Inaudible] [00:18:51] students, they will come and give the prices for [inaudible]. That's how –

[End of Audio]

Duration: 19 minutes

APPENDIX H

Research Team Reflections

Team Teach India Questions

Research Assistant 1

Overall observation of teaching. Overall I thought the teaching went very smoothly. I think time with the translator before hand to explain the project and outcome expectation would have been helpful but the students were very receptive and eager to learn. It was such a joy teaching, playing and getting to know the children.

Overall observation of the learning/teach-back. I think if we explained the purpose of the project or what we were doing to the group of children before teaching it would have been easier. But overall the children did so well and really knew what they were teaching.

How the need for translation affected our experience. The need for translation went well and I don't think it affected the experience in a negative way. I did need the translator during our teaching and she wasn't there but other than that it went well. The children spoke English pretty well.

What were some limitations you saw. I honestly didn't notice very many limitations other than needing the translator during our presentation

What were some things that went really well with the project. The learning and art and projects went really well. The relationships we got to form and grow with them was amazing and seeing what the children have learned in just those two days.

How could we improve this in future schools. An assessment prior to going to the schools to figure out what they know and what resources they have available prior and also their favorite ways to learn would be beneficial.

Research Assistant 2

Overall observation of teaching. I think the teaching was itself a learning process. Once the translating and teaching were in sync, things ran smoothly. The kids were eager to listen and learn the material too in the fun way. Sometimes the colors of the sand became a distraction because they had never seen them before, but once it was explained how they had to utilize what they were given they used the material wisely in a creative way.

Overall observation of the learning/teach-back. This was my favorite part. The kids in my group all were truly leaders and jumped on the opportunity to show me what they knew as soon as possible. The first day of teaching they were mostly excited to draw, but I think constantly referencing the meanings of the colors during their creative designing helped solidify for their teach back. The second day they had maybe one memory lapse, but once they were reminded and reviewed they remembered the material and presented it well

How the need for translation affected our experience. It is definitely necessary. Some of the kids luckily could understand through my own action if we were without a translator, but there are specific directions that needed translation to help them understand the purpose.

What were some limitations you saw. Definitely the language barrier was tough. I think after we ran through the teaching the first time, the making of the plans for the future teaching removed a lot of limitations.

What were some things that went really well with the project. The kids being chosen by the faculty made a huge difference in the success. They were motivated and inspired to be their best and achieve the goal of the project. I believe it will make huge change in the communities to come

How could we improve this in future schools. Just making sure to have enough translators with teachers would make a huge difference. And maybe a more solidified schedule.

Research Assistant 3

Overall observation of the learning/teach-back. Students learned well with the student nurses as our translators. The teach back went well. I saw students take leadership which means they were confident and comfortable with the content.

How the need for translation affected our experience. It wasn't difficult to transfer the knowledge because the students had a foundational knowledge. I did however

see and experience some difficulty with not translation but understanding of unfamiliar concepts/tasks.

What were some limitations you saw. The interviews may have given different results if they were one on one however I believe the information needed was given.

What were some things that went really well with the project. The acceptance of the project was amazing and the implementation overall. From what I saw, the interview gave good information to how to implement teachings in the village.

How could we improve this in future schools. More translators could be helpful if needed in the school. I still believe the 2nd day could not have gone better. I think the assessments that were made the first day helped the 2nd day tremendously. These sorts of assessments in advance would enhance further implementation in other schools and communities.

Research Assistant 4

Overall observation of teaching. Despite the limitations the teaching went well. I was able to teach all of my information in about 10-20 minutes.

Overall observation of the learning/teach-back. The students were able to meet the objectives I set for them. They were able to talk about diabetes and include all of the material taught to them into their puppet show.

How the need for translation affected our experience. I was unable to ensure that the material was translated exactly as I taught it. It also made the process take slightly longer.

What were some limitations you saw. The language barrier and the cultural differences made for some difficulties because they have different foods and customs.

What were some things that went really well with the project. The students were very receptive to the crafts and teaching. My group made puppets and they really enjoyed being creative and making their own unique characters. They were able to give their characters individual personalities during the skit which makes it fun for the other students to watch and learn.

How could we improve this in future schools. In the future I think a good idea might be allowing the students pick the crafts (in a situation with more time) and more translators!

Research Assistant 5

Overall observation of teaching. I believe the teaching project was very successful. The objective of the project was met, the students were able to learn the topics and teach back what they had learned from the craft activities.

Overall observation of the learning/teach-back. The students learned the material at hand and were able to successfully teach back what they had learned over the past two days of instruction.

