KNOWLEDGE ATTITUDE AND PRACTICES OF HYGIENE BEHAVIORS AMONG NARGIS CYCLONE SURVIVORS OF LAPUTTA TOWNSHIP, AYEYARWADDY, UNION OF MYANMAR

Aung Myo Min, Prathurng Hongsranagon*

College of Public Health Sciences, Chulalongkorn University, Bangkok, 10330, Thailand

ABSTRACT: The study was descriptive cross-sectional study to learn about socio-demographic factors, influencing factors on hygiene knowledge, attitude, practices of hygiene behaviors, and knowledge, attitude, readiness to practices, and practices of hygiene behaviors among Nargis cyclone survivors of Laputta Township, Ayeyarwaddy, Union of Myanmar. It also explored the relationship among socio-demographic factors, influencing factors on knowledge, attitude and practices of hygiene behaviors and knowledge, attitude, readiness to practices, and practices of hygiene behaviors. The study was conducted during March 2013. The cluster sampling and simple random sampling methods were used to identify appropriate respondents in the study village for quantitative research. Face-to-face and structured interview questionnaire survey was applied with 440 respondents, both males and females, age 18-59 years old. Data analysis employed descriptive statistics and inferential statistics (Chi-square test) to find the relationship between dependent and independent variables. The result revealed that (41.6%) of the respondents had high level of knowledge and (69.5%) had positive level attitude towards hygiene behaviors, but only (30.2%) had high level of practices of hygiene behaviors. Three socio-demographic factors, namely, education, occupation, and household income indicated statistically significant relationship (*P-value*= <0.05) with knowledge, attitude, readiness to practices, and practices of hygiene behaviors. The influencing factors, such as, presence of health center, presence of hygiene promotion/education activities, presence of water safety items, fly-proof latrine, hand washing facilities, all demonstrated statistically significant relationship (*P-value* = <0.05) with knowledge, attitude, readiness to practices, and practices of hygiene behaviors. In addition, knowledge, attitude, readiness to practices, and practices of hygiene behaviors showed statistically significant relationship among each other (*P-value* = <0.05).To build better hygiene behaviors of the cyclone affected populations, sustainable behavioral change hygiene improvement measures should be implemented. Additional recruitment of health care personnel along with building of functioning health centers equipped with quality drugs should be prioritized. Sustainable hygiene education activities should be implemented by organizing education package including training course, focus group discussion and home visit.

Keywords: Knowledge Attitude & Practices, Hygiene behaviors, Nargis Cyclone survivors, Laputta Township, Union of Myanmar

INTRODUCTION

Cyclone Nargis (category 3, tropical cyclone) which developed in the Bay of Bangal made land fall to Myanmar on 2nd and 3rd May 2008. In addition to the mass destruction of shelters, livelihoods, communication and basic social infrastructures, the great damages to the water sources and sanitation facilities superimposed the burden of water-borne and hygiene related diseases among the affected local communities. Among the cyclone affected townships in Ayeyarwaddy;

* *Correspondence to: Prathurng Hongsranagon*
E-mail: arbeit_3@hotmail.com

Cite this article as: Min AM, Hongsranagon P. Knowledge attitude and practices of hygiene behaviors among Nargis cyclone survivors of Laputta township, Ayeyarwaddy, Union of Myanmar. J Health Res. 2014: 28(1); 31-8.

Laputta Township was the most affected one [1]. Partly as a consequent of losing basic sanitation facilities, the results regarding hygiene practices of inhabitants showed that less than half of the households were using safe (prevalence more than 40% of children) in Laputta Township expected to be mainly related with unsafe sanitary situations and lack of good hygiene practices [2].

Improvement of hygiene behaviours and sanitation situation of populations is one of the key factors to control high prevalence of diarrhoeal diseases and even estimated one quarter to one third decreasing of diarrhea cases could be achieved by implementing water, sanitation, and hygiene improvement activities [3]. Clear understanding of hygiene knowledge and good hygiene practices enables to prevent the root causes of transmission of diarrhoea. Both hygiene education software activities regarding messages to gain sanitary and safe hygiene knowledge and hardware provision of sanitation facilities (latrines, water tanks etc) should be provided to the cyclone affected communities [4].

The objectives of this study were to study the socio-demographic factors, and influencing factors on knowledge, attitude and practices of hygiene behaviors, to access knowledge, attitude, readiness to practices and practices level of hygiene behaviors, to explore relationship among socio-demographic factors, influencing factors and knowledge, attitude, readiness to practices and practices level of hygiene behaviors among the respondents in Laputta Township, Ayeyarwaddy, Union of Myanmar.

