

Research Article

# A Multidimensional Approaches Linking Nutrition, Public Health, and Community-Based Health Intervention for Adolescents at the Rural Level of Bangladesh

Md. Al-Amin<sup>1,†</sup> , Mohammed Asaduzzaman<sup>2,†</sup> , Kamrun Nahar Konika<sup>1</sup> ,  
Asad Ud-Daula<sup>1,\*</sup> 

<sup>1</sup>Department of Applied Nutrition and Food Technology, Islamic University, Kushtia, Bangladesh

<sup>2</sup>Department of Public Administration, Islamic University, Kushtia, Bangladesh

## Abstract

Adolescence represents a critical window of opportunity for shaping long-term health behaviors and development outcomes, especially in resource-limited rural contexts. This study explores the interconnected roles of nutrition, public health, and community-based health interventions in promoting adolescent empowerment in rural Bangladesh. Guided by a multidimensional framework, the research focuses on how communication and the practice of Nutritional Knowledge, Health, and Behavior (NKHB) can influence adolescent well-being. A total of 159 adolescents aged 10 to 17 years participated in the study, with 87 boys and 72 girls included in the sample. Anthropometric analysis revealed that 51.6% of respondents were underweight, 40.9% had a normal BMI, and a small but significant proportion were either overweight or obese. Notably, underweight adolescents reported a higher frequency of common illnesses such as colds, fevers, and skin infections highlighting the link between nutritional deficits and weakened immunity. The findings also identified significant disparities in social interactions and communication patterns. Girls were found to spend more time with mothers and siblings, while boys interacted more with peers and community members. These communication patterns are closely associated with knowledge dissemination and behavioral shaping, suggesting that targeted interventions must address gendered pathways of influence. Despite various national efforts, the research confirms a critical gap in localized and integrated health education strategies for adolescents in rural areas. The study proposes a strategic framework that integrates community-based workshops, school-based monitoring, and adolescent friendly health services to improve NKHB. By aligning this framework with Sustainable Development Goals (SDGs) particularly SDG 2 & SDG 3 the research offers a practical pathway for improving adolescent health outcomes. Ultimately, empowering adolescents through nutrition and behavior change is essential not only for individual development but also for achieving broader public health and development goals in Bangladesh.

## Keywords

Adolescent Nutrition, Public Health Intervention, Community-Based Health, Nutritional Knowledge and Behavior (NKHB), Multidimensional Framework

\*Corresponding author: [asad.uddaula@gmail.com](mailto:asad.uddaula@gmail.com) (Asad Ud-Daula), [asad@anft.iu.ac.bd](mailto:asad@anft.iu.ac.bd) (Asad Ud-Daula)

† Md. Al-Amin and Mohammed Asaduzzaman are co-first authors.

**Received:** 30 May 2025; **Accepted:** 23 June 2025; **Published:** 21 July 2025



Copyright: © The Author(s), 2025. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

## 1. Introduction

Adolescence is a pivotal developmental stage marked by biological, cognitive, emotional, and social transitions. Defined by the World Health Organization (WHO) as the age range of 10 to 19 years [1], this period is characterized not only by puberty and physical changes but also by advanced cognitive development, emotional self-awareness, and evolving social relationships [2-4]. The Encyclopedia of Children's Health describes adolescence as a process of gradual unfolding transitions biological, cognitive, emotional, and social that collectively move an individual from childhood into adulthood. With over 1.3 billion adolescents globally, comprising more than 16% of the world's population, and near about 90% residing in low- and middle-income countries [5-7], investment in adolescent well-being is essential to ensure both current and intergenerational development [8-12]. Adolescents are not only future leaders but also vital agents of change whose health and empowerment are essential to achieving sustainable development [13, 14]. However, in Bangladesh, the nutritional status of adolescents remains a key public health concern, with many facing issues such as stunting, underweight, anemia, and even emerging cases of obesity due to poor dietary knowledge and health behaviors [15-17]. Despite efforts by governmental and non-governmental actors, rural adolescents often lack access to structured, evidence-based programs that address nutritional knowledge, communication, and health behaviors in an integrated manner [18]. Existing gaps in communication between adolescents, parents, and the community further exacerbate the issue, limiting the ability to cultivate healthy food habits with locally available resources [19-21]. This research aims to develop a methodological and strategic framework to promote adolescent empowerment through improved communication and the practice of proper Nutritional Knowledge, Health, and Behavior (NKHB). The central research objective is to explore how local and rural adolescents can be empowered through enhanced communication and NKHB, this raises the central research questions with specific goals to assess the existing NKHB status of adolescents and identify gaps in their knowledge and behaviors. The purpose of the study is to explore how improving communication and promoting Nutritional Knowledge, Health, and Behavior (NKHB) can contribute to healthier, more informed adolescent populations in rural Bangladesh. The significance of this research extends beyond the immediate health of adolescents. It supports Sustainable Development Goals, particularly SDG 3 (Good Health and Well-being), it also contributes to SDG 2 (Zero Hunger), and SDG 1 (No Poverty) [22-26]. It is premised on the understanding that adolescent empowerment through nutrition and health behavior is foundational not only for individual well-being but for sustainable development at the community and national levels [27-29].

