

Hamburg University of Applied Sciences  
Faculty of Life Science  
Department of Health Science  
Lohbrügger Kirchstr. 65  
21033 Hamburg

## **Master of Public Health**

### **Master Thesis**

Evaluation of the effects of PHAST training and community health interventions on the hygiene behaviour of children and women to prevent diarrhoeal diseases  
- in the Locality of Rashad/ South Kordofan/ Republic of Sudan -

submitted on 30<sup>th</sup> July 2009

by: Annett Weidner

Supervisor - 1<sup>st</sup> Examiner:

Prof. Dr. Dr. Karl- Heinz Wehkamp

Hamburg University of Applied Sciences

Supervisor - 2<sup>nd</sup> Examiner:

Dr. Stefan Seebacher

Austrian Red Cross, Vienna

## Table of contents

	Page
Acknowledgment.....	7
Abstract.....	8
<b>1 Introduction.....</b>	<b>10</b>
1.1 Overview about the water and sanitation situation worldwide and in the Republic of Sudan.....	11
1.2 Overview about the entire water and sanitation project.....	12
1.3 Objective of the evaluation study.....	13
1.4 Definition of hygiene behaviour.....	14
1.5 PHAST methodology.....	15
1.5.1 The seven steps and their activities.....	17
1.5.2 Diarrhoeal diseases and disease transmission.....	19
1.6 Application of models referring to individual health behaviour.....	20
<b>2 Methods.....</b>	<b>24</b>
2.1 Study design.....	24
2.2 Study subjects.....	25
2.3 Study setting.....	26
2.4 Data collection.....	26
2.4.1 Characteristics of qualitative and quantitative approaches in general.....	27
2.4.2 Applied approach in this study.....	28

2.4.3	Access to the interviewees.....	28
2.4.4	Conducting of the interviews and observations.....	29
2.4.5	Content of the interviews and observations.....	30
2.5	Data analysis.....	33
<b>3</b>	<b>Results.....</b>	<b>34</b>
3.1	Prevalence and mortality of diarrhoea in Rashad locality.....	34
3.2	Results of the observations, interviews and tests with children...	35
3.3	Results of the observations, interviews and tests with women...	40
3.4	Results of the interviews with teachers.....	44
3.5	Results of the interviews with trainers.....	46
3.6	Results of the interviews with further stakeholders.....	48
<b>4</b>	<b>Discussion.....</b>	<b>52</b>
4.1	Interpretation of the core findings.....	52
4.2	Limitation of the study in general.....	57
4.3	Limitation of the applied methods.....	58
4.4	Comparison with other research findings and studies.....	60
<b>5</b>	<b>Conclusion.....</b>	<b>63</b>
	References.....	65
	Declaration.....	68

## Annexes

I	WHO key hygiene behaviour facts.....	I
II	The principles on PHAST methodology.....	III
III	Example: standardized interview manual.....	IV
IV	Example: standardized observation manual.....	X
V	Selection of used drawings.....	XII
VI	Example: answer sheet.....	XV
VII	Example: abstract of data materials of children.....	XIX

## List of abbreviations

ARC	<b>A</b> ustrian <b>R</b> ed <b>C</b> ross
CPA	<b>C</b> omprehensive <b>P</b> eace <b>A</b> greement
CHAST	<b>C</b> hildren <b>H</b> ygien <b>E</b> <b>A</b> nd <b>S</b> anitation <b>T</b> ransformation
GDP	<b>G</b> ross <b>D</b> omestic <b>P</b> roducts
GoS	<b>G</b> overnment of <b>S</b> udan
GRC	<b>G</b> erman <b>R</b> ed <b>C</b> ross
HPP II	<b>H</b> umanitarian <b>P</b> lus <b>P</b> rogramme <b>I</b> I
ICD	<b>I</b> nternational <b>C</b> ode of <b>D</b> iseases
KAP	<b>K</b> nowledge <b>A</b> ttitude <b>P</b> ractice
ORS	<b>O</b> ral <b>R</b> ehydration <b>S</b> olution
PHAST	<b>P</b> articipatory <b>H</b> ygien <b>E</b> <b>A</b> nd <b>S</b> anitation <b>T</b> ransformation
RCT	<b>R</b> andomized <b>C</b> ontrol <b>T</b> rial
SARAR	<b>S</b> elf-esteem, <b>A</b> ssociative strengths, <b>R</b> esourcefulness, <b>A</b> ction-planning, and <b>R</b> esponsibility
SDP	<b>S</b> udanese <b>P</b> ound
SPLM/A	<b>S</b> udan <b>P</b> eople's <b>L</b> iberation <b>M</b> ovement/ <b>A</b> rm <b>y</b>
SRCS	<b>S</b> udanese <b>R</b> ed <b>C</b> rescent <b>S</b> ociety
ToT	<b>T</b> raining of <b>T</b> rainers
TWC	<b>T</b> own <b>W</b> ater <b>C</b> ommittee
UN	<b>U</b> nited <b>N</b> ations
vip	<b>v</b> entilated <b>i</b> mproved <b>p</b> it
VLT	<b>V</b> illage <b>L</b> evel <b>T</b> raining
VWC	<b>V</b> illage <b>W</b> ater <b>C</b> ommittee
WHO	<b>W</b> orld <b>H</b> ealth <b>O</b> rganization

## List of figures

	Page
Figure 1: Knowledge in good/bad behaviour in school children in Rashad locality, results of the tests conducted in April 2009	37
Figure 2: Knowledge in modes of transmission in school children in Rashad locality, results of the tests conducted in April 2009	37
Figure 3: Knowledge in hygiene, water and sanitation issues in women in Rashad locality, results of the tests conducted in April 2009	42
Figure 4: Knowledge in modes of transmission in women in Rashad locality, results of the tests conducted in April 2009	43

## **Acknowledgment**

This study was performed under the supervision and guidance of Prof Dr Dr Karl-Heinz Wehkamp, Hamburg University of Applied Sciences and Ms Barbara Busch, Desk Officer for East Africa and Dr Stefan Seebacher as the 2<sup>nd</sup> supervisor, International Health Advisor, Austrian Red Cross, headquarter in Vienna as well as Ms Sumiko Morino, Programme Manager of the Austrian Red Cross in Sudan. At every stage of my research work they gave their untiring help, valuable comments and support in the preparation and implementation of this research. I sincerely pay my gratitude to them.

I am also deeply obliged to the head of the Sudanese Red Crescent Society, Mr Osman Jafar Abdala, Khartoum, and also to the SRCS Branch Director, Mr Mirikha El Daw Mirikha, Kadugli, for his admission doing the research as well as his support during the performance.

I would like to gratefully acknowledge the support of Mr Bdaradeen Ibrahim Fraj for his patience and assistance in his translation activity in order to carry out my research work in Rashad locality and Mr Abdalrasul Ismail in driving me safety around to all parts of Rashad locality and to other places in Sudan. I want express my special gratitude to all people in the villages Al Matar, Tabdun and Arkala as well as Rashad town who welcomed me with their kind and friendliness. I would like to specially thank all the participants of this research.

In connection with my research work I had to speak to and interview different Sudanese who have been involved in the water and sanitation project, either from the supply sight as co-worker, stakeholder or from the demand sight as consumer. They spent their valuable time for my research purpose. I am extremely grateful to them.

## **Abstract**

Access to drinking water and improved sanitation are a fundamental need for health of all people. Diarrhoea due to infection is widespread throughout the developing world. It is estimated that 90.0% of all cases of diarrhoea can be attributed to three major causes: inadequate sanitation, poor hygiene and unclean water. Each year approximately 2.2 million people die from diarrhoeal diseases worldwide, 90.0% are children under 5 years of age. (WHO, 2000)

Besides the mentioned causes of diarrhoeal diseases and its abolishment, knowledge and attitude about hygiene and sanitation and the practice of good hygiene behaviour in children and women is needed to reduce diarrhoeal infections and moreover to prevent getting it. The effects of the undertaken PHAST training related to gained knowledge, attitude and practice (KAP) were investigated by using a quantitative approach in order to prove change in hygiene behaviour according to KAP model.

Health indicators in terms of quantitative figures were analyzed. Interviews, observations and tests were done with 118 participants whereby the main target group of the study was based on 70 children and 30 women from three villages in Rashad locality. The tests examined their knowledge in good/bad behaviour related to sanitation, hand washing, water, food preparing and handling as well as in modes of transmission and preventive activities, whereas the passive observation their attitude and practice investigated.

It was found a significant better knowledge in all items in children and women who attended the PHAST training (cases) compared to those who have never attended (controls). However changes in their attitude towards better hygiene and sanitation and their performances could not be evidence based confirmed at the end, neither in cases nor in controls. However during the time of observation it could be found that health facilities and staff in the villages and compounds tend to practice good hygienic activities.



In summary an association between the undertaken PHAST training and knowledge could be found but the change in hygiene behaviour according to the KAP model could not be proven. The PHAST training and other health interventions tend to prevent people from getting diarrhoeal diseases however valid data to prove it were not available in this region.

Key words: PHAST training, diarrhoeal diseases, hygiene behaviour, water, sanitation, hand washing

# 1 Introduction

The Republic of Sudan is located in Northern Africa and poses the largest country in Africa. Sudan has got a total area of 2,505,810 sq km which is slightly more than one-quarter the size of the United States. (Sudan Net, 2009) The total population counted 37,707,000 inhabitants in 2006. (WHO, 2008) Sudan is weakened due to long lasting civil war and an economical instability. In addition to that, it exists a lack of sustainable water and food security in several areas and localities. The consequences of that are distressed civilians and a mass movement of people and nomads. (ARC, 2008)

Moreover a sufficient health system is almost not existent. In other words the state can not provide their citizens with an appropriate health care service. The life expectancy at birth was 59 years of life for males and 61 years for females in 2006. However the healthy life expectancy at birth was less with 47 years of life in males and 50 years in females in 2003. The under five mortality per 1000 live births was 89 in 2006. (WHO, 2006a) Even the adult mortality counted 329 in males and 261 in females per 1000 population. An also concerned fact showed that the total expenditure on health was 3.8% of the GDP and the total expenditure on health per capita counted 61 \$ in 2006. (WHO, 2008)

The climate is tropical in the south and arid desert in the north with a rainy season between April and October. The natural hazards are dust storms. Environmental current issues contain, such as inadequate supplies of potable water, soil erosion and desertification. (Sudan Net, 2009)

Rashad is one of the six localities in South Kordofan State that was mostly Government of Sudan (GoS) -controlled (with enclaves of SPLM/A) and, until recently, disputed under the north-south peace negotiations. The signing of the Comprehensive Peace Agreement (CPA) on 9<sup>th</sup> January 2005 by SPLM/A and Government of Sudan made South Kordofan an autonomous State. (ARC, 2008)

## **1.1 Overview about the water and sanitation situation worldwide and in the Republic of Sudan**

Even though access to drinking water and improved sanitation are a fundamental need and a human right vital for the dignity and health of all people (UN, 1848), world-wide around 1.1 billion people lack access to improved water sources and 2.4 billion have no basic sanitation. Diarrhoea due to infection is widespread throughout the developing world. Each year there are approximately 4 billion cases of diarrhoea worldwide. In Southeast Asia and Africa, diarrhoea is responsible for as much as 8.5% and 7.7% of all deaths respectively. Every year approximately 2.2 million people die from diarrhoeal diseases (including cholera); 90.0% are children under 5 years of age, mostly in developing countries. It is estimated that 90.0% of all cases of diarrhoea can be attributed to three major causes: inadequate sanitation, poor hygiene and unclean water. Indeed, over 45.0% of children suffer from diarrhoeal diseases due to lack of good sanitation facilities. (WHO, 2000)

In Sudan, the population with sustainable access to improved drinking water sources was approximately 64.0% (comparison: urban areas – 78.0%) and with sustainable access to improved sanitation approximately 24.0% (comparison: urban areas – 50.0%) in rural areas in 2006. (WHO, 2006b) Access to safe drinking water and basic sanitation is declared as a human right and is posed as target 3 of the 7 Millennium Development Goal which is defined to halve by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. (UN, 2000)

Diarrhoeal diseases were the fourth highest cause of death in children under 5 years of age with 13.0% between 2000 and 2003 and also the fourth highest cause of death all ages with 19 per 1000 deaths, which was 6.0% in 2002. (WHO, 2006a)

Unfortunately figures are not available for separate regions, such as Rashad locality.