MATERIALS AND METHODS

Sampling technique

Laputta Township was chosen because it was one of the most affected areas of Nargis Cyclone. Only the person currently staying in Laputta Township at least since 2008 and age among 18-59 years who were willing to participate were selected as respondents in this study. Yamane method (equation) (at 95% level of significant) was used to calculate appropriate sample size; 440 total respondents [5]. Cluster sampling and simple random sampling techniques were applied to recruit appropriate respondents. In Laputta Township, there were altogether 684 villages (115 village tracts) and clustering was done according to township local admin set-up that reflects homogeneous presence of schools, health centers etc. After making clusters, two groups of villages were identified; centered villages and non-centered villages. There were 115 centered villages; it was 16.8 % ≈ (17%) of the total villages in target area. The rest were 569 non-centered villages; ≈ (83 %) of the total villages. Total sample size was 440. Respondents represented for centered villages were 17% of 440 = 74.8 ≈ 75 people. Respondents represented for non-centered villages were 440 - 75 = 365 people. Then, simple random sampling was applied to both centered and non-centered villages to identify villages and households in the study village.

Data collection

Data were collected by interviewer-administered structured one by one (face-to-face) interview questionnaires. The validity of the questionnaire had been checked by three experts with rich knowledge and extensive experiences in areas of public health, behavioral change and hygiene issue. The questionnaire had been pilot tested with respondents of same demographic characteristics. Then reliability of the questionnaire was statistically tested with KR21 for hygiene knowledge questions (resultant KR 21 was 0.7824) and Cronbach's Alpha for hygiene attitude questions (resultant Cronbach's Alpha coefficient was 0.787) (coefficient more than 0.7).

Questionnaire were read to respondents and asked for the answer, then re-checked both question and respective answer to avoid any error or misunderstanding between interviewer and respondent. Only single interviewer conducted throughout the entire interview for each respondent.

Statistical analysis

Data had been analyzed by using licensed version of SPSS 17.0 software (licensed for Chulalongkorn University). Distribution of respondents' personal profiles (socio-demographic factors), influencing factors on knowledge, attitude and practices of hygiene behaviors and knowledge, attitude, readiness to practices and practices level of hygiene behaviors were calculated as categorical data and described as descriptive findings. Relationship among respondents' personal profiles (socio-demographic factors), influencing factors and knowledge, attitude, readiness to practices and practices of hygiene behaviors were shown as analytical findings. Chi-square statistics method with significant value (alpha) 0.05 was applied to show the relationship among variables of the study.

The range of possible scores for hygiene knowledge was 0-22 points. The cut points for leveling of hygiene knowledge were - total score 18-22 (more than 80%) was regarded as high level hygiene knowledge, total score 14-17 (60%-80%)

Table 1 Socio-demographic factors of the respondents (n=440)

Personal profiles	Number (n=440)	Percentage (%)
Gender		
Male	214	48.60
Female	226	51.40
Marital status		
Married	329	74.80
Single	55	12.50
Widow	45	10.20
Divorced/Separated	11	2.50
Educational level		
Illiterate	0	0
Primary school level	71	16.10
Middle school level	191	43.40
High school level	134	30.50
University level	44	10.00
Occupation		
General/random laborer	250	56.80
Own business	50	11.40
Public workers/government staff	111	25.20
No occupation	29	6.60
Average total HH income per month (Myanmar Kyat)		
(Exchange rate: 940 Myanmar Kyats = 1 US Dollar)		
50,001-100,000	309	70.20
100,001-150,000	70	15.90
150,001-200,000	24	5.50
200,001-250,000	30	6.80
250,001-300,000	7	1.60

was regarded as moderate level hygiene knowledge and total score 0-13 (less than 60%) was regarded as low level hygiene knowledge [6].

The range of possible scores for hygiene attitude was 0-20 points. The cut points for leveling of hygiene attitude were - average score 0.00 to 0.66 was regarded as negative hygiene attitude level, average score 0.67 to 1.33 was regarded as neutral hygiene attitude level, average score 1.34 to 2.00 was regarded as positive hygiene attitude level [7].

