

Research Article

Using Formative Research to Inform a BCC Strategy to Increase Food Security and Dietary Diversity in Low-Income Rural Communities

Turk T^{1,2*}, Safdar NF³, Hashmi S⁴, Shah N⁵ and Zaheer S⁵

¹Communication Partners International (CPI), Springfield, NSW, Australia

²Adjunct Professor, School of Public Health, Dow University of Health Sciences, Karachi, Pakistan

³Adjunct Associate Professor, School of Public Health, Dow University of Health Sciences, Karachi, Pakistan

⁴Assistant Professor, School of Public Health, Dow University of Health Sciences, Karachi, Pakistan

⁵Senior Lecturer, School of Public Health, Dow University of Health Sciences, Karachi, Pakistan

*Corresponding author: Tahir Turk, Communication Partners International (CPI), 24 Dulwich Road, Springfield, NSW, Australia

Received: May 28, 2021; Accepted: June 22, 2021;

Published: June 29, 2021

Abstract

Background: Adequate nutrition is a public health priority, particularly in low-income rural areas where there is a high prevalence of malnutrition and stunting. Baluchistan is an arid desert and mountainous province with the worst health indicators in Pakistan. The objective of this research study was to identify current knowledge, attitudes and practices of vulnerable women with young children residing in remote areas of Baluchistan and assess their information needs to guide the development of a BCC nutrition strategy materials and activities.

Methods: This study design incorporated formative research *via* eight focus group discussions with demand and supply-side program beneficiaries (n=124) to assess current nutrition knowledge, attitudes and beliefs toward kitchen gardens and proposed nutrition resources. Semi-structured interviews (n=16) were also conducted to provide program intelligence from key informants. A literature review supported the development of discussion agenda based on predominant behavioral theories. Data analysis was conducted with *in vivo* qualitative software coupled with grounded theory with qualitative findings triangulated.

Results: The study identified important factors for the development of BCC resources and activities. Opportunities included effective nutrition education, improved income and livelihoods from kitchen gardens, women's empowerment and gender equality. Challenges included traditional cultural practices, entrenched food preparation behavior, environmental and infrastructural constraints.

Conclusions: Lessons learned highlight the benefits of integrating formative research methods with a comprehensive literature review and behavioral theories for the development of BCC resources for nutrition programs in insecure and resource-constrained settings.

Keywords: Behavior Change Communication, Nutrition, Food Insecurity, Needs Assessment, Formative Research

Abbreviations

AusABBA: Australia Baluchistan Agri Business Programme; BCC: Behavior Change Communication; BNPMC: Baluchistan Nutrition Project for Mothers and Children; FAO: Food and Agriculture Organization; FGDs: Focus Group Discussions; KGP: Kitchen Gardens Project; RAR: Rapid Assessment and Response; SSIs: Semi-Structured Interviews; UN: United Nations; UNICEF: United Nations Children's Fund

Background

WHO estimates that globally, 2 million children under 5 years of age are wasted, 17 million are severely wasted and 155 million are stunted, with around 45% of deaths among children under 5 years of age linked to undernutrition [1], which mostly occurs in Low and Middle Income Countries (LMICs) [2]. Child stunting and malnutrition is also associated with lower dietary diversity with

food insecurity and poor household food choices contributing to the lack in meeting children's nutrient requirements [1,2]. Additionally, malnutrition is seen to predominantly occur in regions where there is limited access to high protein foods, poor vegetation cover and a proxy of rainfall or drought [3]. Socioeconomic determinants also play a significant role in food insecurity and diversity of food choices, which lead to childhood and maternal malnutrition [4].

Baluchistan is an arid and remote province situated in the South West of Pakistan. The Province covers around 44% of the total land mass of Pakistan, making it the largest of the four Provinces in the region. Health and nutrition are a major problem in Baluchistan, which has the worst health indicators of all other Provinces in Pakistan.