How the need for translation affected our experience. Having translators was an essential component to the project, there were definitely some limitations we experienced on the first day because of the lack of translators we had available.

What were some limitations you saw. On the first day the lack of translators was definitely a limitation that we experienced, but several translators were added to the team by the second day.

What were some things that went really well with the project. The interpersonal relationships developed with the students was a component that went exceptionally well during the project.

How could we improve this in future schools. An improvement that should be implemented in the future would be the number of translators available during the first day of the project.

Any comments/questions/observations overall. I had an amazing experience working on this research project and it is sustainable for the community to implement later on without instructors.

Research Assistant 6

Overall observation of teaching. I was pleasantly surprised how much we were able to communicate with the students. They were so receptive to learning and were very glad to have us there. The children new more than I expected and supplemented what we

taught them with past information they learned. They were very ready to interact and hear the information we had to give them.

Overall observation of the learning/teach-back. Though I couldn't understand what they were saying it seemed as though they absorbed the information well and were able to present it completely. The diagrams we drew on the chalk board gave a way they could interact with the material.

How the need for translation affected our experience. They were able to understand a lot especially because we had pictures to show them. The nursing student was a great help for understanding the questions the students had

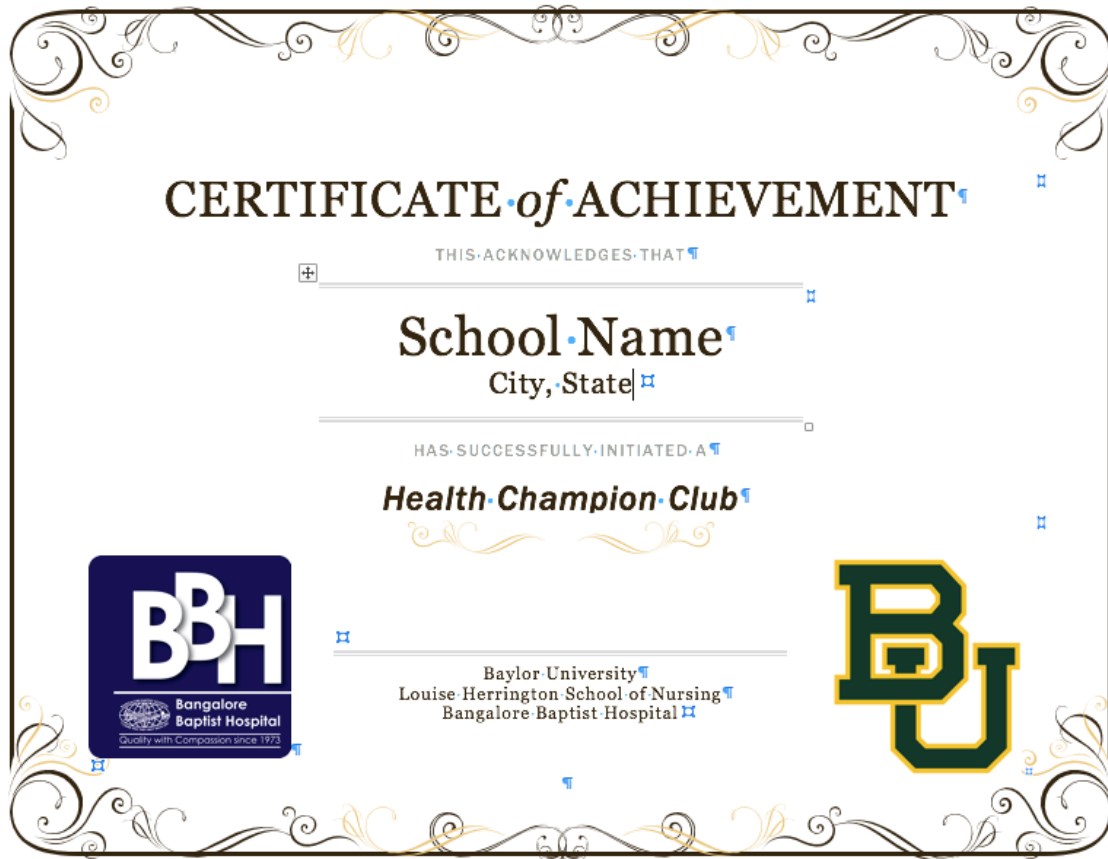
What were some limitations you saw. The first day was more challenging due to the lack of translators

What were some things that went really well with the project. The kids did amazing teaching back and they were all smiles

How could we improve this in future schools. We could quiz the students who were given the student teachings to see how effective the original students teaching was