The range of possible scores for readiness to hygiene practices (or) hygiene practices was the same, 0-36 points. The cut points for leveling of readiness to hygiene practices (or) hygiene practices were - average score 0.00 to 0.66 was regarded as low level readiness to hygiene practices (or) hygiene practices, average score 0.67 to 1.33 was regarded as moderate level readiness to hygiene practices (or) hygiene practices, average score 1.34 to 2.00 was regarded as high level readiness to hygiene practices (or) hygiene practices [7].

Ethical consideration

The study research was passed through The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University and secure approval prior to the field interview (protocol approval reference number 194.1/55). The written participants' information sheet and informed consent form were provided to the every respondent in the study and it clearly mentioned about objectives of study and nature of questionnaires, confidentiality, free participation, freedom to ask any questions at any time and withdrawal with no reasons, no use of data for any other purposes and anonymity.

RESULTS

Table 1 showed socio-demographic distributions of the respondents. 48.60% of the respondents were male and 51.40% were female. There was no illiterate respondent, 16.10% were primary school level, 43.4% were middle school level, 30.50% were high school level and 10.00% were university level. 56.80% of the respondents were general/random laborer (agriculture/ livestock/salt farming/factory, 11.40% had own business (merchant, own shop, own local grinding factory, own agricultural/livestock farm), 25.20% were public workers (clerks, teachers, authorities etc). Respondents average household income per month are 70.20% earned 50,000-100,000 Myanmar Kyats, 15.90% earned 100,001-150,000 Myanmar Kyats, 5.50% earned 150,001-200,000 Myanmar Kyats, 6.80% earned 200,001-250,000 Myanmar Kyats and 1.60% earned 250,001-300,000 Myanmar Kyats.

Table 2 Availability of influencing factors among the respondents (n=440)

Influencing factors	Number (n=440)	Percentage (%)
Presence of functioning health center/staff		
Yes	76	17.28
No	364	82.72
Presence of hygiene promotion/education activities		
Yes	404	91.80
No	36	8.20
Presence of hygiene related mass media		
Yes	374	85.00
No	66	15.00
Presence of hygiene information visibilities (at public places and home)		
Yes	404	91.80
No	36	8.20
Presence of fly proof latrine/hand washing facilities		
Yes	170	38.60
No	270	61.40
Presence of particular waste throwing places in village		
Yes	76	17.28
No	364	82.72

Table 3 Knowledge, attitude, readiness to practices and practices level of hygiene behaviors among the respondents (n=440)

Level	Number	Percentage (%)
Low level hygiene knowledge	134	30.4
Moderate level hygiene knowledge	123	28.0
High level hygiene knowledge	183	41.6
Negative hygiene attitude	0	0
Neutral hygiene attitude	134	30.5
Positive hygiene attitude	306	69.5
Low level readiness to hygiene practices	105	23.8
Moderate level readiness to hygiene practices	182	41.4
High level readiness to hygiene practices	153	34.8
Low level hygiene practices	22	5.0
Moderate level hygiene practices	285	64.8
High level hygiene practices	133	30.2

Table 2 expressed availability of influencing factors among the respondents. 17.28% of respondents had functioning health center in their village but 82.72% did not have. 91.80% of respondents could benefit hygiene promotion/ education activities, but 8.20% could not benefit. 85.00% of respondents could receive hygiene knowledge from kinds of mass media (newspaper, radio etc) but 15.00% could not benefit. 91.80% of respondents answered that they have hygiene visibilities in their home and/or at public places of their village. Only 38.60% of respondents had fly proof latrine. Similarly, only 38.60% of respondents had hand washing facilities. Only 17.28% of respondents had particular waste throwing place in their village.

Table 3 showed knowledge, attitude, readiness to practices and practices level of hygiene behaviors among respondents. Regarding hygiene knowledge, 30.40% of the respondents had low level hygiene knowledge, 28.00% had moderate level and 41.60% had high level hygiene knowledge. Regarding hygiene attitude, 30.50% of the respondents had neutral hygiene attitude level, 69.50% had positive hygiene attitude level. Regarding readiness to hygiene practices, 23.80% of the respondents had low level readiness to hygiene practices, 41.40% had moderate level readiness to hygiene practices and 34.80% had high level readiness to hygiene practices. Regarding hygiene practices, 5.00% of the respondents had low level hygiene practices, 64.80% had moderate level and 30.20% had high level hygiene practices.