Many districts in Baluchistan are food insecure with women and children being most affected by food insecurity and malnutrition. As a result, the Province has the highest prevalence of malnutrition with

a globally critical level of stunting of 47% in children under the age of five [5].

There are multiple determinants of stunting and malnutrition that pose challenges toward improved nutrition in Pakistan. Recommendations on strategies to improve nutrition outcomes include a greater focus on poverty alleviation, improvement of mother's health literacy including community-based education and targeted nutritional interventions, and accessibility to health care facilities. Furthermore, behavioral interventions that can address the limited exposure to information and geographical isolation of most vulnerable groups are seen as being much needed in the Baluchistan context [6].

Given these factors there is a considerable need for behavior Change Communication (BCC) programs to improve nutritional outcomes in the province and health seeking behavior [7]. However, the nature and extent of behavior change activities is uncertain due to the current lack of understanding of the cultural dynamics that may affect dietary attitudes and practices in these areas. To support greater integration and institutionalizing of strategic, evidence based BCC approaches a Kitchen Gardens Project (KGP) was established to add value to the efforts of inter-sectoral integration of donor programs aiming to achieve improved nutrition outcomes.

The Baluchistan Nutrition Project for Mothers and Children is funded through the Australian Government under the World Bank's Multi Donor Trust Fund for Nutrition. Project components are designed to address general malnutrition in women and children, micronutrient malnutrition, BCC and strengthening of institutional capacity. The initial BCC component was involved with assessing needs for the development and implementation of the KGP messages and a set of basic but innovative nutrition communication products to improve nutrition behavior. Additionally, a training package to improve family dietary and child feeding practices of mothers with infants was also required to support greater participation in the KGP for improved nutrition to be implemented through a Pilot Project.

Methods

The formative research method used for the development of the Pilot Project Plan comprised of Rapid Assessment and Response (RAR) approach. RAR has been found to be a cost effective, pragmatic method of public health and social issues research allowing for rapid collection of programme intelligence to support the development of BCC plans [8-10]. The application of RAR was of particular importance in the resource constrained and insecure settings of Baluchistan with the fieldwork needing to be conducted in a short time period, while ensuring adequate levels of safety for field teams. Despite the limitations a best practice approach to designing effective behavioral change interventions was embarked upon, including an assessment of participants' health behavior and examination of the type of actions needed, with the objective of tailoring the interventions to best meet the participants' needs [11].

The RAR method included academically robust, qualitative approaches, including Semi Structured Interviews (SSIs), Focus Group Discussions (FGDs), observational research, case study approaches and narratives, which are seen to have generally been underutilized in public health program research [12]. These

qualitative methodological approaches to data collection were seen as potentially powerful tools for understanding the culturally specific influences exacerbating the challenges in Baluchistan [13]. An added innovation to the formative research, to garner additional insights for possible BCC messaging approaches, was the use of Photo voice participative research techniques [14]. Photo-voice was seen as having the potential to provide messaging from local opinion leaders, which could be used during the project implementation stage. Ethics approval for the study was obtained from Dow University of Health Sciences, Ethics Committee (Approval number: IRB-/399/DUHS/Approval/2019).

The first step of the study involved an audit of existing nutrition resources in the Province with the intention of pretesting key resources as a component of the formative research. Next, was completion of a literature review to provide context for the program. International and national literature was sourced from 27 online databases as well as grey literature and internal reports sourced from provincial stakeholders. Predominant behavioral theories applicable to the study were also identified with key variables incorporated into the program logic framework, objectives, SSI and FG discussion agenda. Behavioral theories most relevant to the nutrition project included Health Belief Model which explores variables of target audience perceived susceptibility, severity, barriers and benefits [15]; Theory of Planned behavioral and Social Cognitive Theory which explore variables of perceived behavioral control, self-efficacy, outcome expectancy and environmental influences [16,17]; diffusion of Innovations which examines the role of local opinion leaders in the diffusion of new agricultural practices [18], and Nudge Theory which posits the importance of providing incentives to elicit greater engagement in health programs to influence dietary behavior [19]. BCC program objectives emanating from the behavioral theories included increasing target audience awareness and knowledge about the risks of malnutrition; changing attitudes, beliefs and self-efficacy perceptions; shaping community social norms through influencers and other role models, increasing motivation to engage with the program through incentives, and building practical skills and behavioral intentions toward establishing KGs to grow nutritious, protein dense, produce.