## 2. Materials and Methods

Multiple qualitative methods have been considered in order to avoid the potential limitations of using a single method. As an empirical in nature, first hand data was an essential requirement for this research. Various techniques of qualitative and quantitative methods have been applied for collecting empirical data. In some cases, secondary data has been used in order to supplement the primary data. The mixed methods are effective in minimizing biases and subjectivity inherent in any single positivist or interpretive methods and also useful to enhance integrity and ethical aspects of the research [30].

However, in line with the dominant and less dominant design [31], qualitative method is the dominant based on the research nature and context. For qualitative research approach, the study also chooses case study design for completing the research process for contextual preferences [32]. Therefore, the overall methodological plans were: Conducting Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA) sessions (for adolescent's parents); conducting formal interview with the selected adolescents and conducting participant observation and stakeholder analysis.

### 2.1. Selection of Research Units and Participants

This research has been conducted in the Jhenaidah district of Khulna Division. Jhenaidah district has been purposively chosen because it is situated besides the research site (Islamic University, Kushtia-7003, Bangladesh). It is noted that Bangladesh belongs to a homogeneous society. As a result, the findings of this research are expected to represent and as well as reproducible and applicable to other districts. Mirzapur Union Parishad (UP) of Shailkupa Upazila under Jhenaidah District has been selected for this research. The empirical study has been conducted in two CBHCCs under Mirzapur UP. We interviewed a total 159 respondents from adolescents from the research units to collect empirical data. Purposive sampling and snow ball approach have been used in selecting the respondents.

### 2.2. Data Collection and Analysis

Five different sets of formal questionnaires for each stakeholder have been used to collect empirical data from the research units. The language of the questionnaires was in Bengali. In addition, we also collected data by conducting PRA, RRA sessions and participants observation techniques. Microsoft Excel and SPSS have been used for extensive data analysis.

### 2.3. Ethical Issues

This is a multidisciplinary study that intends to advance the academic understanding about adolescent's nutritional knowledge and behavior in local and rural level Bangladesh. Therefore, normative ethical standards have been followed

throughout the research project. The research team fully acknowledges the sensitive and ethical issues. To ensure privacy and anonymity of the interviewees are asked to give an informed consent before interviewing. The members of the research team were committed to good scientific practice.

## 2.4. Time-table

This project was about 8 months starting from October

2024 to May 2025, conducting empirical study was the hardest part of this research.