Table 4 indicated relationship among socio-demographic factors, influencing factors and knowledge, attitude, readiness to practices and practices level of hygiene behaviors among the study population. The study showed that there was

Table 4 Relationship among socio-demographic factors, influencing factors and knowledge, attitude, readiness to practices and practices level of hygiene behaviors among the study population

Independent variables	*P-value* (using chi-square test)			
	Hygiene knowledge	Hygiene attitude	Readiness to hygiene practices	Hygiene practices
Educational level	0.000	0.000	0.000	0.008
Occupation	0.000	0.000	0.000	0.000
Average total household income	0.000	0.000	0.000	0.000
Presence of health center	0.000	0.000	0.000	0.000
Presence of hygiene promotion activities	0.000	0.000	0.019	0.021
Presence of hygiene education activities	0.000	0.000	0.019	0.021
Presence of hygiene related mass media	0.049	0.022	0.000	0.000
Presence of hygiene informative visibilities	0.000	0.000	0.019	0.021
Presence of fly proof latrine	0.007	0.002	0.000	0.000
Presence of hand washing items	0.007	0.002	0.000	0.000
Presence of particular waste throwing places	0.000	0.000	0.000	0.000

statistically significant relationship among educational level, occupation, average total household income per month and knowledge, attitude, readiness to practices and practices of hygiene behaviors (*P-value* = <0.05). Availability of hygiene information and education services such as - presence of functioning health center in respondents' village, presence of hygiene promotion/education activities showed statistically significant relationship with knowledge, attitude, readiness to practices and practices of hygiene behaviors (*P-value* = <0.05). Similarly, availability of hygiene facilities such as - presence of items to make water safe for drinking, fly-proof latrine, hand washing facilities, food covering items in respondents' home and presence of particular waste throwing places in respondents' village showed statistically significant relationship with knowledge, attitude, readiness to practices and practices of hygiene behaviors (*P-value* = <0.05).

DISCUSSION

The study showed that only 17.00% of the total study population had functioning health centers in their own village. That finding regards low percentage of health center in the study villages connected to the finding of Post Nargis Joint Assessment, surveyed in July 2008, which mentioned that estimated 75.00% of primary health facilities including rural health centers in the affected townships were destroyed by the Cyclone Nargis and most of those damaged facilities were serving more remote and poorer rural populations. Secondly, that low result of presence of health center in the study villages also connected with Post Nargis Joint Assessment highlighted point -the least access to the health facilities concentrated in Laputta and Bogale.

Except 8.20% of total respondents, the rest 91.80% of the respondents could benefit hygiene promotion and education activities by national and international non-government organizations and government health department as well. Complementary activities of hygiene promotion and education lead the community to behave better hygiene practices, easier accessibility of hygiene infrastructures (hand washing facilities and latrine) and moreover which in turn results blocking the various transmission routes of hygiene related diseases [8]. The complementary interaction produced significant reduce in the incidence of diarrhea among children [9].

According to the study, presence of fly-proof latrine was still low among the study population. That study result could be referred to the finding in the Post Nargis Joint Assessment which mentioned that most of the toilet facilities had been destructed and unsafe defecation practiced such as open defecation, using floating or direct drop latrines without pits had been noted in up to 40.00% of cyclone affected surveyed population. The shift to the unsafe defecation was most common in lower Delta area including Laputta. The study showed that only 38.60% had hand washing facilities (soap). That result opposed with finding of Post

Nargis Periodic Review IV surveyed in May 2010 which showed that 91.00% of the surveyed household had soap. This could be due to the fact that the result of the study only represented Laputta Township, one of the most affected area of the Nargis Cyclone whereas the result of Periodic Review IV represented 30 townships with different level of effect by the cyclone.

Socio-economic burden of the study population might mainly responsible for those low percentages of fly-proof latrine and hand washing facilities coverage among the study population. Practices of hygiene messages by the families in the community were differed with education, occupation, household income, life styles and socio-economic status [10]. Without improvements of socio-economic level, conduction health education activities alone was not effective for behavioral change of the community [11]. Education activities along with provision of infrastructures (like latrines) in an area with poor latrine coverage could gain high, sustainable level of uptake and initiate future demand for sanitation [12].

The study showed that 85.00% of total respondents could receive hygiene message through mass media (newspaper, journals, radio etc) whereas 15.00% could not.

The approach of providing information through mass media is less cost intensive measure compare to a community based approach. Mass media is always being a worth in addition to the public based education and provision of hardware facilities. Moreover mass media approach has additional effects as changing towards positive socio-behavioral norms and the attitude of key persons among the community (e.g. teachers, village leader etc) which in turn affect the behaviors of large scale community members [13].