Given the the ongoing insecurity concerns in the province, fieldwork approaches deployed a small field team of three staff to travel to the capital city of Quetta to conduct the SSIs and travel onward to project intervention districts of Kharan and Nushki. SSIs were facilitated with 16 key informants as the approach has been found to offer a flexible and powerful tool to capture local people's voices and how they create meaning from their experience [20]. Key informants interviewed included Program Directors, Deputy Directors and Program Managers, Provincial BCC Consultants, District Nutrition Officer's, the Head of the Lady Health Workers, and Provincial Nutrition Directorate staff working with at-risk groups.

Additionally, Technical Advisor's and Team Leaders from the Women's Economic Empowerment and Agri-Business Units were interviewed as were Trainers from the Food and Agriculture donor agency, representatives from UNICEF, World Food Program, and the World Health Organization.

Insights from the SSIs and the literature review informed the

Table 1: Sampling frame, group profiles and locations for focus group discussions conducted in intervention Districts of Baluchistan (n=124).

Group	Location	SES	Age	Gender & Criteria
1	Nushki	C-D	16-45	Female Trainers (Supply Side)
2	Nushki	C-D	16-45	Female Influencers (Supply Side)
3	Nushki	C-D	20-34	Male Influencers (Supply Side)
4	Nushki	C-D	16-29	Female Influencers (Supply Side)
5	Kharan	C-D	16-29	Females (Demand Side)
6	Kharan	C-D	30-44	Females (Demand Side)
7	Kharan	C-D	16-29	Males (Demand Side)
8	Kharan	C-D	30-44	Males (Demand Side)

development of discussion agenda for the FGDs. Eight FGDs were conducted with program beneficiaries as the approach has been found to be a pragmatic method of formative research with community participants who, on their own, may be reluctant to be interviewed or who may feel they have nothing to say [21]. Convenience samples of participants for the FGDs were selected following training workshops and during the field visits. Group segmentation included demand and supply side participants segmented by gender, age, socioeconomic status and location. A structured screening instrument was used to screen participants prior to recruitment (Table 1).

A total of 124 participants took part in FGDs with 8-19 participants attending each of the groups. Male and female group moderators were trained to facilitate like-minded gender groups in local language, with each FGD taking approximately 60-75 minutes to complete. Data collection involved recording of all discussions and then compiling of the recordings into Word format. Recordings were supplemented through dialogue between team members, immediately following each group discussion. Notes were compiled in a question-by-question format to capture what the individuals had to say in regard to each topic with the notes from the SSIs and FGDs totaling 48 single-spaced, A4 pages.

Data analysis was conducted using *in vivo* software to uncover the most significant themes and issues related to the behavioral theories. Software analysis was supplemented with grounded theory approaches, which use open, axial and selective coding to identify and categorize the relationships of various categories as well using selective coding to identify other categories which may be part of the core categories [22]. Data from the literature review, the SSIs and FGDs was triangulated to provide a rich data-source for comparative analysis [23].

Results

A number of biopsychosocial and cultural determinants emerged from the analysis of the data sets with the themes highlighted within core categories of project challenges, strengths and opportunities to support the behavioral interventions. Participant responses were also categorized according to key determinants from the predominant behavioral theories. Key challenges for the nutrition project included structural, environmental and policy challenges, as well as limitations in knowledge and poor attitudes of some participants on how to achieve improved nutrition outcomes (Table 2).