## 2.5. Participants and Public Involvement

Participants or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

# 3. Results

## 3.1. Adolescents Perspectives About Anthropometric Assessment and Disease Condition

**Table 1.** Adolescent anthropometric assessment and disease condition.

Nutritional and health status	Total N=159	Under weight N=82	Normal N=65	Over weight N=10	Obese N=2	p-value
Gender						
Boy	54.7 (87)	48.8 (40)	61.5 (40)	50.0 (5)	100.0 (2)	0.25
Girl	45.3 (72)	51.2 (42)	38.5 (25)	50.0 (5)	0.0 (0)	
Age of the respondents						
10-13 years	11.3 (18)	14.6 (12)	9.2 (6)	0.0 (0)	0.0 (0)	0.53
14-15 years	35.8 (57)	36.6 (30)	33.8 (22)	50.0 (5)	0.0 (0)	
16-17 years	52.8 (84)	48.8 (40)	56.9 (37)	50.0 (5)	100.0 (2)	
Any disease had in last one week						
Yes	42.8 (68)	45.1 (37)	40.0 (26)	40.0 (4)	50.0 (1)	0.93
No	57.2 (91)	54.9 (45)	60.0 (39)	60.0 (6)	50.0 (1)	
Diarrhea						
Yes	1.5 (1)	2.7 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.84
No	98.5 (67)	97.3 (36)	100.0 (26)	100.0 (4)	100.0 (1)	
Fever						
Yes	20.6 (14)	18.9 (7)	23.1 (6)	0.0 (0)	100.0 (1)	0.17
No	79.4 (54)	81.1 (30)	76.9 (20)	100.0 (4)	0.0 (0)	
Cold						
Yes	75.0 (51)	78.4 (29)	69.2 (18)	100.0 (4)	0.0 (0)	0.17
No	25.0 (17)	21.6 (8)	30.8 (8)	0.0 (0)	100.0 (1)	
Skin disease						
Yes	14.7 (10)	13.5 (5)	19.2 (5)	0.0 (0)	0.0 (0)	0.72
No	85.3 (58)	86.5 (32)	80.8 (21)	100.0 (4)	(1)	

Data were presented as percentage and number of the respondents accordingly

This research project was communicated and taken interview for data from 159 adolescent respondents whose age ranges from 10-17 years; where 87 respondents were boys and 72 respondents were girls respectively. The empirical data shows that among the studied adolescents 82 are found underweight, 65 are normal, 10 are overweight and 03 are obese. The data was categorized according to the international classification of Body mass index (BMI). Furthermore, the adolescent was grouped into three according to their age where 16-17 years respondents were dominated in the health index based on BMI. This study also found the health status of adolescent had been suffered from any of the disease indicated in the [Table 1](#), data showed that more than half of the respondents were not experience with the guided disease. However, this study exhibited that 68 adolescents were suffered any of the following disease in the last one week were

underweight adolescent were found to be more vulnerable and common cold was no less than prevalent. ([Table 1](#))

Data were taken for seven days to get the mean value of every days of each respondent.

The data showed here the spending time of boys and girls with their fathers, mothers, sibling, relative, neighbor, friends and local people. The data demonstrated that boys spend a bit more time with their fathers than the girls but in contrast the girls spend more time with their mothers than the boys. The relationship of girls and boys with their mothers are highly significant. The empirical data show that the girls spend more time with their sibling than the boys which is also highly significant. It was found that boys spend more time with their relatives, friends and local people than the girls. ([Table 2](#))

**Table 2.** Adolescent social communication in hour: passing with family members and others.

Social communication: passing family members and other	Total N-159	Boy N-87	Girl N-72	P-value
Father				
Mean	1.2	1.3	1.1	0.064
SD	0.9	1.1	0.4	
Mother				
Mean	1.9	1.6	2.1	0.001
SD	0.9	1.1	0.5	
Sibling				
Mean	0.9	0.6	1.3	<0.001
SD	0.9	0.9	0.8	
Relatives				
Mean	0.3	0.3	0.2	0.508
SD	0.7	0.7	0.8	
Neighbor				
Mean	0.5	0.5	0.6	0.088
SD	0.6	0.6	0.6	
Friends				
Mean	1.5	2.1	0.8	<0.001
SD	1.4	1.4	1.2	
Local elites				
Mean	0.1	0.1	0.1	0.864
SD	0.6	0.3	0.8	

### 3.2. Patterns of Social Communication and Interaction

To explore the social dynamics of adolescents, their daily interactions over a week were recorded and averaged. The analysis revealed gender-specific differences in time allocation across various social relationships (Table 2). Boys spent slightly more time with their fathers (mean = 1.3 hours/day) compared to girls (mean = 1.1 hours/day), though this difference was not statistically significant ( $p = 0.064$ ). Conversely, girls spent significantly more time with their mothers (mean = 2.1 hours/day,  $p = 0.001$ ) and siblings (mean = 1.3 hours/day,  $p < 0.001$ ), indicating stronger intra-family engagement among female adolescents.