## **1.2 Overview about the entire water and sanitation project**

The HPP-II-Project, named as “Rural Community Development, Rashad Province, South Kordofan State” was carried out by a consortium of the Austrian Red Cross (ARC) and the German Red Cross (GRC) in partnership with the Sudanese Red Crescent Society (SRCS), South Kordofan Branch, which started in September 2005 and finished in December 2007.

The project objective was defined to achieve an improvement in living conditions and health status which included water and food security provision of the distressed civilian population by a sustainable reduction in food insecurity, water related diseases and malnutrition within the most vulnerable communities in Rashad locality. (ARC, 2008)

The following indicators show shortly the interventions which were done by the different protagonists:

Firstly, 15,000 people in several villages without access to safe water before were provided with a total number of 24 boreholes, 21 of them hand pump equipped and 3 mini water yards. 35 village and town water committees (VWCs, TWCs) have been formed and members have been trained in water tariff collection modalities, bookkeeping and other relevant responsibilities and skills for managing a sustainable water committee.

Secondly, 25 community vegetable gardens were established for vegetable irrigation by support on boreholes to provide enough water in each village and seed kits distributed to 500 families. That intervention also aimed to generate incomes by selling the products on the local markets.

Thirdly, sustainable development was facilitated by institutional capacity building within the stakeholders for Rashad locality.

Fourthly, 76 persons were trained in hand pump maintenance. Additionally water point and health committees were trained in hand-pump operation & maintenance, vegetable farming and health promotion in each village.

Fifthly and most important for this evaluation study was, that a total number of 71 facilitators have been trained in hygiene promotion trainings according to the PHAST (Participatory Hygiene and Sanitation Transformation) method. These facilitators

trained in a 10-day PHAST Training of Trainers (ToT) in order to hold PHAST Village Level Trainings (VLTs) for a total of 2039 participants in their villages.

Moreover after one year of hygiene promotion using the PHAST methodology, further community health interventions were defined and implemented according to the village needs (e.g. latrines, health unit, medical assistant training, and farming assistance). (ARC, 2008)

Whereas the ARC/ SRCS concentrated on the water and sanitation activities the vegetable garden activities were undertaken by the GRC/ SRCS.

### **1.3 Objective of the evaluation study**

The main objective of this study was to investigate whether an association exists between changes in hygiene behaviour by the application of the PHAST training and other health interventions in children and women in Rashad locality. There were two questions to be answered, firstly whether the PHAST training and its used methods was effective enough to keep skills and apply them and secondly, whether the action plan of the PHAST training was appropriate and completely fulfilled.

Furthermore, there was following assumption by using behaviour related models: If an improvement in knowledge and attitude in children and women about health related issues such as hygiene and sanitation as well as to practise have been reached, the chance to change hygiene behaviour would be increased.

It also aimed at evaluating the relationship between the improvement of sanitation as one kind of health intervention and the transmission of water borne diseases. Sanitation has been proven to be a main factor in transmission of most infectious diseases. Therefore an improvement of sanitation should have a resultant effect of reducing spread of such diseases.

This research focused only on diarrhoeal diseases as one sub-classification of water borne diseases and investigated further whether the change in hygiene behaviour is associated with diarrhoea in this region. Regards to all these mentioned facts, it is

assumed that the health conscientious hygiene behaviour and an improvement in sanitation reduce the incidence of diarrhoeal diseases. This project aims to verify if this hypothesis holds true in this part of Sudan.

This evaluation study charged by the ARC was one part of the entire water and sanitation project. It was done to analyze after one year finishing of the project, whether the sustainability of the aims in this case “Improvement of hygienic behaviour among the vulnerable residents in South Kordofan” have been reached. Even the project staff members might gain skills in doing a quantitative research by using different methods.

The interviews, tests and observations help to analyse the success or failure of the project in this component. Furthermore findings might be used to recommend alternative methods or interventions which should be implemented, either in the next stage of this project or in new projects with similar objectives.

#### **1.4 Definition of hygiene behaviour**

The WHO use key measures to reduce the number of cases of diarrhoeal diseases, such as access to safe drinking water, improved sanitation, good personal and food hygiene, health education about how infections spread.

Boot and Cairncross (1993) define hygiene behaviour as the wide range of actions associated with the prevention of water and sanitation-related diseases. One of the five domains of hygiene behaviour, which they identified, is water and personal hygiene. To mention the other ones, these are similar to the key measures of the WHO, such as disposal of human faeces, use and protection of water sources, food hygiene domestic and environmental hygiene.

Benenson (1990) describes good personal hygiene behaviours that are generally considered to be associated with water and sanitation related diseases more specific with following measures:

- washing hands with soap and water immediately after evacuating bowels or bladder and always before handling food or eating;
- keeping hands and unclean articles, or articles that have been used for toilet purposes by others, away from the mouth, nose eyes, ears, genitalia and wounds;

- avoiding the use of common or unclean eating utensils, drinking cups, towels, handkerchiefs, combs, hairbrushes and pipes;
- avoiding exposure of other persons to spray from the nose and mouth as in coughing, sneezing, laughing or talking;
- washing hands thoroughly after handling a patient or his belongings; and keeping the body clean by sufficiently frequent soap and water baths.

Indeed much of the transmission of diarrhoea can be prevented by personal hygiene. At this point, it has to be mentioned that cleaning fingernails closely related to hand washing is. Whereas clean fingernails have an aesthetic value, from a health point of view they are particularly important when food is consumed or fed to infants using fingers. (Cairncross, 2003b)

Curtis and Cairncross (2003) found out by doing literature review that frequent hand washing the most important personal hygiene behaviour is. Only a single personal hygiene practice of washing hands with soap is alone able to reduce diarrhoea incidence by over 40.0%. According to the researchers hand washing with soap and water after contact with faecal material can reduce diarrhoeal diseases by 42.0% or more. Even Fewtrell et al. (2004) found similar results by doing a review. The incidence of diarrhoea can be reduced by hand washing with above mentioned percentage, by sanitation with 32.0%, by hygiene promotion with 38.0% and followed by water quality with 31.0%.

The WHO worked out the most important key hygiene behaviours that have the greatest impact in reducing the transmission of the diarrhoeal infectious diseases which are attached in Annex I.

## **1.5 PHAST methodology**

PHAST, which means Participatory Hygiene And Sanitation Transformation, is an innovative approach to promoting hygiene, sanitation and community management of water and sanitation facilities. This approach aims to empower communities to manage their water and to control water and sanitation related infectious diseases, and it does so by promoting health awareness and understanding which, in turn, lead to environmental

and behavioural improvements. It helps people to feel more confident about themselves and their ability to take action and make improvements in their communities. (Simpson et al., 1997) Feelings of empowerment and personal growth are as important as the physical changes, such as cleaning up the environment or building latrines. The relationship between sanitation and health status can be demonstrated.

The PHAST approach is an adaptation of the SARAR methodology. SARAR stands for **S**elf-esteem, **A**ssociative strengths, **R**esourcefulness, **A**ction-planning, and **R**esponsibility. It was developed during the 1970s and 1980s by Dr Lyra Srinivasan and colleagues for a variety of development purposes.

This approach concentrates as well on participatory learning, which builds on people's innate ability and helps people to recognize their talents within the participatory group and to use them in order to address and resolve their own problems. (Simpson et al., 1997)

The main underlying health-related community development principles of PHAST are attached in Annex II. The participatory process is much more likely to be successful than those which impose solutions on communities. Participatory methods have succeeded where other strategies have failed. There are based on adult education and have been field –testing extensively. (Wood et al., 1998a) Of course, the participatory process will work only if there exists respect for people's knowledge and ideas, with clear recognition of their individual and collective inputs; faith in the creative potential of people and in the synergy of the participatory process; a minimum of structure, a maximum of participation; loyalty to the group; and a commitment to creating opportunities for people to express themselves. (WHO, Afro 2009)

PHAST uses methods and materials that stimulate the participation of women, men and children in the development process. It relies heavily both on the training of extension workers and on the development of graphic materials (sets of so called 'tools kits') that are modified and adapted to reflect the actual cultural and physical characteristics of communities in a particular area. The toolkits must be developed with drawings that match the people and environment that will be working in. The customs, religion, class, dress, interpersonal relationships, lifestyle, types of activities, buildings and facilities



(such as water source and toilets) should be like those of the group. The production of PHAST materials therefore requires trained artists as well as trained extension workers. (Simpson et al., 1997)

Furthermore, principles on learning, decision-making, mechanisms for information exchange and discovery gave also inputs for the PHAST approach. The PHAST initiative has been able to put these principles into operation at international, national and community levels. (Simpson et al., 1997)

### **1.5.1 The seven steps and their activities**

The PHAST training is shortly introduced in this chapter. A full description of the PHAST methodology would overstretch this thesis. The methodology is written in the PHAST step-by-step guide by the WHO. (Wood et al., 1998b)

The PHAST approach consists of seven steps which contains between one and four activities respectively. Instructions and how to facilitate each activity are provided by the purpose, time, materials, what to do and notes. The activities are supported by drawings or charts, also called “tools” in order to support the discussions. Each activity should be evaluated at its conclusion and again, if possible, before a new step or activity starts.

The first step identifies problems. For that, community stories will help to express, discover and discuss concerns and health problems in the community.

The second step takes action in problem analysis. That includes different activities, such as mapping water and sanitation in the community. Identifying good and bad hygiene behaviours help to look more closely at common hygiene and sanitation practice. The following activity: “investigating community practices” is related to what is good or bad for health. The fourth activity in this step is to look how the diseases spread by faeces contaminated environment and which can leads to diarrhoeal diseases.

Solutions will be planned in the third step. These actions include blocking the spread of diseases by identifying routes of transmission; selecting the barriers in order to analyze how effective these blocks are; identifying tasks of men and women and, if necessarily,

add some related to hygiene and sanitation issues in the community.

The fourth step includes the selection of options. That means different activities, such as choosing sanitation improvements. This activity helps the group to assess the community sanitation and decide which change wants to be made. In the second activity the participants are engaged by choosing improved hygiene behaviour which wants to work on in this community. In the fourth step should be taken into account enough time for questions and considerations in order to increase confidence and self-reliance of the group.

The fifth step plans new facilities and behaviour change. In this stage participants plan activities for changes. It means that the group plan action steps for implementing solutions which they have decided before. The next activity includes planning who does what referring to task allocation and responsibility. In this activity the group should be encouraged to plan activities, such as health education sessions which will have a crucial influence in changing hygiene behaviour as well as making plans for physical changes such as building new latrines. The last activity in the fifth step is to identify what might go wrong, which exactly means to foresee possible problems and develop ways to overcome them.

The sixth step consists of planning activities for monitoring and evaluation. This activity includes establishing a procedure for checking the process frequently, dating for the evaluation activity and who should be response for that.

Step seven is the participatory evaluation stage in which the whole process is checked in order to see whether the targets have been reached. Every designed plan and written material is checked. A community walk has to be done to observe the hygiene behaviour and to look at the facilities. It can be checked the knowledge, attitude and experience about the lessons learnt by creating socio dramas in terms of music, dancing, acting and humour. Even planned activities which still need to be done as well as problems and difficulties should be detected in the evaluation process. Then it might be discussed how to deal with them. The evaluation process should be done after the community has implemented its plan, either six month or one year after the start of the program. Using community maps help to evaluate whether the community has undergone any physical changes. The most important objective in this step is to show up their success as a result of their efforts but also mistakes which can learn from in future.

In conclusion the first five steps help take the community group through the process to develop a plan in order to prevent diarrhoeal diseases by improving water supply, hygiene behaviour and sanitation. The sixth and seventh steps involve monitoring and evaluation.