A number of strengths were also identified to provide insights for

improved BCC nutrition interventions in Baluchistan. These included closed but also strongly bonded and motivated community networks, opportunities for greater program integration and ownership, cultural factors to facilitate message dissemination and behavioral change, and insights on potential influencers and predominant communication channels in the remote rural areas (Table 3).

More specifically, a number of opportunities for the BCC project emerged from stakeholder and beneficiary discussions. Opportunity categories related to program messages, communication channels, human resources and the types of incentives could stimulate engagement (Table 4).

Discussion

The RAR formative research to inform the design of BCC messages and interventions for the KG food insecurity and nutrition program has highlighted a number of challenges. The barrier and benefit analysis has also highlighted program strengths and identified opportunities to more fully engage communities in the behavioral change process. Given the dearth of program intelligence on what may work in challenging cultural contexts, the formative research was critical in starting to build this evidence base. This was particularly important as behavioral theories also highlight that a number of maladaptive responses may be grounded in long held community customs and deeply entrenched cultural habits [24]. As such, this study has provided program planners with a better understanding of the cultural, socioeconomic, psychological, gender and other barriers to behavior change in Baloch rural communities as well as providing opportunities on how best to leverage the scarce resources available for improved BCC interventions in the province.

Barriers categories identified that the KGP will not be successful if issues of water scarcity and infrastructure are not adequately addressed through a combination of interventions. This may require the development of more specific programs to ameliorate water insecurity, alongside the nutrition education and counselling interventions [25]. Cultural factors including entrenched dietary habits, gender inequality, which disempowers women from decision-making, and limited access to health and agricultural information, was found to further limit self-efficacy and perceived behavioral control toward desired behavioral changes [26]. However, other researchers have posited that greater nutrition-focused approaches to agriculture and the design and training of agricultural inputs may also empower caregivers to provide improved nutrition to their children [27]. The triangulated findings highlight the need to address a range of behavioral determinants with BCC messages and interventions including the provision of ongoing practical advice on planting, growing, maintaining and preparing produce from KGs, while being respectful of cultural issues.

“We need to be considerate to the local context and culture. Pictorial messages should include both men and women, but women should be properly dressed and covered, and men should be dressed in shalwar and kameez and local hat”. FAO Stakeholder-Quetta.

Additionally, opportunities identified from the formative research include the willingness of opinion leaders and program beneficiaries to more fully engage in the program if incentives such as training and educational items are provided. This confirms findings

Table 2: Program challenges identified from beneficiaries and stakeholders.

Challenges	Program Beneficiaries/Stakeholders feedback
Water Scarcity/Water Quality	<p>"Telling people to make gardens when there is no water will not make any sense". Social Worker Stakeholder - Nushki</p> <p>"The water we drink is the same as our animals drink and we do not boil it all the time. Diarrhea and weakness is very common". Female Farmer - Kharan</p> <p>"We have abundant water, but the main problem is we do not have clean water in our area". Female Farmer - Nushki</p> <p>"The primary problem is still water availability Our area was very prospering before the drought. We had all the cattle in our home". Local Politician - Nushki</p>
Scarce Human Resources	<p>"Sometimes we are exhausted, and we have so much to do. The Polio campaign has been too much. Of course, we need to deliver but we are only human". Lady Health Worker - Nushki</p> <p>"We are paid very little and sometimes salaries do not come on time. They should increase our pay. We are in the front line". Lady Health Worker - Nushki</p>
Lack of Infrastructure	<p>"The health facilities in Kharan are not good. We need to take our sick to Karachi that is very far". Female Farmer - Kharan</p> <p>"One thing the government can do is to provide drip irrigation systems. Planning should be long lasting as we have already suffered from a lack of water for years". FAO Stakeholder - Kharan</p>
Poor knowledge and self-efficacy towards Improved nutrition	<p>"Overall health is good, but our children are sometimes not well. They have dull skin. They cry a lot, maybe there are worms in their stomach. What should we do?" Woman Farmer? - Kharan</p> <p>"Pregnant ladies should eat more; but then I used to work while I was pregnant. Female School Teacher - Nushki</p> <p>Low blood (anaemia) is very common in our community especially in girls and women. They feel weakness all the time". Lady Health Worker - Kharan</p>
Cultural Factors	<p>"Our men like to eat meat, for lunch and dinner. We mostly have vegetables and beans but for dinner. I try to cook at least one meat item. But not all the time; maybe two or three times a week". Female Farmer - Kharan</p>
Gender Inequality	<p>"In our society men are given preference over women. More and better food is served to men compared to women". Female Farmer - Nushki</p>
Environmental Factors-Insecurity	<p>"Due to droughts, unrest and trade restrictions at the Afghan border; people have now migrated to towns and cities. This influenced the culture of sourcing food from the land, which has increased poverty and badly influenced health and food insecurity. Political Leader - GoB</p>