Interactions with peers and the broader community also varied by gender. Boys had significantly more engagement with friends (mean = 2.1 hours/day) compared to girls (mean = 0.8 hours/day;  $p < 0.001$ ), suggesting a more socially outgoing pattern among male adolescents. No significant gender differences were found in time spent with relatives, neighbors, or local elites. These interaction patterns reflect the influence of cultural norms and gender expectations on adolescent social behavior, which can impact both mental well-being and access to community-based health information.

## 4. Discussion

The findings of this study underscore the urgent need to address the complex interplay between nutrition and health among adolescents in Bangladesh. With over half (51.6%) of the surveyed adolescents classified as underweight and a growing minority experiencing overweight and obesity, the dual burden of malnutrition is clearly evident. This pattern not only reflects gaps in dietary intake and nutritional awareness but also signals systemic challenges in adolescent health governance. These nutritional disparities directly hinder the achievement of Sustainable Development Goal 2 (Zero Hunger) and Goal 3 (Good Health and Well-being), especially in the context of early-life health vulnerability.

The high incidence of reported illnesses among underweight adolescents particularly the prevalence of common cold, fever, and skin diseases suggests a weakened immune response likely exacerbated by chronic undernutrition. These findings align with global evidence that links inadequate nutrition with reduced resistance to infections and slower recovery. The clustering of malnutrition and illness in this age group highlights a missed opportunity for early intervention, which is vital considering adolescence is a second window of growth and development. Therefore, comprehensive public health strategies are needed to prevent a continued cycle of poor health into adulthood.

The study advocates for a multidimensional, community-based health intervention framework that integrates both nutrition-specific and nutrition-sensitive approaches. Community-Based Health Care Centers (CBHCCs) should serve

as hubs for adolescent nutrition education, anthropometric monitoring, and early disease detection. Schools can also play a pivotal role by embedding nutrition literacy and health behavior change communication within their curricula. Furthermore, while this study did not explore socio-economic variables, the health disparities identified point to broader structural and systemic barriers that require cross-sectoral policy collaboration and investment.

In conclusion, this research adds to the growing body of evidence that adolescent health must be approached through interconnected strategies that recognize the mutual reinforcement of nutrition, public health, and community support systems. Targeted, scalable, and locally adaptable interventions are essential not only to improve immediate health outcomes but also to set the foundation for a healthier, more productive future generation. Future studies should investigate the longitudinal impacts of integrated interventions and explore the cost-effectiveness of implementing such frameworks in rural and underserved areas.

## 5. Conclusions

Bangladesh contains a considerable number of adolescent populations that are more than one-fifth of the total population those ages between 10 and 19 years. The country has taken many initiatives and strategies for making a competent and healthy adolescence those are indispensable for attaining sustainable development goals by 2030. However, the adolescents in Bangladesh are experienced with limited access to get information and services on Sexual and Reproductive Health (SRH) and due to inadequate comprehensive knowledge in SRH the adolescents are inspired early marriage and fertility. This situation has pushed Bangladesh into highest adolescent fertility rate in South Asia. Furthermore, Bangladeshi boys and girls, particularly adolescent girls suffer from different sort of malnutrition and micronutrient deficiencies due to lack of comprehensive social awareness and proper nutritional knowledge. Though the adolescent pregnancy and malnutrition is the result of diverse underlying societal, economic and other forces, yet can be hindrance to the good future shape as it will compromise the greater public health. It is recommended to conduct longitudinal studies in future that evaluate the long-term impact of integrated NKHB interventions on adolescent health outcomes, particularly across diverse rural and urban settings. Additionally, there is also a need for more participatory research approaches that engage adolescents directly in the design and implementation of health education programs, ensuring cultural sensitivity and sustainability."

## Abbreviations

BMI	Body Mass Index
NKHB	Nutritional Knowledge, Health, and Behavior



SDGs	Sustainable Development Goals
WHO	World Health Organization
PRA	Participatory Rural Appraisal
RRA	Rapid Rural Appraisal
CBHCCs	Community-Based Health Care Centers
SRH	Sexual and Reproductive Health

## Acknowledgments

We are very thankful to the University Grants Commission (UGC) of Bangladesh for its valuable support at different levels of this project. We are very indebted to the authority of Islamic University, Kushtia-7003, Bangladesh for providing a good research environment and logistic support in order to finalize this project.