### **1.5.2 Diarrhoeal diseases and disease transmission**

As mentioned in chapter 1.5.1, the PHAST approach clearly emphasizes participatory activities of communities to discover the faecal-oral contamination routes of diarrhoeal diseases organisms. Then the participants analyze their own hygiene behaviours in the light of this information and plan how to block the contamination routes. (Wood et al., 1998a)

Diarrhoea is one among many water and sanitation related diseases. Diarrhoea might last a few days or several weeks as in persistent diarrhoea. For instances, cholera and dysentery cause severe, sometimes life threatening forms of diarrhoea. Signs of diarrhoea are if the stool contains more water than normal and could also contain blood or mucus. Evidence of diarrhoea is three or more loose or liquid stools or more frequently than normal for the individual per day, that means exactly 24 hours. (WHO, 2000) It is usually a symptom of gastrointestinal infection, which can be caused by a variety of agents such as bacterial, viral and parasitic organisms. The reservoir can be the human, animals or the environment. Infection is spread through contaminated food or drinking water or from person to person as a result of poor hygiene. Especially infants may suffer from diarrhoea after having put dirty objects into their mouth or after being hand-fed by someone with dirty hands. Likewise people who are malnourished or have impaired immunity can be easily infected. The usual ways how diarrhoeal germs reach people are via fingers, flies, field and fluids and food as indirect modes of transmission or directly faecal-oral into the mouth. (Wood et al., 1998a) However this kind of diarrhoea can be prevented. Of course there are other reasons for diarrhoeal diseases as well, such as measles, malaria and other illnesses, for example chemical irritation of the gut or non-infectious bowel diseases.

Diarrhoea can be serious dangerous due to the loss of liquid from their body. It can cause or make malnutrition worse due to the loss of nutrients from the body. Nutrients is needed to repair damaged tissue and for growth. It may be life threatening and results in death. (WHO, 2000)

Diarrhoea can be prevented by safe disposal of human excreta (especially faeces from young children, babies and people with diarrhoea); by hand washing before eating, feeding or handling food as well as after defecation or handling faeces and maintain drinking water which is free of faecal contaminations at home and at the source.

However if diarrhoea occurs, it can be treated quite easy by giving Oral Rehydration Solutions (ORS) to prevent dehydration, drinking plenty of liquids more as usual, such as boiled water, weak tea, coconut water, juices and breast milk for infants and continue eating food, such as cooked cereals, soup, rice, yoghurt. If there are signs of dehydration or other problems a health worker or physician should be consulted. (WHO, 2000)

## **1.6 Application of models referring to individual health behaviour**

The definition of health behaviour is what people do to maintain health and/or overcome illness. (Scrimshaw & Hutardo, 1987) Health behaviour is, for example drinking safe water, using a hygienic latrine, breastfeeding, eating sufficiently cooked food, washing hands after defecation and before touching food. An overview of the main health behaviours that help prevent water and sanitation related diseases are attached in Annex I. Individuals are one of the essential units of health education and health behaviour theory, research and practice, because groups, communities, organizations are composed of individuals. (Rimer, 1997)

Kurt Lewin, a German psychotherapist, founded the Field Theory in 1935 and developed the KAP Model. KAP stays for knowledge, attitude and practice. (Rimer, 1997) This model simply claimed that the gain of knowledge by education of a special health related issue and the attitude to this issue combined with their performance can lead to behaviour change. Later on different theories and models were found, based on the KAP Model.

**Knowledge** is defined as expertise and skills acquired by a person through experience or education. It is characterized as the theoretical or practical understanding of a subject; what is known in a particular field or in total; facts and information or awareness or familiarity gained by experience of a fact or situation. (Simpson, 1989)

Jung's definition of **attitude** is the "readiness of the psyche to act or react in a certain way". In other words, an attitude is a hypothetical construct that represents an individual's degree of like or dislike for an item. Attitudes are generally positive or negative views of a person, place, thing or event. Attitudes are judgments. Attitudes can be changed through persuasion. (Jung, 1971)

During the 1940s and 1950s researchers began to learn more about how the individuals make decisions concerning health and what determines health behaviour. During this time the Health Belief Model was developed by a Combination of behavioural theories and cognitively mediated learning theories. Rosenstock and Hochbaum began their pioneering work to understand why individuals participated in screening programs to tuberculosis. These research findings resulted in the first version of the Health Belief Model. (Rimer, 1997) Other scientists reviewed the evolution of this model later on. This model is generally regarded as the beginning of systematic, theory-based research in individual health behaviour. It was the first explicit population-based behavioural model for a health topic and is still one of the most influential and widely used psychosocial approaches in this field world wide. It explains (not just describe) health-related behaviour according to generalizable constructs of a model and derives change strategies for public health/ health education campaigns. (Schwarzer, 2004) On the one hand, the model combined levels of perceived susceptibility and perceived severity, which can be influenced by demographical and social-psychological variables, to provide the energy or force to act. The force to act can be triggered by the perceived threat or other cues to get in action. On the other hand, the perception of benefits minus barriers provides a preferred path of action as well. Likewise self-efficacy influences the readiness to take action. The perceived benefits are outcome perceptions. It means that a person's estimate that a given behaviour will lead to certain outcomes. Self-efficacy is defined as the belief that one can successfully execute a behaviour required to produce a particular outcome. (Janz, et al., 1984)

Generally, without a focus on behaviours from the very beginning, programs might end up with interventions that are under-used and that have only a modest impact. This is shown by the fact that many program evaluations found dramatic increases in knowledge and attitudes, but little or no change in behaviour. Focusing on behaviours, especially on the “P” element in KAP from the beginning might help to prevent this from happening. (Simpson et al., 1997)

The framework and surroundings, where the PHAST training was usually implemented, have not been maturely for the Health Belief Model as very complex behaviour model yet. Usually the KAP model as a behaviour change model is named and applied in combination with PHAST methodology.

This methodology underlines that no lasting change in people's behaviour will occur without understanding and believing. People must believe that better hygiene and sanitation will lead to better health and better living. The PHAST initiative recognized that much of the great shift in health-related behaviour in the last century has been due to education and a recognition of the relationship between public and private sanitation facilities, behaviour and disease transmission routes. If people understand how transmission occurs, they can identify the different ways to block the routes. Likewise they can weigh advantages and disadvantages of blocking transmission routes for their households and communities. Determinants could be time, money, benefits, worth to block it. (Wood et al., 1998a)

Hygiene behaviour change is defined as the action of replacing current unsafe hygiene practices with improved behaviour. (Rimer, 1997) Those who plan and manage hygiene promotion programs often want to promote hygiene by educating people on the links between good hygiene and better health. However local people themselves often do not see the health benefits as the primary reason to change their behaviours. (Simpson et al., 1997)

Therefore people may be persuaded to change a habit or build a facility for reasons other than health (such as status or privacy), however the idea of improved health may also be a motivation. There is no reason to believe that people everywhere cannot acquire the same knowledge and act upon it. Thus PHAST has proceeded on the

premise that behaviour will only meaningfully change and be sustained when people understand and believe in health concepts. Belief underlies all enduring behaviour change and, without it, changes soon fall back into old behaviour patterns. If this is the case, then why have health education messages largely failed to result in behaviour change? The practitioners of PHAST have observed that conventional health education messages are widely known and largely understood, but that these messages do not enable people to implement change. In fact, there are few messages on how to create a credit scheme, how to convince your husband that he must help carry more water to the home, or how to persuade your mother-in-law that you need to attend a planning meeting. The objective of PHAST is not only to teach hygiene and sanitation concepts (where needed) but, more importantly, to enable people to overcome constraints to change. It aims to do this by involving all members of society - young and old, female and male, higher and lower status - in a participatory process involving: assessing their own knowledge base; investigating their own environmental situation; visualizing a future scenario; analyzing constraints to change; planning for change; and finally implementing change. (Simpson et al., 1997)

## **2 Methods**

In this research an evaluation was done by a cross-sectional study in order to review the undertaken health interventions, in this case the effects of the PHAST training in a defined population.

### **2.1 Study design**

Cross-sectional studies are also called prevalence studies/surveys or cross-sectional surveys are observation studies, which are used in descriptive epidemiology. Cross-sectional studies measure the prevalence of exposure or outcome in a defined population. Another feature of this type of study is that measurements of exposures and outcomes are made at the same point in time or in a defined time frame. (Beaglehole et al., 1993)

The correlation between the exposure -PHAST training and other health interventions- and the outcome -change in hygiene behaviour- could be investigated. Therefore cross-sectional studies are very often applied to investigate the prevalence of long-lasting risk factors, health- related habits, health damaging behaviour or health promoting in a population as well as to find out health care needs of a population. But when the health behaviour is investigated, such studies should be repeated after a special time to look how the behaviour maybe changed by executed interventions. (Gordis, 2004)

Evaluation studies assess the extent of implementation and impact of a specific program or project and usually emphasize needs assessment and/or formative evaluation methods designed to provide ongoing feedback to program or project managers. Summative data is used to estimate the extent of change in the targeted population based on particular project or program interventions. It is often used a range of qualitative and quantitative tools but rarely used control or comparison groups and statistical methods to test specific hypotheses. Generally the evaluation clearly describes design, the methods and how they are used, findings and summary/ recommendations to provide answers to specific evaluation questions that are directly related to the objectives of the project. Furthermore one or more of the above mentioned components is emphasized in



sufficient detail for replication or decision making. (Bortz & Döring, 2005)

The evaluation of the effects of the PHAST training included and justified valid and relevant measures by doing structured interviews, tests and observations in case and control groups. Furthermore, it clearly describes the PHAST training as one contribution to the entire project outcomes. The evaluation intended to provide sufficient contextual information for the ARC which allows to generalize and to replicate the results by adopting the program in another location.

## **2.2 Study subjects**

The target group was mainly distressed children and women living in the aforementioned district. The sample method used was building a cluster sample. The participants were randomly recruited after their appearance at the meeting point and allocated in cases or controls, depended on the participation of the PHAST training. That exactly means, cases have attended and controls have never attended the PHAST training.

Altogether 70 children were interviewed and tested, cases and controls separately, but boys and girls were mixed. In detail, 60 school children of approximately 300 pupils at the basic schools from the three villages and 10 school children from Rashad town attended the tests, wherein the last mentioned 10 were only allocated as controls. Among the children from the villages were altogether 24 cases, 5 females and 19 males; and 36 controls. Among these controls were 19 females and 17 males. Likewise children were allocated in three different age groups: 6-7; 8-10 and 11-12 years of age whereby 45 (15 cases and 30 controls) belonged to the 8-10 years age group and 24 (8 cases and 16 controls) of them to the eldest age group.

Furthermore interviews and tests were done with overall 30 women, separated in 15 cases and 15 controls equally and distributed in four different age groups: 15-20; 21-25; 26-40 and 41-55 years of age with a roughly equal distribution of all women. That means 5 cases and 5 controls from each village. The interviewed women were not in all

cases mothers of the school children at the same time. Such a selection was not possible because of the limited size of the villages.

In order to get a suitable level of selection and a broader view, the trainers and teachers from the mentioned villages as well as the community leaders and SRCS project staff members as stakeholders were also interviewed. Overall 6 teachers of 14 from the three basic schools, 2 women at the age of 18 and 31 and 4 men between 45-59 years of age as well as 6 trainers, 2 women at the age of 39 and 40 and 4 men between 19-33 years old were interviewed. The 3 community leaders were approximately between 60 and 77 years old and all males. The interviewed SRCS project staff members were 2 men at the age of 42 and 58 as well as one 26 years old woman.

Overall 118 participants built up the sample size.

### **2.3 Study setting**

The research was done in Rashad locality in the town itself and in three villages, called Arkala, Al Matar, Tabdun. The reason for doing the evaluation in these villages was due to the mentioned community health interventions. Three vip (ventilated improved pit) latrines were built in the basic schools of these villages. With the appropriate sanitation equipment the personal hygiene can be practiced in a better way. As well the women, teachers, trainers and so on were recruited from these villages. The participants of the study were interviewed either at school, at the community meeting place in each village, in their own houses or in the offices of the SRCS in Rashad, Kadugli or Khartoum. The observation was done in the schools, in the villages as well as in several households.