Table 3: Program strengths identified from beneficiaries and stakeholders.

Strengths	Program Beneficiaries/Stakeholders feedback
Strong Community Networks	<p>"We are from this area, they are from this area, and we are neighbours. We go there; they offer us food and drinks. We are like their family; they listen to each and everything we say and try to follow us". Lady Health Worker - Nushki</p>
Program Integration	<p>"We give awareness on Nutrition to mothers' groups, but they lack decision making authority about their children's health. We think BCC will work better if we also educate husbands". Lady Health Worker - Nushki</p>
Cultural Factors	<p>"When you speak the message, it should be in local language but if it's a written message it should be in Urdu. Well, for anyone that is literate enough to read, Urdu is the basic language". Male School Teacher - Kharan</p>
Interpersonal Communication	<p>"The best channels would be face to face communication. In that, way we can certainly convince the other person. Balochistan's local people respect guests and take their advice. Lady health workers and others may be a very good option". Ministry of Health Stakeholder - Quetta</p>
Motivation to Engage	<p>"We would like to attend more activities such as Kitchen Garden trainings and nutrition education programs if they're arranged within our community. Female Farmer - Nushki)</p>

from similar programs in other regional countries designed to empower communities toward improved agricultural practices [28]. Other opportunities to support empowerment identified through the findings include the potential for KGs to improve food security and nutritional outcomes while facilitating easier access to food, reducing household expenditure, while improving household diets [29] including food sovereignty and the localization of food systems [30] through more integrated, holistic approaches [31].

This study found limited diversity in food products in the province. This may be addressed by applying Diffusion of Innovation

approaches and identifying opinion leaders in the agricultural communities to grow previously not considered protein dense, farming produce. The approach supports other studies, which point to the need to promote dietary diversity as a critical nutritional feature for rural communities located in semi-and arid areas as well as promoting the value of grain legumes, rich in proteins and micronutrients, which also possess good adaptability to marginal rural environmental conditions [32]. Feedback from women on their motivation to engage identifies the key role that greater food security may play in women's empowerment in the conservative settings. The

Table 4: Program opportunities identified from beneficiaries and stakeholders.