The study showed that only 17.28% of the respondents had particular waste throwing space and the rest 82.72% of the respondents did not have such particular waste throwing place. Similar results in practices of proper solid waste disposal also denoted in Post Nargis Periodic Review II, III and IV that only 16.00%, 27.00% and 45.00% of the households reported proper dispose of solid waste. The method of throwing waste into the river water was unsafe; it could pollute the water resources and affect the community downstream as well. In Periodic Review III which had been surveyed in rainy season, the method of throwing waste into the river was widely reported up to 40.00% as it might have seasonal attraction in a way that with faster flowing of river water stream during the rainy season the waste could be washed out more quickly.

There was statistically significant relationship among educational level of the respondents and knowledge, attitude and practices of hygiene behaviors (*P-value* = <0.05). One study in Kenya showed that higher literacy associated with higher hand-washing with soap [13].

The types of respondents' occupation and average total household income per month showed statistically significant relationship with knowledge, attitude and practices of hygiene behaviors (*P-value* = <0.05). As a relevant data, one of the studies in India showed that higher level of hygiene practices as 51.00%, 44.00%, 39.00% could be found in population of high, middle and lower economic class respectively [14].

In the study, availability of hygiene information and education services such as - presence of functioning health center in respondents' village, presence of hygiene promotion/education activities, presence of hygiene informative visibilities and presence of hygiene related mass media showed statistically significant relationship with knowledge, attitude, readiness to practices and practices of hygiene behaviors (*P-value* = <0.05).

The result of sustainable health education for improvement of knowledge, attitude, and practices was studied in previous several researches. In Bangladesh, families whose could benefit hygiene interventions became significant improvement regards personal hygiene and sanitation knowledge if compare to households without no intervention activities [15]. The research in Zimbabwe also showed similar significant improvement of hygiene behaviors among the community members who received the interventions through health education and promotion activities [16]. Water and Sanitation Program - South Asia in 2000 suggested that software education interventions should not end once the particular period of intervention ends because post provision support is crucial [17].

Availability of hygiene facilities such as - presence of fly-proof latrine, hand washing facilities in respondents' home and presence of particular waste throwing place in respondents' village showed statistically significant relationship with knowledge, attitude, readiness to practices and practices of hygiene behaviors (*P-value* = <0.05).

Hardware structural availability such as fly proof latrines, hand washing facilities are partly associated with hygiene practices. The poor hygiene practices can be seen predominantly in the lowest category of each factor. Availability of

water sources in the house is associated with significantly higher hand washing rates than those don't have water in the house [18].

In the study, 41.60% of total respondents had high level hygienic behavioral knowledge, 69.50% had positive attitude towards hygienic behaviors but only 30.20% had high level hygiene practices. Those results implied that simple knowledge and awareness were not adequate to ensure safe hygiene practices of the population. It might be due to the following factors - 1) Low level availability of hygiene infrastructures and items like fly-proof latrine, soaps (only 38.6% had fly-proof latrine) - financial burden would mainly contribute low percentage of fly-proof latrine presence among the study population. 2) Though the study population had high level hygienic behavioral knowledge and positive attitude towards hygienic behaviors, it was difficult to practice the good hygiene behaviors as a regular basis because of many socio-demographic limitations (e.g. working in the far farm for the whole day and there is no fly-proof latrine nearby). 3) Used to with traditional pattern of behaviors that was difficult to change instantly (e.g. behaviors of throwing waste into river etc). 4) Though human being had rich knowledge and positive attitude; it was difficult to practice the new (good) behaviors - because of the hard-core human nature and/or undesirable mindset to the new changes/things.

CONCLUSION AND RECOMMENDATION

Incorporation with government department of health and participation of all possible stakeholders – More field based health care personnel (midwives, health assistant etc) should be recruited in the study area along with setting up of health care center equipped with quality drugs and required facilities. Community mobilization and health education refresher training should be organized for the in-service field based health staff. Sustainable hygiene education activities by government health department and international and local non-government organizations as well are highly recommended. Provisions of hygiene facilities like fly proof latrine at the particular public places (schools, markets) are highly suggested. Discount sales of hygienic wares should be regularly provided periodically to the local community. Community should be encouraged to participate in hygiene promotion activities of their village by organizing attractive edutainment program like village cleaning campaign, hygienic household contest etc. Formation of community task forces like village hygiene committee etc should be initiated. After organizing some basic awareness raising trainings for those task forces, they could disseminate knowledge to the peers, lead the hygiene related public campaign activities and encourage the community for better hygienic behaviors. Under the management of village authority and reliable representatives, some cash should be set up as village funds to be used in public concerns like repairing community water ponds etc. Local authority, non government organizations, private donors and local media (journals, pamphlets etc) should be more encouraged for focusing on hygiene promotion and community awareness raising activities. Awareness raising activities and information should also be widely disseminated to schools by way of easily understandable visibilities.