### **2.4 Data collection**

Generally, there are two different researches and assessment approaches using in health science, the qualitative and the quantitative approach.

The following chapter gives firstly an overview about the two types and secondly, the considerations and reasons for using the quantitative approach in this research.

### **2.4.1 Characteristics of qualitative and quantitative approaches in general**

The approaches distinguish in research objectives, research design, data collection and data analysis. Whereas the quantitative approach focuses on describing or comparing groups according to differentiating variables, the qualitative approach focuses on the process by understanding how respondents' define, experience and constitute their world. The quantitative study design shows a stepwise approach and the qualitative study design has got a cyclical iterative character. The quantitative data collection is done by closed, structured and pre-formulated questionnaires/ answers, whereas the qualitative data collection by individual or group and open or little structured communication or observation. The data analyses in a quantitative approach based on numerical statistical research and methodologies as well as objective observations and the qualitative approach on language and subjective observations/ perceptions.

The quantitative approach focuses on known issues, search for status quo, facts or trends. The researcher tries to collect as many and as representative as possible subjects and keeps distance to them. In contrast to a qualitative approach, the quantitative approach deals with objectivity by using standardized plans in order to guarantee reproducibility. The "hard" data are collected in numbers by pre-existing concepts of data and answers in order to do calculations and statistical analysis. The confirmation or rejection of pre-conceived concepts can be received by using a quantitative method. Finally, the quantitative approach is a deductive research approach in order to test hypotheses or confirm existing theories. (Pencheon et al., 2001)

Whereas the qualitative approach in contrast to the quantitative approach focuses on unknown issues, search for meaning, emotions and sense. The researcher mostly interacts with and concentrates on few subjects. It is a situative approach with openness. An unexpected course is given. No pre-conceived answers are available. A qualitative approach always deals with subjectivity. The "soft" data are collected in words for combining conceptual analysis. (Lamnek, 1995) A qualitative approach has an open and explorative character. It has got an inductive research approach in order to generate hypotheses and ideas for theory building. (Pencheon et al., 2001)

#### **2.4.2 Applied approach in this study**

There were different facts take into account for doing quantitative research predominantly. Data were collected by the conducting of structured interviews in face to face situations with different groups such as supplier and user of the undertaken project interventions. This method fulfils the demand on objectivity, validity and reliability. The interview manuals contained both open and closed questions as well as standardized and non-standardized answer possibilities in order to prove the hypothesis. Even the yielded opinions and personal ratings of the open questions were quantified with support on building categories afterwards. The method of using structured interviews was also chosen due to the researcher could not conduct the interview alone, because there was a need for translation activities for each question.

Referring to the conditions in this study, standardized observations could be done by a complete passive observer in order to observe different pre-defined situations, also called standardised observation. This type of observation posed the most appropriate and feasible one.

These various methods helped to determine whether the PHAST training has had any effect on the hygiene behaviour of women and children or not.

In general the quantitative approach is a good way to measure health knowledge. Additionally awareness and behaviour change might be investigated in support with qualitative tools such as open questions. These questions allowed asking participants about their attitude in different issues. Consequently the researcher can receive new ideas and needs for health interventions. These results can be used for new strategies in health promotion or can help to generate new hypothesis for further investigations.

#### **2.4.3 Access to the interviewees**

Access to the target group was given due to the willingness of the community leaders. Even the appreciate position of the Red Cross/ Red Crescent and their staff in society made it easier to recruit the participants for this research. It has to be also mentioned that most of the citizens were convinced about the good things which were done to

them. They were glad for the undertaken project interventions and they recognized the better living conditions for themselves. Of course the participation in this research based on voluntary. However the appointments for doing interviews have been made in a very sensible way where several concerns had to take into account, such as market days, lunch breaks, sickness leaves and so one.

#### **2.4.4 Conducting of the interviews and observations**

All interviews were conducted by the researcher and her assistant. This type of interviews is also called tandem-interviews, because two interviewers are involved. The Sudanese assistant translated all questions from English in Arabic and opposite. The researcher wrote down the results after each question. One example of the applied standardized interview manuals is attached in Annex III. The assistant had been involved in the entire water and sanitation programme and therefore he had good knowledge and knew deep details about the undertaken project. Likewise he have been trained in doing interviews as well as introduced in the research topic before.

Before the survey have started, it had been done a review of the interview and observation manuals in cooperation with the coordinator of the water and sanitation projects of the SRCS in order to avoid misunderstandings in the questions and used materials as well as to add important questions. Furthermore a pretest with individuals on-site had been done in order to check whether the questions are easy to understand and answer. After that, few things in terms of the content and methods during the tests had to be adjusted before the real survey started. For example, when the pictures were shown during the tests, the translator explained what could be seen on it in Arabic. Also another assistant translated further in traditional language, if necessarily, to get sure that the children understood instructions and what was shown.

The school children were interviewed together in groups with 8-10 kids. In support with different materials and drawings the interviewer emphasized to make it interesting for the kids by using playable methods. Additionally, school children were observed in pre-defined activities regarded to how they practise their hygiene behaviour and to identify their attitude towards this issue. However during the observation, children were not

separated in cases and controls. Furthermore the hygiene circumstances at school and around were watched and noted.

Group interviews were conducted with a size of 5 women. Additionally, knowledge and attitude referring to their hygiene were also checked by doing the tests. As mentioned before, a passive standardized observation in each village and some households were done. However the citizens, who lived in the households, could not be allocated in cases and controls.

The teachers were separately interviewed in single interviews. Interviews were done in the same manner with the trainer, community leaders, project staff members in order to give them the chance to answer without any pressure of desired replies from others.

#### **2.4.5 Content of the interviews and observations**

The investigation started with one observation day at school. The children as well as the cleanness of the school and its conditions were observed. One example of the observation manual is attached in Annex IV.

Then questions were asked, such as when they do hand washing. Drawings and materials, such as soap were used to find out whether they have knowledge about good and bad hygiene behaviour. A selection of the drawings, which were used, is attached in Annex V. Afterwards a test was done by handing out answer sheets for each. Of course, the first questions were about personal details, such as age, sex and if they have ever participated PHAST training in order to make an adequate allocation for data analysis and evaluation afterwards. An example of an answer sheet is attached in Annex VI. During the test the children had to decide in types of “smilies” between good/ bad behaviour or “I do not know” in terms of sanitation, hand washing, water and food preparing and handling. Furthermore “modes of transmission of diarrhoeal germs” and “preventive activities” were checked by using drawings with the options of “yes”, “no” and “I don’t know” answer possibilities.

Before the interviews with the women have been done, the villages had been visited. A passive observation about the conditions, cleanness, sanitation and water facilities in

each village in several households as well as hygiene behaviour in food preparing, eating and hand washing had been observed and written down.

The women were asked about their knowledge. That means knowledge about sanitation; personal hygiene; water; modes of transmission of diarrhoeal germs; definition, prevention and treatment of diarrhoea. Equally questions about food preparing and handling, cleaning of clothes and homes were asked.

One part of the group interviews included the same tests that were done with the children. Only the signs “smilies” in their answer sheets were replaced by “thumbs”, which supposed to be more appropriate for adults. Additionally a group work was done. The disposal of faeces from the most unhygienic to the most hygienic way was checked by bringing drawings in the right order.

The participants of the PHAST training were also asked to give their opinions how the training and its applied methods was, how the trainer taught and if they thought they could keep their learnt knowledge and practice it. All interviewees were asked how they found the advertising and promotion campaign (poster, t-shirt, drama, poems).

The evaluation team conducted structured single interviews with the teachers at school about soap consumption, water consumption, frequency and amount of water supply per day (water barrels); how much the water in their community cost and the distance to the water source (time expenditure).

It was asked about their education in sanitation and hygiene issues including their knowledge about diarrhoea, prevention and treatments; their undertaken activities about water, hygiene and sanitation improvements at school; their observation whether the pupils follow the hygiene advises; appraisal of children’s knowledge and their attitude and practice to hygiene and sanitation. Likewise teacher’s opinions about the role and function of the school in water and sanitation issues were asked.

Qualitative data could be obtained by asking them about their perception of the children hygienic behaviour. They could also tell what kind of activities and interventions should be done in this issue in future.

Likewise single interviews were done with 6 PHAST trainers. The trainers were indirectly asked about their knowledge in good and bad hygiene behaviour, transmission routes of diarrhoeal germs as well as knowledge about definition,

prevention and treatment of diarrhoea by asking them how and what they taught. They were also asked to give their opinions about the training, the applied methods, the advertising and promotion campaign (poster, t-shirt, drama, poems). Trainers were asked about the applied toolkits, such as the drawings and if they were suitable or should they be adopted for their community. As well they were interviewed what they thought about the long keeping skills of the participants by the training and how many participants as well as which participants were reached. They were asked about their opinions whether the objectives of the training have been reached.

Interviews were also done with the 3 community leaders of the villages and 3 project staff members from SRCS in order to find out which activities and health interventions in water, hygiene and sanitation were undertaken in and by their community. Like the other interviewees they were asked about personal details and if they have ever participated PHAST training. Furthermore, they were interviewed about their opinions how dangerous diarrhoea for their community is, how it can be prevented as well as their thinking about the role and function of the schools in this issue to find out their attitude. Questions about water in terms of water sources and water costs were also asked. Furthermore, they were asked how the PHAST training and its applied methods in their opinions was; what were good and bad things on it; if the advertisement and promotion used were appropriate tools in order to reach the target group. Changes in education level regards to hygiene knowledge have also been assessed by the interviews. Additionally, they were interviewed about their opinions whether the objectives have been reached or not. The limitations and advantages of the PHAST methodology were also discussed according to the views of the project team and community leaders. Furthermore, it was asked if there is a change in knowledge, attitude and practice from the view of the interviewees. They were also interviewed about other interventions which could be used or prospectively implemented in schools and villages respectively.

Additionally, at the end of each interview of all target groups, except children, were time for other comments, requests, ideas and problems. Furthermore every interviewed person, even the children, were asked how this interview was and about their feelings during the interview.



## **2.5 Data analysis**

The data analysis of the results of the tests was done by counting and using Excel. The data entry was done twice, the second one posed the control of the data entry. The analysis of the gathered materials of the interviews with open and close questions was done by highlighting of the important results. Categories were developed with the most common results. Afterwards the data were quantified by using excel sheets.

The results of the observations were also analysed by highlighting the observed information and quantified afterwards.

### **3 Results**

The following chapter points out the crucial results of the tested knowledge in children and women about hygiene and sanitation as well as the core findings of the observations which were done. An abstract about the results in children in type of Excel sheets are attached in Annex VII in order to give an example how the analysis was done.

Furthermore, crucial results which were gained by the interviews with other stakeholders, such as community leaders, project staff, teacher and trainer are also posed in chapter 3.

#### **3.1 Prevalence and mortality of diarrhoea in Rashad locality**

Some figures and rates of cases of diarrhoea and also its mortality were already pointed out in the introduction, chapter 1. However these figures gave only estimation about whole Sudan and showed quite big differences between urban and rural areas as well as the north and south part of Sudan. Therefore the figures from the WHO do not show the health situation in Rashad locality in reality.

The Federal Ministry of Health in Sudan and its department, called National Health Centre for Health Information, requires monthly registered data on cases of diseases, allocated in the ICD in age and gender from every State in Sudan since 2008.

In Rashad locality, approximately 3,850 inhabitants in an area of 10 sq km benefited from one hospital, located in Rashad town. In 2008 the total number of people who had access to in-patient or out-patient treatment counted 11,008 patients, almost equal distributed among males and females. Among this amount, the total number of hospitalized patients counted 3,302 patients. Among in- and- out-patient people, there were 878 cases, diagnosed by ICD A09 that means diarrhoea and gastroenteritis. In other words, in 7.98% of all patients were diagnosed diarrhoea and gastroenteritis. The cases of death among the in-patient people counted 29 or 0.88% and was quite equal distributed among males and females. 14 of them (48.28%) died in the first year after birth and overall 20 cases (68.97%) under 5 years of age.