Opportunities	Program Beneficiaries/Stakeholders feedback
Willingness of opinion leaders to engage	<p>"We need to engage religious leaders and let them convince the local population on health behaviors. Religious leaders have a great influence on society especially on the males of the family.</p> <p>Religious Leader - Nushki</p> <p>"I think message should be delivered through lady health workers. Now we know the ladies in the houses; they are now our friends".</p> <p>Lady Health Worker - Nushki</p>
Communication Channels	<p>"Radio is important. Local FM stations are widely listened to in homes and markets. A local language message would substitute the need of reading through newspaper (literacy) as it reaches all family members at home".</p> <p>Social Activist - Nushki</p> <p>"Posters and paintings in popular sites would help such as hospitals, market areas, vaccination centers and such. Giving a message that is targeted and well written will have an impact".</p> <p>WHO Stakeholder - Quetta</p> <p>"Men's WhatsApp groups are formed through which beneficiaries get information on seeds and other KG related issues.</p> <p>FAO stakeholder</p>
Incentives	<p>"Only delivering health and nutrition messages will not work without giving something to them. It could be a small gift, a calendar or anything. In this way we also feel more comfortable and confident".</p> <p>Lady Health Worker - Kharan</p> <p>"Kitchen gardens are mainly managed by women. If you have a model kitchen garden in schools and colleges and show the students' its benefits then they will take this home or when they get married, they may grow their own garden.</p> <p>Female School Teacher - Nushki</p> <p>"Health and financial benefits from home produced vegetables should be communicated in the messages for BCC".</p> <p>Senior subject specialist GCEE - Nushki</p>

emphasis on supporting greater gender equality by building women's self-confidence and control over their food supplies and income is also evident in other country programs [19,33]. Additional benefits not yet realized through these discussions include climate change adaptation and the preservation of biodiversity [34].

Last, is the potential to build on the currently limited access to nutrition information cited by beneficiaries through specifically tailored messages to the risk groups and the dissemination of messages through more integrated and appropriate communication platforms. Although, the needs assessment identified that women in particular had limited opportunities to build knowledge about KGs nutritional benefits, given literacy challenges and relatively little access to mass media communication channels, opportunities to cut through with the BCC program messages at a community and interpersonal level were also identified. Communication from trusted lady health workers, already living within these communities, coupled with training and materials incentives, have the potential to better impact on women's knowledge, attitudes and beliefs about KGs and nutrition. Given the critical importance of more fully engaging vulnerable women in remote districts of Baluchistan, consideration should also be given to including their husbands in BCC activities as a result of their gatekeeping role, highlighted from the study and also identified in neighboring communities [35].

Conclusions

The formative research rapid assessment method for application in resource constrained and insecure settings has provided considerable insights on how to increase the impact of the KG nutrition program in Baluchistan. The study contributes to the very limited research conducted in insecure, closed and conservative communities, while outlining iterative, participatory, user-centered approaches to support the development of tailored BCC messages and materials, and the identification of predominant dissemination channels. Recommendations emanating from the findings include greater consideration in the use of empowering and personalized messages from community opinion leaders to highlight the benefits of establishing KGs, the building of women farmer's skills and

confidence to improve self-efficacy perceptions and perceived behavioral control, while addressing cultural and gender sensitivities. Insights on program branding and materials designs were also identified (to be reported on in another article) as well as highlighting the benefits of greater engagement by incentivizing participants.

There are a number of limitations in conducting field research in resource constrained and insecure settings such as those found in remote rural Baluchistan. These include limitations in the time available to collect the data given the inherent risks to field staff. External validity may have also limited study findings with the application of subjective, nonprobability sampling using both purposive and convenience samples with voluntary participation. This was due to the short time span for the work, the deliberate selection of participants based on what was needed to be known and the availability of knowledgeable or experienced people who were willing to provide the information, coupled with the general lack of access to women in the conservative cultural environments. Cultural constraints created additional limitations in the number of participants attending groups in some areas. Internal bias was minimized through the selection of items for the discussion agenda emanating from the literature review and advice from key informants.

Ethics Approval and Consent to Participate

Ethics approval for the study was obtained from Dow University of Health Sciences, Ethics Committee - Approval number: IRB-/399/DUHS/Approval/2019. Informed consent from participants in FGDs was obtained through signing of a participant consent form following explanation to each participant of what the study was aiming to achieve. Prior to signing the consent form field staff read the following message to prospective group participants: "I am doing this interview as part of a collaborative process between the Food and Agriculture Organization and Dow University of Health Sciences. I am very interested in all your ideas, comments and suggestions. Results from this interview will be combined with other interviews to assist in developing a survey for the project".