## Author Contributions

**Md. Al-Amin:** Investigation, Software, Visualization, Writing – review & editing

**Mohammad Asaduzzaman:** Data curation, Formal Analysis, Funding acquisition, Methodology, Project administration

**Kamrun Nahar Konika:** Investigation, Software, Writing – review & editing

**Asad Ud-Daula:** Conceptualization, Resources, Supervision, Validation, Writing – original draft

## Data Availability Statement

The data is available from the corresponding author upon reasonable request.

## Funding

This research received funding support from UNICEF-University Grants Commission (UGC), Bangladesh.

## Conflicts of Interest

The authors declare no conflicts of interest.

## References

- [1] World Health Organization. Adolescent health [Internet]. Geneva: WHO; 2024. Available from: [https://www.who.int/health-topics/adolescent-health#tab=tab\\_1](https://www.who.int/health-topics/adolescent-health#tab=tab_1)
- [2] Cluver LD et al. (2019) Improving lives by accelerating progress towards the UN Sustainable Development Goals for adolescents living with HIV: a prospective cohort study, *The Lancet: Child & Adolescent Health*, 3: 245–54.
- [3] Sherr L (2018) Mental health challenges and interventions for adolescents—the first 1,000 weeks, In: Lansford J, Banati P, eds, *Handbook of Adolescent Development Research and Its Impact on Global Policy*. Oxford: Oxford University Press.
- [4] Moghaddam HT et al. (2016) Adolescence Health: The Needs, Problems and Attention, *Int J Pediatr*, 4(2): 1423–38.
- [5] United Nations Children's Fund (UNICEF). Adolescents: Overview. New York: UNICEF. Available from: <https://data.unicef.org/topic/adolescents/overview/>
- [6] Population Council. Adolescents and young people [Internet]. New York: Population Council; [cited 2025 May 29]. Available from: [https://popcouncil.org/focus\\_area/adolescents-young-people/](https://popcouncil.org/focus_area/adolescents-young-people/)
- [7] Shinde S, Harling G, Assefa N, Bärnighausen T, Bukenya J, Chukwu A, et al. Counting adolescents in: the development of an adolescent health indicator framework for population-based settings. *eClinicalMedicine*. 2023; 61: 102067. <https://doi.org/10.1016/j.eclinm.2023.102067>
- [8] Global Adolescent Health. Global investment in adolescents [Internet]. [cited 2025 May 29]. Available from: <https://adolescentsourfuture.com/global-investment-in-adolescents/>
- [9] Ross DA, Friedman HS, Welch D, Kaoma NS, Bhushan R, Rasmussen B. Four powerful reasons for increasing investment in adolescents and their wellbeing. *BMJ*. 2022 Oct 27; 379: o2526. <https://doi.org/10.1136/bmj.o2526>
- [10] World Health Organization, United Nations Population Fund, United Nations Children's Fund, Partnership for Maternal, Newborn & Child Health. Adolescents in a changing world: the case for urgent investment [Internet]. Geneva: WHO; 2024 [cited 2025 May 29]. Available from: <https://www.unfpa.org/publications/adolescents-changing-world-case-urgent-investment>
- [11] World Health Organization. Adolescents in a changing world: the case for urgent investment [Internet]. Geneva: WHO; 2024 [cited 2025 May 30]. Available from: <https://www.unfpa.org/sites/default/files/pub-pdf/adolescents-in-a-changing-world---the-case-for-urgent-investment.pdf>
- [12] Thomas L. Investing in adolescent mental health delivers long-term economic and social benefits [Internet]; 2025 Jan 20 [cited 2025 May 30]. Available from: <https://www.news-medical.net/news/20250120/Investing-in-adolescent-mental-health-delivers-long-term-economic-and-social-benefits.aspx>
- [13] Landry M et al. (2020) Adolescents' development of gender equity attitudes in India, *International Journal of Adolescence and Youth*, 25: 1, 94–103, <https://doi.org/10.1080/02673843.2019.1590852>
- [14] Ogamba IK (2018) Millennials empowerment: youth entrepreneurship for sustainable development, *World Journal of Entrepreneurship, Management and Sustainable Development*, 15(3): 267–278.