In the first quarter in 2009, 1,588 in- and out-patient people visited the hospital for

treatment. Among those, 397 (25.0%) suffered from diarrhoea and gastroenteritis, females and males did not differ a lot. People who were treated as in-patient counted 788 patients in this time period. Among those 3 died, 2 of them were newborn males.

### **3.2 Results of the observations, interviews and tests with children**

In each village two observation days were done in combination with doing the interviews and tests. All three school surroundings looked quite clean but some waste was distributed in the school area, such as faeces of animals and plastic waste etc.. In all schools approximately 50.0% of the classrooms looked complete clean. Only in Al Matar were chairs and table in some classrooms, but not enough for everybody. The most classrooms were only huts, no stone buildings, especially in Tabdun and Arkala. When children got one sweet after the test in each school, it was observed that approximately 50.0% of the children threw the cover away in the middle of the classroom. Even the research assistant did the same several times.

A crude estimation of 30.0% of the 70 school children, who were observed and tested at school, looked quite clean in themselves and also their clothes. All of them wore shoes on the days of testing and observation. All three schools have got four vip latrines. None of them were proper clean and all of them smelled badly. There were only in Al Matar facilities, such as a house for food storing and a kitchen in order to prepare lunch for the pupils. All schools did not have flowing water. The water source was between 600 m and 3 km far away from the schools. The water container did not look clean in the school in Al Matar. Tabdun and Arkala have not got water at school.

It has to be mentioned that the boys of the control group of the primary school in Rashad looked clean as well as the school buildings inside and outside. None of them threw the plastic cover of the sweets away.

All children knew what soap is by showing them a piece, but nobody knew toilet paper. All groups knew when and what they have to use soap for. 83.3% of the cases and 45.7% of the controls said that they had ever heard something about hygiene and sanitation. The most common answer posed that mothers has to look and care for

hygiene and sanitation as well as cleaning themselves, dishes, clothes, houses, kitchen etc. and using the latrines. Two groups of cases answered the question: “Where have you heard about hygiene and sanitation” with following answers: “from the trainers of the PHAST training”. Additionally, the cases and control groups answered either they have heard about this issue from the teacher at school in a special subject or from home. One control group could not give any answer of this question. The control group from Rashad town answered additionally, that a staff from the health office also visited them at school and at home and gave advices in these issues. All groups independent on cases or controls knew when they should wash their hands. All children in case groups knew how latrines look like by showing pictures, whereas children of the control group in Tabdun did not know. All groups knew that they have latrines at school and what it use for. Altogether 28.6% of all interviewed children had latrines in their houses at home, among those 100.0% from Rashad and 16.7% from the village Al Matar. Likewise every child has ever suffered from diarrhoea.

The test results clearly showed a significant better knowledge among cases than controls from the three villages. The tests showed averaged 72.2% of cases and 63.0% of controls gave right answers in terms of good or bad behaviour in sanitation issues. Questions about hand washing could be correctly answered by averaged 79.2% of cases and 65.3% of controls and questions about water by averaged 61.7% of cases and 57.8% of controls. Within this item only 16.7% of cases and 41.7% of controls knew that animals should not drink water from the water barrels of human beings. Good or bad behaviour in terms of food preparing and handling resulted in averaged 74.0% of cases and 57.6% of controls right answers. (figure 1) Only 38.9% of controls compared to 70.8% of cases knew that animals should not eat from the same plate than human beings eat.

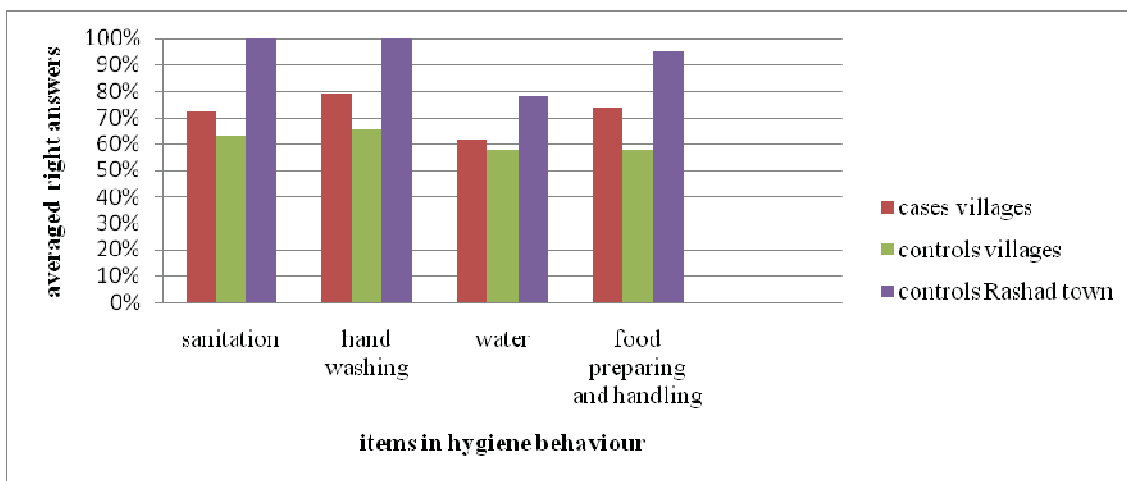


figure 1: Knowledge in good/bad behaviour in school children in Rashad locality, results of the tests conducted in April 2009

In item 4 “modes of transmission” were found that averaged 74.2% of cases and 55.5% of controls gave right answers. All cases and 86.1% of controls knew that flies can transmit diarrhoeal germs. Likewise 100.0% cases but only 55.5% of controls knew that faeces can be a transmitter. Concerned about the fact that food can also be a transmitter gave only 41.7% of cases and 44.4% of controls right answer. Wearing shoes belongs to protective factors. However only 36.1% of controls knew that, compared to the cases where 41.7% of them gave the right answer. (figure 2)

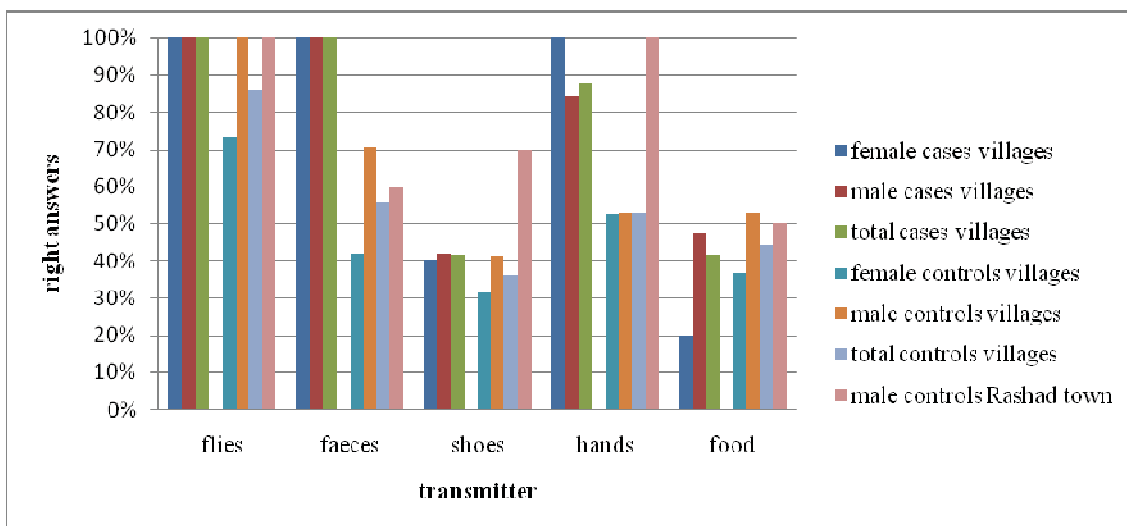


figure 2: Knowledge in modes of transmission in school children in Rashad locality, results of the tests conducted in April 2009

A crucial difference between cases and controls could be found in knowledge about prevention of diarrhoea. Averaged 77.1% of cases and 55.2% of controls could differ

between preventive and non-preventive activities and staff. Among the children, 62.5% of cases and 41.7% of controls knew that eating with animals from the same plate is not a preventive factor. In fact, below 70.0% of controls answered right in 7 of the 8 questions in this item. Only the fact, that reheating food can prevent people from getting diarrhoea, were right answered by 92.0% of controls.

In contrast 6 of 8 questions were right answered by at least 70.0% of the cases. The concerned result in cases was that 45.8% of them compared to 36.1% controls did not know that washing clothes is a preventive activity.

It was found a significant difference considering the results of the controls from Rashad town compared to cases and controls from the three villages. These controls have never attended the PHAST training but their knowledge over exceeded even the cases in all items of the test. These controls answered the questions in sanitation, hand washing and preventive activities 100.0% correct. In the item “water” answered averaged 78.0% and in the item “food preparing and handling” averaged 95.0% right. (figure 1) However the item “modes of transmission” showed some lack of knowledge as well. The fact that faeces can be a transmitter knew 60.0% and food 50.0% of the controls. However, wearing shoes as protective factor knew 70.0% of the controls. (figure 2)

Furthermore, there were not found a significant difference within the age groups in cases and controls.

Considering the gender aspect it could not be found significant differences within the controls, except in terms of modes of transmission. Whereas averaged 63.5% of the boys knew routes of transmission, only averaged 47.4% of the girls gave right answers. In contrast to the controls, the results in cases clearly showed differences between males and females. In all items, except in “modes of transmission”, reached girls better averaged results. Overall the knowledge about bad and good behaviour in terms of sanitation, hand washing, water and food preparing and handling resulted in males in averaged 66.2% and in females in 84.2% right answers. For example in “food preparing and handling” averaged 95.0% of the females answered right, compared to 68.4% of the males. Likewise the results in preventive activities differed with 10% better for females. The knowledge in “modes of transmission” differed in males and females between

72.0% and 74.7% respectively and can be neglected therefore.

It was found some differences in knowledge between the villages in cases and controls. The amount of female cases who were recruited was not enough to make statements about the differences between the villages. Female controls from Arkala over exceeded the female controls from the other villages with better knowledge in each item. In item “modes of transmission” gave averaged 64.0% of female participants from Arkala right answers compared to 25.0% from Al Matar. In item “hand washing” knew 100% females from Arkala against averaged 41.0% from Al Matar right answers. A crucial difference in right answers was also found in preventive activities with averaged 77.5% from Arkala against averaged 25.0% from Al Matar.

Differences were also found between the villages among male cases. The male cases from Arkala reached the best results between 76.6% and 94.0% averaged right answers in all items, whereas the male cases from Al Matar between 44.0% and 68.9% reached. The differences can be clearly seen in knowledge about bad and good behaviour in sanitation, hand washing, water, food preparing and handling with averaged 54.0% correct answers from Al Matar and 84.5% from Arkala.

It was also found the same big differences between these both villages in male controls. The boys from Arkala again reached the highest percentage in right answers in all items, for example 51.8% averaged right answers from Al Matar against 68.6% from Arkala in terms of good and bad behaviour. Knowledge in modes of transmission counted 25.0% better results in male controls from Arkala than from Al Matar, and 13.5% better result than from Tabdun. The concerned result between the villages clearly showed that knowledge in good and bad behaviour among the male controls from Tabdun and Arkala resulted in a higher averaged percentage of right answers with 68.8% and 68.5% respectively than among male cases in Al Matar (54.0%). Additionally, the knowledge in “modes of transmission” and “preventive activities” in male controls from Arkala with averaged 76.0% and 72.5% right answers was still higher than in male cases from Al Matar with averaged 68.9% and 66.7% right answers in the same item.

All children at the end were happy to attend the interviews, but the most of them were very shy and fear, especially the girls.

### **3.3 Results of the observations, interviews and tests with women**

In each village was done two observation days in combination with doing the interviews.

In all three villages were distributed faeces of animals all, over but not in the compound of the houses. However other waste, such as plastic was very rarely found in the public and also in the private places. The wastage systems functioned in a way that the waste was frequently collected and burnt afterwards. Only 3 of 11 observed houses were overcrowded with waste in front of their entries. The meeting points in the villages looked appropriate clean.