Availability of Data and Materials

The datasets used and/or analyzed during the current study are

available from the corresponding author on reasonable request.

Funding

The project was financed by The Australian Government as part of the Australia Baluchistan Agri Business programme (AusABBA) and the Baluchistan Nutrition Project for Mothers and Children (BNPMC).

Authors' Contributions

TT supported the development of discussion agenda, sampling and fieldwork method, interpreted and triangulated the participant data with the literature and was a major contributor in writing the manuscript. NFS supervised the national field-team, supported the development and translation of instruments and fieldwork logistics, data-collection and contributed to development of the final manuscript. SKH managed the fieldwork methods conducted FGDs and SSIs, collected, analyzed and interpreted the data sets and findings. NS conducted the FGDs and SSIs collected, analyzed and interpreted the data sets and findings. SZ supported the data-collection, analysis and findings. All authors read and approved the final manuscript.

Acknowledgements

The authors would like to acknowledge the support of key agencies in building the evidence base for the BCC program in Baluchistan. These include the Integrated Homestead Kitchen Gardens Project (IHKGP), which was established as part of the Australia Baluchistan Agri Business programme (AusABBA) and the Baluchistan Nutrition Project for Mothers and Children (BNPMC) with the project implemented by the Food and Agriculture Organization (FAO) of the United Nations (UN) in collaboration with the Government of Baluchistan.