- [15] Global Alliance for Improved Nutrition (GAIN). Adolescent nutrition in Bangladesh [Internet]. Geneva: GAIN; 2018 [cited 2025 May 29]. Available from: <https://www.gainhealth.org/sites/default/files/publications/documents/adolescent-nutrition-in-bangladesh-2018.pdf>
- [16] Islam MS, Roy C, Ishadi KS, Mithu MMU, Abedin ES, Karim MS, et al. Dietary pattern and nutritional status of school-going adolescents in rural areas of Bangladesh. *Curr Res Nutr Food Sci J*. 2024; 12(3):[page numbers]. <https://doi.org/10.12944/CRNFSJ.12.3.11>
- [17] Alam N, Roy SK, Ahmed T, Ahmed AM. Nutritional status, dietary intake, and relevant knowledge of adolescent girls in rural Bangladesh. *J Health Popul Nutr*. 2010 Feb; 28(1): 86-94. <https://doi.org/10.3329/jhpn.v28i1.4527>
- [18] Islam MR, Rahman SM, Tarafder C, Rahman MM, Rahman A, Ekström EC. Exploring Rural Adolescents' Dietary Diversity and Its Socioeconomic Correlates: A Cross-Sectional Study from Matlab, Bangladesh. *Nutrients*. 2020 Jul 26; 12(8): 2230. <https://doi.org/10.3390/nu12082230>
- [19] Naeeni MM, Jafari S, Fouladgar M, Heidari K, Farajzadegan Z, Fakhri M, Karami P, Omid R. Nutritional Knowledge, Practice, and Dietary Habits among school Children and Adolescents. *Int J Prev Med*. 2014; 5(Suppl 2): S171–S178.
- [20] Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc*. 2002; 102(3 Suppl): S40–51.
- [21] Coulson NS, Eiser C, Eiser JR. Nutrition education in the national curriculum. *Health Educ J*. 1998; 57: 81–8.
- [22] Canavan CR & Fawazi WW (2019) Addressing knowledge gaps in adolescent nutrition: toward advancing public health and sustainable development, *Current Developments in Nutrition*, 3(7), <https://doi.org/10.1093/cdn/nzz062>
- [23] Klasen S (2002) Low schooling for girls, slower growth for all? Cross-country evidence on the effect of gender inequality in education on economic development, *The World Bank Economic Review*, 16(3): 345-373.
- [24] Seguino S (2000) Gender inequality and economic growth: a cross-country analysis, *World Development*, 28(7): 1211-1230.
- [25] World Bank (2009) *Africa Development Indicators 2008/9: Youth and Employment in Africa*, Washington DC: The World Bank.
- [26] WHO (2014) Strengthening intersectoral collaboration for adolescent health, available at: <https://apps.who.int/iris/handle/10665/204359>
- [27] Mohajer N & Earnest J (2009) Youth empowerment for the most vulnerable A model based on the pedagogy of Freire and experiences in the field, *Health Education*, 109(5): 424-438, <https://doi.org/10.1108/09654280910984834>
- [28] A. T. Soliman, N. Alaaraj, N. Hamed, F. Alyafei, S. Ahmed, M. Shaat, M. Itani, R. Elalaily, and N. Soliman, "Nutritional interventions during adolescence and their possible effects," *Acta Bio-Medica: Atenei Parmensis*, vol. 93, no. 1, p. e2022087, 2022. <https://doi.org/10.23750/abm.v93i1.12789>
- [29] A. Y. Riddle, C. M. Kroeger, A. K. Ramage, Z. A. Bhutta, E. Kristjansson, C. Vlassoff, M. Taljaard, B. Skidmore, V. Welch, and G. A. Wells, "Protocol: The effects of empowerment-based nutrition interventions on the nutritional status of adolescent girls in low- and middle-income countries," *Campbell Systematic Reviews*, vol. 15, no. 3, p. e1042, 2019. <https://doi.org/10.1002/cl2.1042>
- [30] Bergman, M. M (2008) Introduction: Wither Mixed Methods? in Bergman M. M. (ed.) *Advances in Mixed Methods Research: Theories and Applications*, SAGE.
- [31] Tashakkori, A. and Teddlie, C. (1998) *Mixed Methodology: Combining Qualitative and quantitative Approaches*, Sage Publication.
- [32] Yin, R. K. (1994) *Case Study Research: Design and Methods*, (2nd Edition). Thousand Oaks, CA: Sage Publication.