The following percentages are only crude estimations. Due to many people around the observer during the time of observation, an accurate counting was not possible. The people in the villages wore almost completely dirty and damaged clothes. Below 20.0% of children and approximately 35.0% of adults mostly women, looked clean in the villages. Most adults wore shoes, but only 40.0% of the young children. It was also observed that many flies sat on children faces. In all three villages was no flowing water in any places or houses, but two of the villages has got a water pump or mini water yard, which were still working and in good conditions. However due to the long dry season, there were not sufficient water available in Tabdun. The water pump in Al Matar was approximately 400 m far away from the community central place. The farming garden and 50.0% of the mango tree were still alive. The water source in Tabdun was approximately 2 km far away from the villages. The farming gardens could not be planted because of a lack of water. There was neither a water source nor any farming gardens in Arkala.

A total of 11 households were randomly selected and visited. All compounds looked clean inside. Only in one compound was distributed few faeces of animals. Furthermore in 6 of 11 kitchens were chicken or goats inside, and donkeys were also found in one compound. Altogether the kitchens were clean at the time of observation. Some of them were very basic without any equipment and mostly cooked on the floor. Cutlery and crockery looked quite clean, in 9 of 11 households stored on the top. There were covered drinking water vessels in 9 of 11 households and in 8 of the houses stored up. It



could not be determined if the vessels were clean. All households had food storing places, more or less in good conditions. 4 of 11 households had their one traditional latrines which were clean and did not smell at the time of visiting, however many flies were found around the latrines. The other compounds did not have own latrines. People used either the latrine of the neighbours or the nature, especially in Tabdun where below 10.0% of the households had latrines.

All groups said that women have to take care for hygiene and sanitation in the houses, like cleaning the houses, dishes, clothes and the children in order to prevent diseases and support a good health status. All women have ever suffered from diarrhoea in their life, mostly several times. All women, independent whether they attended the PHAST training, had ideas about the signs of diarrhoea. But there was a difference between understanding why diarrhoea dangerous is. All three case groups and one control group said due to the loose of liquid. The two other control groups answered only that you can die from it. The cases and controls in each group would treat diarrhoea either with ORS, mixed sugar and salt or local medicine, such as herbs, roots and fruits. Afterwards they would bring the sick people to the health centre or hospital.

All case groups appraised the PHAST training as efficient and the trainers as very good. The women claimed they have kept the learnt skills until now and practise it daily, for example: “keep water vessels with drinking water clean and on the top, clean latrines, wash hands, make the dishes and store it on the top, wash the children daily” etc.. About the advertising and promotion were answered almost by every interviewee from all groups in the same way: “bringing sweets and toys for children or other gifts for everybody like mosquito nets, t-shirts and soap”. Only one case group said that they wanted learn for their life and not because of gifts. At the end of all interviews was time for ideas, problems and requests. The most common comments were that the cases of diarrhoea have dramatically reduced after the PHAST training and interventions, however there is a need for more training and latrines. In Tabdun and in Arkala women complained that there is not enough water available for doing hygiene activities. All women who did not attend the PHAST training regretted it afterwards and wished a new training.

The test results clearly showed an averaged better knowledge among cases than controls from the three villages in the items of good/bad behaviour, modes of transmission and preventive activities (figure 3).

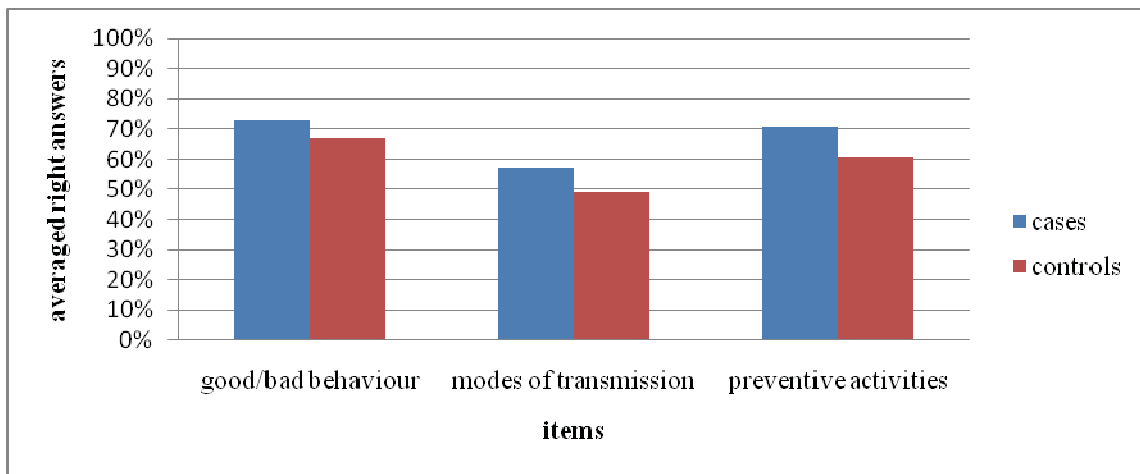


figure 3: Knowledge in hygiene, water and sanitation issues in women in Rashad locality, results of the tests conducted in April 2009

Averaged 72.8% of cases and 67.1% of controls could distinguish between good and bad behaviour. (figure 3) An average of 82.2% of all cases and 84.4% of all controls knew what good and bad behaviour in terms of sanitation is. It was also found a controversial disparity in knowledge in hand washing between cases with averaged 60.0% correct answers and controls with 80.0%. Within this item both groups, 53.3% of cases and 33.3% of controls gave wrong answers in the following questions: “taking water from a big water barrel with a small pot for washing hands” is a bad behaviour. The results clearly showed that controls have at least averaged 80.0% knowledge in sanitation and hand washing. These figures posed the best results in controls within all items.

The results in the item “water” clearly showed differences between cases and controls. Averaged 78.7% of the cases and 62.7% of the controls gave right answers by showing and explaining pictures in this item. 93.3% of participants in both groups knew that washing their kids is a good behaviour. There was a meaningful difference concerned on food preparing and handling between cases with averaged 81.7% and controls with 53.3% right answers. Only the drawing that showed a woman who washes their hands before cooking was right answered by averaged 73.3% of controls.

In contrast, item 4 “modes of transmission” did not result in a big difference between cases and controls, averaged 57.3% and 49.3% respectively. (figure 3) 86.7% of cases and 66.7% of controls knew that flies can transmit diarrhoeal germs, but only 26.7% of cases and 60.0% of controls knew that food can also be a transmitter. Wearing shoes belongs to protective factors. However only 20.0% of controls knew that, compared to the cases where 53.3% gave the right answer. (figure 4)

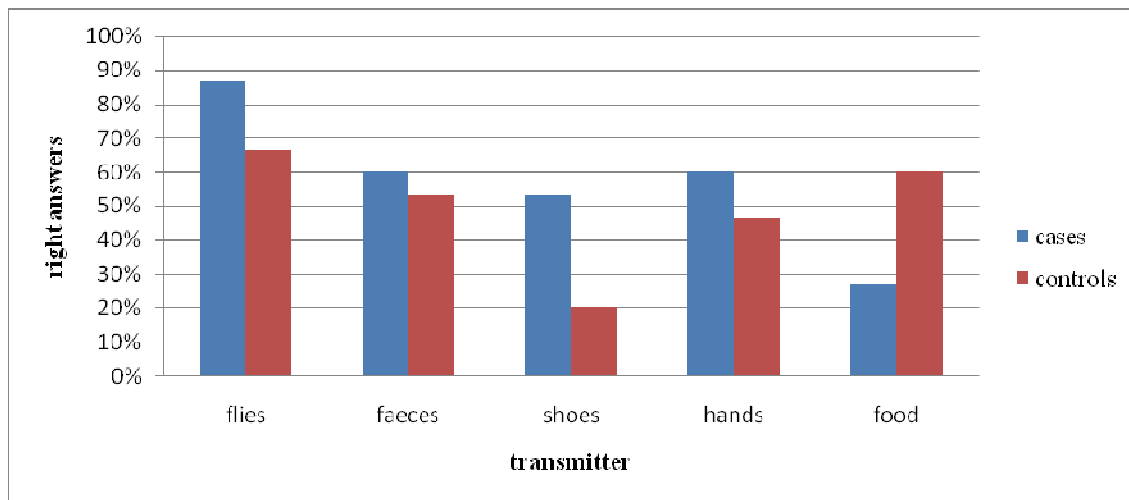


figure 4: Knowledge in modes of transmission in women in Rashad locality, results of the tests conducted in April 2009

It was found a moderate difference between cases and controls in the item: “activities and staff to prevent diarrhoea”. Averaged 70.8% of cases and 60.8% of controls did know how they can prevent diarrhoeal diseases in terms of hygiene and sanitation. (figure 3) Less than 54.0% of the women in both groups did not know that animals should not eat from the same plate than human beings eat. Another concerned result was again, that only 46.7% of controls knew wearing shoes is a protective factor. In both groups, averaged 83.3% of cases and 76.7% of controls had knowledge that washing clothes as well as reheating food can protect people from getting diarrhoea.

The age groups in women did not show meaningful differences in knowledge in cases and controls. The right answers were scattered in four age groups, therefore no pattern could be identified related to the amount of tested women.

There was no significant difference in cases in terms of “good/bad behaviour” and “modes of transmission” between women from the villages, but in “preventive

activities” averaged 80.0% of cases from Tabdun answered right, compared to 60.0% from Al Matar.

However, it could be found diversities between the controls in knowledge. In Tabdun averaged 77.1% of women gave right answers related to “good and bad behaviour” in sanitation, water, hand washing and preparing, compared to Al Matar with averaged 60.0% and Arkala with averaged 62.9% of right answers. Knowledge in “modes of transmission” were found in averaged 68.0% in controls from Arkala, whereas averaged 32.0% from Al Matar and averaged 48.0% from Tabdun had knowledge about that.

Knowledge in item “preventive activities” with averaged 72.5% right answers were reached by women from Tabdun, compared to 50.0% from Arkala.

All groups, except one cases and one control group, brought pictures with different disposal methods in the right order, from the unhygienic to the more hygienic one.

The feedback at the end differed between the cases and controls. Whereas cases were very happy to do the tests and interviews, the controls were more afraid to participate in the interviews and tests before. At the end everybody was happy about the visiting and interviews.

### **3.4 Results of the interviews with teachers**

In summary 6 teachers were interviewed, the head and another teacher from each school. 3 of them attended the PHAST training. 1 of the 6 teachers had some basic knowledge what hygiene is, and 3 said that each person is responsible for their hygiene. All teachers mentioned that parents and teachers should collaborate to care for the cleanness of the children. All teachers knew the signs and had some ideas about the definition of diarrhoea. Furthermore they said that diarrhoea is very dangerous and causes in death because of loosing liquid. Only one knew that diarrhoeal sick people loose nutrients and vitamins. They all knew it can be transmitted quickly to each other, especially at school. All teachers knew that diarrhoea can be treated with ORS or traditional medicine such as herbal tea, roots or gruel. If the cases are serious they have to bring the children to the health centre or hospital, but only two teachers answered that people who suffer from diarrhoea need to drink a lot of water.

In all three schools teachers were very concerned about having clean schools. They established several cleaning days a week or a month. All schools had their own school health committee, joined by teacher and school children in order to discuss water, hygiene and sanitation issues and to develop activity plans. In Tabdun parents meetings took place each year to discuss hot issues. All teachers added that they checked their students at least twice a week whether they looked clean and wore clean clothes. Only one teacher checked also children's nails frequently.

Al Matar provided pupils with drinking water and food additionally. According to the teachers all children at this school have their own cup, spoon and plate.

The main activities at two schools to prevent diarrhoea were following: "teaching hygiene and sanitation issues, such as drink only water from the hand pump or filtered water; keep yourself and your clothes clean, prepare good food and wash hands before and after eating as well as after using latrines". According to the previous answers, only the school in Al Matar used water from the hand pump independent on the season and for which purpose. In Al Matar and Akrala water was brought by an own school staff, paid by the government. Unfortunately there were no food preparing and drinking water available in Tabdun. Children had to bring their own water at school. Arkala provided children with water that was not drinking water at all. The water source was quite close to the schools in two cases, approximately 400 m far away in Al Matar and 1,200 m in Tabdun. The schools got the water for free. Al Matar needed between two and three barrels (approximately 72 l per barrel) for drinking and hand washing. Unfortunately during the dry season the once water source in Arkala was 3 km far away and supply the school with dirty water from the well. The interviewer said that water was usually not boiled before drinking, even in the rain season.