References

- Haddad L, Cameron L, Barnett I. The double burden of malnutrition in SE Asia and the Pacific: priorities, policies and politics. *Health Policy and Planning*. 2015; 30: 1193.
- Mahmudiono T. Child stunting in households with double burden of malnutrition: Applications of behavioral epidemiology. ProQuest Dissertations Publishing. 2016: 10127361.
- Kinyoki DK, Kandala NB, Manda SO, et al. Assessing comorbidity and correlates of wasting and stunting among children in Somalia using cross-sectional household surveys: 2007 to 2010. *BMJ Open*. 2016; 3: e009854.
- Mostafa Kamal SM. Socio-economic Determinants of Severe and Moderate Stunting among Under-Five Children of Rural Bangladesh. *Mal J Nutr*. 2011; 1: 105-118.
- UNICEF: National Nutrition Survey 2018 - Key Findings Report: A summary of the key insights and statistics 2019.
- Khan S, Zaheer S, Safdar NF. Determinants of stunting, underweight and wasting among children <5 years of age: evidence from 2012-2013 Pakistan demographic and health survey. *BMC Public Health*. 2019; 19.
- Pelto GH, Martin SL, Van Liere M, Fabrizio CS. The scope and practice of behavior change communication to improve infant and young child feeding in low and middle income countries: results of a practitioner study in international development organizations. *Maternal & Child Nutr*. 2016; 2: 229-244.
- Turk T, Quang ND, Nga T, Phuong H, Tung LA, Trang VH. A rapid assessment and response approach for socially marketed nutrition commodities in Viet Nam. *Asia Pac J Clin Nutr*. 2017; 1: 182-189.
- Turk T, Elkins D. Using a Formative Research Rapid Assessment Method to Support the Development of a HIV/AIDS Antiretroviral Therapy Communication Campaign in Kenya. *J Infect Dis Ther*. 2013; 1: 120.
- Turk T, Latu N, Cocker-Palu E, Liavaa V, Vivili P, Gloede S, et al. Using rapid assessment and response to operationalize physical activity strategic health communication campaigns in Tonga. *Health Promotion Journal of Australia*. 2011; 1: 13-19.
- (NICE) NiHACE. Behavior change: individual approaches United Kingdom: NICE. 2014.
- Ulin PR, Robinson ET, Tolle EE. *Qualitative Methods in Public Health: A Field Guide for Applied Research*. San Francisco, Cal: Jossey-Bass. 2012.
- Seidman IE. *Interviewing as qualitative research: A guide for research in education and the social studies*. New York: Teachers College Press. 1991.
- World Health Organization. *Rapid Reviews to Strengthen Health Policy and Systems: A Practical Guide*. (Tricco AC, Langlois EV, Straus SE, eds.). 2017.
- Siddiqui TR, Ghazal S, Bibi S, Ahmed W, Sajjad SF. Use of the Health Belief Model for the Assessment of Public Knowledge and Household Preventive Practices in Karachi, Pakistan, a Dengue-Endemic City. *PLOS Neglected Tropical Diseases*. 2016; 10: e0005129.
- Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991; 50: 179-211.
- Bandura A. Toward a unifying theory of behavior change. *Psychol Rev*. 1977; 84: 191-215.
- Rogers ER. *Diffusion of Innovations*. 4th Ed. Simon and Schuster, NY. 2010.
- Arno A, Thomas S. The efficacy of nudge theory strategies in influencing adult dietary behavior: a systematic review and meta-analysis. *BMC Public Health*. 2016; 16: 676.
- Rabionet SE. How I Learned to Design and Conduct Semi-structured Interviews: An Ongoing and Continuous Journey. *The Qualitative Report*. 2011; 2: 563-566.
- Kitzinger J. Qualitative research: introducing focus groups. *BMJ*. 1995; 311: 299-302.
- Glaser BG, Strauss AL. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. 1967; Chicago; Aldine.
- Carter N, Bryant-Lukosius D, DiCenso A, et al. The use of triangulation in qualitative research. *Oncol Nurs Forum*. 2014; 41: 545-547.
- Prentice-Dunn S, Rogers RW. Protection Motivation Theory and preventive health: beyond the Health Belief Model. *Health Education Research*. 1986; 3: 153-161.
- Hossain M, Choudhury N, Adib B, et al. Evidence-based approaches to childhood stunting in low and middle income countries: a systematic review. *Archives of Disease in Childhood*. 2017; 10: 903.
- Ajzen I. Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. *Journal of Community & Applied Social Psychology*. 2002; 4: 665-683.
- Anonymous: Growing better health. *Appropriate Technology*. 2014; 4: 8-10.
- Patalagsa MA, Schreinemachers P, Begum S, et al. Sowing seeds of empowerment: effect of women's home garden training in Bangladesh. *Agriculture & Food Security*. 2015; 4.
- Pillai A, Kinabo J, Krawinkel MB. Effect of nutrition education on the knowledge scores of urban households with home gardens in Morogoro, Tanzania. *Agriculture & Food Security*. 2016; 5.
- Boone K, Taylor P. Deconstructing homegardens: food security and sovereignty in northern Nicaragua. *Agriculture and Human Values*. 2016; 2: 239-255.
- Nsabuwera V, Hedt-Gauthier B, Khogali M, et al. Making progress towards food security: evidence from an intervention in three rural districts of Rwanda. *Public Health Nutrition*. 2016; 7: 1296-1304.

32. Chibarabada TP, Modi AT, Mabhaudhi T. Expounding the Value of Grain Legumes in the Semi- and Arid Tropics. *Sustainability*. 2017; 1: 60.
33. Wood EA, McNamara K, Kowalewska A, et al. Household decision-making around food in rural Tajikistn: a cross-sectional study to help extension workers in the field. *Food & Nutrition Research*. 2018; 62: 1-12.
34. Oedl-Wieser T. Women as Drivers for a Sustainable and Social Inclusive Development in Mountain Regions. The Case of the Austrian Alps. *European Countryside*. 2017; 4: 808-821.
35. Wilcox CS, Grutzmacher S, Ramsing R, et al. Empowering women to improve family food security in Afghanistan. *Renewable Agriculture and Food Systems, Innovations and Trends in Sustainable Urban Agriculture*. 2015; 1: 15-21.