APPENDIX I

Certificate of Achievement for Participating School



REFERENCES

- Altogether Better, 2018, 'Unlocking the power of communities to transform lives: Health champions', in *Altogether Better*, viewed 20 April 2018, from <http://altogetherbetter.org.uk/health-champions>.
- Abdi, S., Wadugodapitiya, A., Bedaf, S., George, C., Norman, G., Hawley, M. *et al.*, 2018, 'Identification of priority health conditions for field-based screening in urban slums in Bangalore, India', *BMC Public Health* 18(309).
- Bangalorerural.nic.in., 2018. *Office of the Deputy Commissioner Bengaluru Rural District*. [online] Available at: <http://bangalorerural.nic.in/english/index.asp> [Accessed 7 Jul. 2018].
- Gaur, N., 2018, 'An experiment in rural education', in K. Kumar (ed.), *Routledge Handbook of Education in India: Debates, Practices, and Policies*, pp 174-184, Taylor & Francis Group, New York.
- Gupta, R., 2016, 'Convergence in urban-rural prevalence of hypertension in India', *Journal of Human Hypertension* 30, 79-82.
- Hsieh, H. & Shannon, E., 2005, "Three approaches to qualitative content analysis", *Qualitative Health Research*, 15(9), 1277-1288.
- Hu, F., 2011, 'Globalization of Diabetes: The role of diet, lifestyle, and genes', *Diabetes Care* 34(6), 1249-1257.
- International Diabetes Federation, 2018, 'Promoting diabetes care, prevention and a cure worldwide', in *International Diabetes Federation*, viewed 20 April 2018, from <https://www.idf.org/>.
- Johnson, C., Mohan, S., Praveen, D., Woodward, M., Maulik, P., Shivashankar, R. *et al.*, 2014, 'Protocol for developing the evidence base for a national salt reduction programme for India', *British Medical Journal* 4.
- Kamboj, P. & Singh, S., 2015, 'Effectiveness of Selected Teaching Strategies in Relation to the Learning Styles of Secondary School Students in India', *Interchange* 46, 289-312.
- Kini, S., Kamath, V., Kulkarni, M., Kamath, A. & Shivalli, S., 2016, 'Pre-Hypertension Among Young Adults (20-30 Years) in Coastal Villages of Udupi District in Southern India: An Alarming Scenario', *PLOS One*, 29 April.

- Little, M., Humphries, S., Patel, K., Dodd, W. & Dewey, C., 2016, 'Factors associated with glucose tolerance, pre-diabetes, and type 2 diabetes in a rural community of south India: a cross-sectional study', *Diabetology & Metabolic Syndrome* 8(21).
- Mahajan, S., 2018, 'Science and mathematics teaching in schools and colleges', in K. Kumar (ed.), *Routledge Handbook of Education in India: Debates, Practices, and Policies*, pp 120-141, Taylor & Francis Group, New York.
- NHS Confederation, 2012, 'Community health champions: creating new relationships with patients and communities', Altogether Better, Wakefield.
- Sathish, T., Kannan, S., Sarma, S., Razum, O., Sauzet, O. & Thankappan, K., 2017, "Seven-year longitudinal change in risk factors for NCDs in rural Kerala, India: The WHO STEPS approach", *Public Library of Science*, 12(6).
- Swaminathan, K., Veerasekar, G., Kuppusamy, S., Sundaresan, M., Velmurugan, G. & Palaniswami, G., 2017, 'Noncommunicable disease in rural India: Are we seriously underestimating the risk? The Nallampatti noncommunicable disease study', *Indian Journal of Endocrinology and Metabolism*, January-February, 90-95.
- United Nations Educational, Scientific and Cultural Organization, 2010, 'Current Challenges in basic science education', in *UNESCO*, viewed 20 April 2018, from <http://unesdoc.unesco.org/images/0019/001914/191425e.pdf>.
- White, J., South, J., Woodall, J., Kinsella, K., 2010, 'Altogether better thematic evaluation community health champions and empowerment', in *All Together Better*, viewed 20 April 2018, from <http://altogetherbetter.org.uk/SharedFiles/Download.aspx?pageid=4&mid=112&fileid=76>.
- World Health Organization n.d., *NLiS Country Profile: India*, viewed 16 December 2017, from <http://apps.who.int/nutrition/landscape/report.aspx?iso=ind>
- World Health Organization, 2016, 'World health statistics 2016: Monitoring health for the SDGs sustainable development goals', in *World Health Organization*, viewed 20 April 2018, from http://www.who.int/gho/publications/world_health_statistics/2016/en/.