Teacher said students used hygiene water dispensers with soap in all three schools and parents paid for it. The soap was mostly bought on the market in Rashad and the consumption counted approximately 70 pieces per month in Al Makar, 45 pieces in Tabdun and 35 pieces in Akala, dependent on the amount of pupils.

All the teachers appraised children's knowledge and attitude towards personal hygiene and sanitation as good nowadays and as a big change before and after the training was conducted in the villages. All of them thought that the children who attended the training have kept the learnt knowledge until now and also they have followed the

personal hygiene advises.

All 6 teachers mentioned that the role and function of the school in terms of hygiene and sanitation issues is very important. One teacher said that teachers have to be idols for the children in this issue. In all schools there was an extra subject about hygiene and sanitation. Books were also available about how could this topic be taught.

Each teacher had similar requests such as better houses and classrooms, kitchens, more equipment for example furniture, drinking water vessels, more latrines and also bathrooms. However the most problems in Arkala were faced by the shortage of water that led in a lack of cleanness in children.

All teachers said they felt well and happy during the interviews in terms of the atmosphere and the clear questions. All of them said thanks for coming.

### **3.5 Results of the interviews with trainers**

As already mentioned in chapter 2.2, a total number of 6 trainers were interviewed from more than the mentioned three villages. 5 of 6 trainers had knowledge in personal hygiene behaviour in terms of hand washing before and after different activities. Knowledge in water, for example “boiling water before drinking, if the water does not come from the water pumps” was answered by 2 of them. In terms of sanitation answered 2 of them: “using latrines and if not, defecate far away from the water source by using digging tools”. In item “cleaning” said all of them some of the following: “clean water container; clean houses, kitchens and floors” as well as “care for the children in terms of washing them and their clothes”. In item “food preparing” answered 4 of them “cover the food and heat it up again before eating” as well as “keep the kitchen and dishes clean and on the top” are good behaviours.

In items 2 “modes of transmission” answered only 2 trainers that it is necessarily to have “clean hands”, “washing dishes and cover it” as well as “drinking clean water in order to block and reduce transmission of diarrhoeal germs”. The modes of transmission were almost unknown. The trainers said that diarrhoea occurred a lot before the PHAST training was undertaken. 5 of 6 trainers confessed that they have suffered from diarrhoea

several times. Nobody of them could define diarrhoea referring to the definition of the WHO, but all of them had some ideas about the signs of diarrhoea. Each trainer was convinced that diarrhoea is dangerous and all of them knew the reason, due to the loss of water and liquid in the body. The trainers answered at least one of the following: “clean areas”; “washing hands with water and soap before and after different activities”; “washing clothes”; “using latrines” as well as “preparing, handling and storing food in a hygienic way” and “using smoke against flies” can prevent diarrhoea. Each trainer knew at least one intervention that should be done if someone has diarrhoea, such as “giving ORS, sugar and salt”, “traditional medicine”, “sand” as well as “people has to go into the hospital”. But only 2 of them knew that people needs to drink a lot. No interviewees would give diarrhoeal sick people appropriate food, such as cooked cereals, rice etc..

About the PHAST training answered each trainer that it was effective. According to the interviewed trainer, altogether 202 men, 273 women and an unknown amount of children attended the training in their villages. 3 of the 6 trainers conducted two PHAST trainings in their villages, one trainer none. Almost all trainers expressed that the women were very ambitious to learn as much as they could. They came daily and in time to the training as well as the children were very pleased to attend and very clever and quickly in understanding. In their opinion almost all women have kept the learnt skills until now and have followed the advices and practise it. However men did not come to the training every day and some of them refused to follow the recommendations of the training. Only in Tabdun the PHAST trainer has followed up the training monthly by going from door to door and checking the knowledge and practise.

The toolkits used were pocket charts, posters, boards and drawings. 5 of the 6 trainer said that the drawings were appropriate in order to cover the activities in their community for all age groups and gender that attended the PHAST training. None of the villages adopted drawings after the training was done. In the item “promotion and advertisement for the training” answered all trainers that distribution of sweets and toys for children as well as small gifts such as t-shirts, soap and mosquito nets were good ways to encourage the residents to participate in. Furthermore 4 of them answered that doing dramas were a good way to transmit the hygiene and sanitation issues in the

community. One trainer respectively said that showing videos about the issues would be an appropriate way, giving more gifts, for example soap, and offer food and tea would be also a good advertisement for participation.

In conclusion, all trainers asserted that the incidence rate of diarrhoea has been reduced since the PHAST training and other interventions had been done, especially in children. All trainers said that the objectives of the project have been reached and 5 of them wanted a follow up training or new PHAST training for non- participants. Two trainers wished hand pumps for cleaning water in their villages, one trainer wanted introduce cleaning days in his village. The trainers in Tabdun wished to build up public latrines for utilization and new classrooms at school as well as more water sources because of the lack of water. One trainer suggested that running a competition in doing homework during the training might enhanced exercises. One of them also wished to make PHAST training together within several villages in order to exchange experience.

All the interviewees felt well, were happy to give feedback of the training and enjoyed the relaxed atmosphere during the interviews.

### **3.6 Results of the interviews with further stakeholders**

Interviews were done with the three community leaders of the villages at the community level. One of them has ever participated PHAST training. They described the efforts in water, hygiene and sanitation issues, which were undertaken in the community, as following: “built up water pumps” (in two villages); “conducted PHAST trainings”; “built up latrines”; “distribution of digging tools and mosquito nets” as well as “built up farming gardens and plant mango trees”. Furthermore all of them described further activities which were done by their own, such as “establishment of water committees” in order to discuss water and sanitation issues. All leaders appraised the role and function of the school and their teacher in this topic as very important. They said that teachers should help to keep the villages clean and to do check ups twice a week whether the children are clean and wear clean clothes.

One village has got an water pump approximately 400 m far away from the community



place, one a water pump with solar and water yard approximately in 1,500 m distance. Unfortunately in Arkala could not be found water in the ground in order to bore and built up a water pump. The only water sources were a well and a lake, respectively 3 km far away. These water sources did not spent drinking water quality and enough water for all the residents during the dry season.

There were different prices for water in the villages. Families in Al Matar had to pay 2 SDP monthly for drinking water for themselves and another 6 SDP for animals, if they had many of them, whereas people from Tabdun had to pay 0.50 SDP monthly for their families.

Two of the community leaders had a crude idea why diarrhoea dangerous is and how it is caused. As good preventive activities were mentioned: “drink only drinking water”; “women have to keep their children clean and take care for them” as well as “using latrines instead of going in the nature”. The community leaders scaled the undertaken PHAST training as efficient. All of them thought that the knowledge about hygiene has changed in a good way. All three leaders said that the villages and houses were more clean and hygienic than before. Two of them said that few of the participants did not follow up the advices in their homes afterwards.

Referring to promotion and advertisement, the community leader mentioned similar things than the trainers did. Sweets or small gifts could encourage residents, especially children, to attend the training, and doing dramas posed the best way to transmit information. Tabdun’s community leader went from door to door to invite the people to participate in the PHAST training. One of the leaders mentioned that watching videos would be a good method in future.

In conclusion all three community leader estimated that the objective of the water and sanitation project in this component has been reached. They said that many children died due to diarrhoea in the past, but very few nowadays. Only in Arkala was the mortality rate in children still high according to the community leader. Especially Tabdun’s and Arkala’s community leaders said it needed more follow up and discussion about personal hygiene in their villages.

In future all three villages want do activities, such as building new classrooms at school

and more latrines in their compounds. Furthermore they want do several activities referring to the maintenance of the vegetable gardens in Al Matar, using mosquito nets during the rain seasons and reinforce the responsibility for cleanness by everybody. All three villages wished to establish an own small health centre in their villages due to the big distance to Rashad town. Likewise they want get more PHAST training. According to the community leaders were more problems in understanding how important personal hygiene really is and to practise it than to have knowledge in this issue. Therefore two of them want to do more check ups. If there was no compliance of advises, it should follow a kind of punishment for such families. Tabdun and Arkala wished to solve the water problem they have.

Furthermore three interviews were also done with project coordinators and educators in this project. All of them have attended PHAST training before. Two of them explained the undertaken project activities in the same way than the community leaders did. Considering the water committees meant two interviewees that the committees need support how they could get in action, whereas one claimed that the communities should get up by their own. The project staff said they advised the health committees that received water should be paid by the residents. In reality residents of these villages mostly paid 1 SDP per family and approximately 5 SDP if they had animals.

All three interviewees were convinced that the school and the teacher should play an important role in water and sanitation issues. Firstly, the teachers should be trained and secondly, those have to teach about this topic at school. Likewise an adapted PHAST training with simpler curriculum or the CHAST training for children would be appropriate in order to change children's behaviour.

All the staff knew why diarrhoea dangerous is and how it might be prevented. The staff said that the PHAST training was good in giving more skills. The used methods were suitable to reach also illiterate people, but sometimes people were too shy to participate and express their knowledge in a good way, especially the women. However women and children were the best and most important target group for the trainings.

All of them were convinced that the hygiene situation in the villages is better than before, but changing in behaviour takes a long time and even if the residents have the knowledge about personal hygiene, only few practise it. A criticized point was mentioned as the irresponsibility of the communities about this issue in some villages.

The encouragement of ToT was conducted by doing meetings and trainings in Rashad town. According to the interviewers the preconditions of the trainer should be at least a secondary school education and should involved more women prospectively. The mobilization in the villages was undertaken by meetings with the community leaders and other village members before. The interviewees said there was a need for better equipment such as using more dramas, videos, posters etc. to reach the people in a better way. One interviewee estimated that the drawings should be adjusted by Sudanese artists in order to cover resident activities in the different areas completely. According to the staff, the objective of the hygiene component has been partly reached due to the lack in people's daily life practise. Training and practical exercises have to be longer in time duration for sustainable changes as well as follow ups are needed. The change in sanitation was named as very limited from one interviewee. Prospectively incentives for families might be implemented, for example bonuses for very clean houses. The responsibility should be also mobilized what the communities and their residents have to do. According to one staff it needs the combination of training in hygiene and building of sanitation and water facilities as a whole package.

At the end the community leaders and the project staff members felt very well and enjoyed the good atmosphere during the interviews.

## **4 Discussion**

In this chapter results and methods of the research are discussed. It is also focused on limitations that were given by several conditions, such as research methods, or influences from outside.

### **4.1 Interpretation of the core findings**

The figures from Rashad hospital, which were pointed out in chapter 3.1, assume not to be real figures in diarrhoea and their mortality for different reasons.

Firstly, there were some limitations in the validation of the figures. In January and February 2008, no cases in ICD A09 were documented. It does not mean there were no cases in these months at all. It was also observed that the cases in ICD A09 increased gradual monthly. It is predominantly assumed a lack in documentation, because the registration system has just started in 2008. It can be also assumed that the data collection was not currently done. In counting were also found many mistakes. Consequently, the first quarter in 2009 showed much higher cases in diarrhoea and gastroenterities than the previous year during the same period of time. It is assumed that these figures showed a more realistic picture than the year before. However it had to take into account as well that many nomads come to the hospital during August and November, because of their staying in this area during the rain season.

Secondly, the numbers of patients diagnosed with ICD A09 can not be determined only as cases of diarrhoea, because several diseases belong to this ICD.

Thirdly and unfortunately, the cause of death could not be found in the documentation. According to the medical doctor, he could remind on only 2 cases of death caused by diarrhoea since 2007, both under the age of 5.

Fourthly, residents of the remote villages are not always able and willing to come to the hospital if they suffer from diarrhoea.

Fifthly and unfortunately, figures in Rashad locality and its hospital were only available for the year 2008. Therefore a comparison was not possible between years before and after the undertaken water and sanitation project, especially after completing the PHAST training in 2007 in the belonging villages.