ACKNOWLEDGEMENT

I would like to express my heartfelt appreciation to my parents for their precious guidance, inspiration, encouragement and support to complete the Master of Public Health (M.P.H) programme. I am grateful to thanks the respondents for their kind participation to conduct the interview. This publication was possible with partial support provided by the funds made available under the Higher Education Research Promotion and National Research University Project of Thailand, office of the Higher Education Commission (Project no. AS1148A-55).

REFERENCES

1. Tripartite Core Group comprised of Government of the Union of Myanmar, the association of Southeast Asian Nations and the United Nations, Post Nargis Periodic Review 4; 2010.
2. Tripartite Core Group comprised of Government of the Union of Myanmar, the association of Southeast Asian Nations and the United Nations, Post Nargis Periodic Review 1; 2008.
3. Esrey SA, Potash JB, Roberts L, Shiff C. Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. Bull World Health Organ. 1991; 69(5): 609-21.
4. World Health Organization [WHO]. Hand-washing could save the lives of millions of children [cited 2012 Nov 20]. Available from: http://www.scielosp.org/ scielo.php?lng=en.
5. Yamane T. Statistics: An introductory analysis. 2nd ed. New York: Harper and Row; 1967.
6. Bloom's taxonomy [monograph on the internet]. University of Victoria Counseling Services; 2003 [cited 2012 Nov 11]. Available from: http://www.coun.uvic.ca/ learn/program/ hndouts/bloom.html
7. Wanichbuncha K. Statistic for research. 6th ed. Bangkok: Chulalongkorn University; 2012.

8. Combining hygiene behavior change with water and sanitation: monitoring progress in Hato Mayor, Dominican Republic, Part II (Dec 2001- March 2004). Environmental Health Project (EHP); 2004.
9. Buraer S, Esrey S. Water and sanitation: health and nutrition benefits to children. In: Child growth and nutrition in developing countries: priorities for action. New York: Comell University Press. p. 153-74.
10. Jenkins MW, Curtis V. Achieving the 'good life': why some people want latrines in rural Benin. Environ Sci Technol. 2005; 39(10): 3495-506.
11. Taha AZ. Sebai Z. Shahidullah M. Hanif M. Ahmed HO. Assessment of water use and sanitation behavior of a rural area in Bangladesh. Arch Environ Health. 2000; 55(1): 51-7.
12. Simms VM, Makalo P. Bailey RL. Emerson PM. Sustainability and acceptability of latrine provision in The Gambia. Trans Royal Soc Trop Med Hyg. 2005; 99(8): 631-7.
13. Schmidt WP, Aunger R, Coombes Y, Maina PM, Matiko CN, Biran A, et al. Determinants of hand washing practices in Kenya: the role of media exposure, poverty and infrastructure. Trop Med Int Health. 2009 Dec; 14(12): 1534-41.
14. Nath KJ, Chowdhury B, Sengupta A. Study on perception and practices of hygiene and impact on health in India. South Asia Hygiene Practitioners' Workshop; 2010 Feb; Dhaka: 2010.
15. Mascie-Taylor CG, Karim R, Karim E, Akhtar S, Ahmed T, Montanari RM. The cost-effectiveness of health education in improving knowledge and awareness about intestinal parasites in rural Bangladesh. Econ Hum Biol. 2003; 1(3): 321-30.
16. Waterkeyn J, Cairncross S. Creating demand for sanitation and hygiene through Community health Clubs: a cost-effective intervention in two districts in Zimbabwe. Soc Sci Med. 2005; 61(2): 1958-70.
17. Water and Sanitation Program – South Asia 2000. Learning the fundamentals of hygiene promotion: a review of three large-scale projects in India [monograph on the internet]. Sanitat Hygiene Prom Series 3. [cited 2012 Nov 18]. Available from: http://www.wsp.org
18. Schmidt WP, Aunger R, Coombes Y, Maina PM, Matiko CN, Biran A, et al. Determinants of hand washing practices in Kenya: the role of media exposure, poverty and infrastructure. Trop Med Int Health. 2009 Dec; 14(12): 1534-41.