In conclusion, these quantitative figures can only give a crude estimation about what is going on related to diarrhoeal diseases in this area. Due to the mentioned limitations, an association between PHAST training and health interventions and reduction in incidence of diarrhoeal diseases can not be made.

The test results in children and women clearly showed a significant better knowledge in cases than in controls in all items. In both target groups could be determined a common knowledge about personal hygiene, such as “hand washing” in all participants. Additionally all women had high knowledge in “sanitation”. Knowledge in “water” and “food preparing and handling” items were more found in women cases than in children cases. Knowledge about preventive activities was also known in women cases the most. This finding indicates that the cases could remind what they have learnt in PHAST training, however women better than children. This result is attributed to the fact that the tested pupils were very young when the PHAST training was run two years ago.

It could further be ascertained that questions apart from the mesmerized curriculum of PHAST training could not be answered with a high percentage of right answers, for example whether wearing shoes can be a transmitter of diarrhoeal germs. This finding shows that logical thinking was very limited. Furthermore creativity was also not obtained, but was needed to play the warming up games.

The differences in knowledge about good/bad behaviour, modes of transmission and preventive activities between cases and controls also indicate that learnt lessons and skills were not sufficiently spread among the women and children in all investigated villages. This could have two reasons, firstly the issue hygiene and sanitation is not important enough in their opinion or secondly, women want keep their skills and knowledge for themselves as a resource of power and more influence in their villages.

A concerned fact in children and women was clearly found by figures that modes of transmission were not appropriate known, especially by food and followed by hands. However flies as route of transmission were mostly known in all participants and faeces in children cases. The other interviewees, even the trainers did not have appropriate knowledge in modes of transmission. Without knowledge about the routes of transmission of diarrhoeal germs, the prevention of diarrhoea is limited according to the

PHAST training guide. (Wood et al., 1998a)

As already mentioned on page 38, it could be found significant differences in children within the cases but not within the controls related to gender, except in modes of transmission. Girls had a higher knowledge after the training than boys. These findings are coherent with the answers of the PHAST trainers that females were more eager and ambitious to learn and to attend the training than males. They felt more response related to hygiene and sanitation issues in their community.

However this statement about the differences between females and males in cases is very limited, because of the amount of female participants. 5 females against 19 males could not give a valid result. It needs more female cases to prove the results.

In rural areas in Sudan were not found an association between age and level of education at all. Children start school in diverse ages and follow up their school education with more and less attendance and absences for different reasons over the years. The different chosen age groups can be neglected in terms of higher/ lesser knowledge in hygiene and sanitation issues. However, it can not be made an evidence based statement about the impact of the age on the knowledge due to the small sample size of tested children in the three age groups.

It could not be found significant differences in knowledge in women within the defined age groups, because the sample size in the four different age groups in cases and controls was also not big enough to make an evidenced based statement. Therefore it can not be testified which women age group the most appropriate target group in PHAST training supposed to be.

The test results clearly showed a crucial difference in knowledge and clean looking in children between the villages and the small town. Children in town as control group reached the best results, even better than the women in the villages who attended PHAST training. This finding might be attributed to the fact that the basic education level as well as the hygiene education at school is significant higher and better in town than in the villages and has nothing to do with the PHAST training. It could also be determined a better understanding of the introductions and obviously higher logical and creative thinking in pupils from town than from the villages. Miss understandings

caused by language difficulties can emphasize this fact.

Due to disparity of conditions and education level in children between the three villages and the rural town the results in controls might not be considered cumulatively. It would give a distortion of the results in controls compared to cases in terms of diminishing of the differences and would follow in a bias.

Differences in knowledge between the villages could be caused by the level of education in general, learnt knowledge in hygiene and sanitation issues, lecture abilities and motivation of the PHAST trainers as the results of interviews with the trainers showed. Not all PHAST trainers in the villages followed up activities in hygiene and sanitation. Even movements and modifications within the villages changed conditions quickly, for example death or leaving of trainers.

It could not be found any community maps of the whole action plans of the conducted PHAST trainings on-site. Therefore it might not be identified whether the steps as well as the action plans of the PHAST trainings were completely implemented in the villages. However there was lack in knowledge, for example in modes of transmission that tends to be not sufficiently fulfilled.

Results have also shown that differences in children's knowledge were dependent on the encouragement and education level of their teachers, what the results of their interviews also showed.

It has also to take into account that the power and the will of the community leaders play a big role related to the improvement of hygiene and sanitation in the villages.

The results clearly showed a contrast between the interviewed project staff members and the PHAST trainers related to the necessary adaptation of the drawings and the need for further tool kits. The trainers on-site were convinced there is no need for that. It is assumed a lack of communication in this matter between top and down.

According to the answers, a contrast could be found between project staff/ community leaders and women/trainers referring to attitude and practise towards hygiene and sanitation. Staff members and community leaders appraised these still as the most

problem rather than knowledge, whereas women and trainers appraised their attitude and knowledge as very good.

Answers related to questions about advertisement and promotion activities can allow the conclusion that people have not understood the concept and importance of their own health yet. The majority of the study subjects were convinced to attend the training and perform health interventions with the objective to get gifts and staff from the project. Few of them were aware to benefit from the project activities for their own health that is existential necessarily for their well being and disease prevention. This fact gives the conclusion that health conscientious attitude is not common at all.

Figures that were given in the description of observations at school and in the villages can only be crude estimations. The counting of people was not possible and the indicators of hygiene and sanitation could not be investigated due to the settings in the villages changed quickly and made it unmanageable.

Unfortunately activities in terms of hygiene and sanitation practise in school children could not be observed due to holidays during the time, when the research was conducted. Consequently, it could also not be observed how the kitchen co-workers cook the food at school. Likewise, it could not be observed activities, such as cooking; eating; using latrines and hand washing in the villages during the time of presence. It was observed that children in two schools threw the sweet plastic cover in the class rooms away as well as the research assistant did. Likewise hand washing before and after eating could not be observed by residents from one village during having lunch together. Due to these observations it can be concluded that people have not got the attitude as well as have practised good hygiene behaviour, even if they have got knowledge about it.

The distribution of faeces in the villages and a shortage of sanitation facilities, such as latrines, posed a hygienic risk for diarrhoeal diseases. Young children without wearing shoes and clean clothes represent definitely the highest risk group related to this matter. The cleanness of the observed households as well as their handling of food and water showed the compliance in hygiene advices, in depended on PHAST training participation. These findings are contradicted to the spread of knowledge between



participants and non-participants of the PHAST training. However it underlines the fact that people follow requirements without knowledge about the reasons why they do that.

According to the hypothesis, the occurrence of sanitation facilities and their utilization might contribute on the reduction of incidence of diarrhoeal diseases in a crucial way. It was mentioned in the results of observation that all sanitation facilities at school looked not clean and smelled. Therefore it can be assumed that the latrines were used by the children in all schools and also by residents from the villages, because 2 of 4 latrines were not locked in all latrine buildings. The latrines in the observed households looked clean but had a lot of flies which is also a good indicator for utilization. However in both settings were no possibilities to observe the utilization by them. As the figures of the amount of latrines showed, there was more or less a lack of sanitation facilities in the villages in general.

#### **4.2 Limitation of the study in general**

The water supply in the focused area has to take into account. The geographical and climate conditions produce a shortage of clean water and water in general during the dry season. These conditions occurred in 2 of 3 villages. The research was done during the driest period of the year. All the interviewees in these villages complained about the shortage of water. These facts can not be neglected and have a crucial impact on hygiene and sanitation behaviour in people. Without enough water, residents can not practise good hygiene behaviour, even if they have knowledge and attitude about that. People are inhibited in doing improvement in practising of good hygiene behaviour by outside factors which are not controllable by them.

It should always be born in mind that other factors such as gender equity and human rights have also an influence on the behaviour related to the hygiene issue and the ability to give contributions during the interview. It could be observed a lack of self esteem in women and children. However women who attended the PHAST training have done the interviews and tests with more self confidence than the women of the control group did. It has to be mentioned that this disparity embarrassed the research in a worried way. In the past there were difficulties for women to attend the PHAST

training because of many daily duties they have to do.

### **4.3 Limitations of the applied research methods**

Cross-sectional studies can only measure exposures and outcomes at the same point in time or in a defined time frame, so it can only be described a status quo.

Indicators for health in type of quantitative data, such as access to health; mortality rates; prevalence and incidence of diarrhoeal diseases were very rare available for this region. Even the available data from the hospital did not require by completeness, validity and comparability. A complete surveillance system has not existed yet.

Consequently, a comparison between the mentioned indicators before and after the PHAST training and health interventions could not be done. Equally, a comparison between the knowledge in water and sanitation issues before and after the PHAST training was also not possible due to the lack of assessment data or previous undertaken researches in this matter.

Optimal conditions were not given for a conventional quantitative research, such as a survey with questionnaires.

Firstly, the sample size was not as high as should be and does not fulfill the requirement on representativeness for the whole target group of Rashad locality. However the results are representative for the investigated village due to the building of cluster samples in each village. The decision for the small sample size of overall 118 participants is caused by the limited resources in terms of time and budget as well as the several problems for recruitment a higher amount of participants in this region. Some people who attended the PHAST training have already left this area. Even a random sample in case of the participants, trainers, community leaders etc. was not given, because there was no possibility to find a big sample and select the participants randomly in this region.

Secondly, considerations to do interviews instead of using questionnaires were caused by the high illiteracy rate. Likewise, having no experience to complete questionnaires made this method unusable, even if it would be more suitable in order to hindrance the researcher and the assistant for being directly involved in the data collection.

Group interviews, which were done with women, were a good way to obtain information about a particular topic which all the participants have a fair knowledge in. There were two reasons using this method, firstly to acquire them to participate, and secondly to inspire them to answer honestly by the encouragements of the others.

There were some limitations referring to biases and confounder. A selection bias, such as sampling bias, ascertainment bias and participation bias could not be avoided by the application of a quantitative approach.

The participants attended the interviews readily. That could be caused by the expectation for prospective projects and donations. Therefore the pattern of social desirability could not be completely prevented. Due to the interviewees were poor as well as had limited education, they might be tempted to say what they thought the interviewer wanted to hear. There was a risk that the interviewees perceived there to be a 'correct' answer, which did not necessarily reflect their genuine knowledge and attitude. In order to minimize this phenomenon the main target group posed the school children, because children answer more honestly and authentically than adults mostly do.

An information bias, such as translation bias could not be eliminated. Language problems occurred almost doubled. The remote villages and their residents spoke their own traditional languages and mostly a poor Arabic. That made the interviews and tests more complicated. It needed another person for translation between the research assistant and the participants. Especially the understanding of the introductions for doing the tests demanded vast efforts and patience.

Likewise, it could not be avoided the direct influence by conducting the interviews. However this bias was minimized by having a locally trained research assistant and the good will of the community leaders. An observation bias was minimized by doing an observation spontaneously without prior notice of the research participants. A recall bias, reporting bias as well as interviewer bias have to be mentioned, because these kinds of biases were not possible to eliminate.

The results of few questions might be caused by misunderstandings referring to the message of the drawings, because the results repeatedly showed low percentages in

right answers in all participants in cases and controls. It is assumed that the drawings, which showed: “a person who takes water away from the big barrel by a small pot to wash their hands” and “a person who washes himself from the big water barrel” as well as “a chicken drinks from the water container of human beings”, were not clear enough and right understood from them. All other wrong answers in cases and controls tend to be attributed to a lack of knowledge and not to a misunderstanding of the message.

#### **4.4 Comparison with other research findings and studies**

The PHAST approach was field tested before in both, rural and urban areas in four African countries such as Botswana, Kenya, Uganda and Zimbabwe. According to the WHO the results were very encouraging because this approach involved community groups in a way never before possible. Groups planned ways to improve hygiene behaviours in the community. The participants built or improved facilities and made plans for operation and maintenance of facilities. The PHAST initiative laid the ground work for communities to take their own development forward. Even though the approach was tried in different countries and different types of communities, the results were equally inspiring. The approach can be replicated successfully provided a number of supporting conditions exist. (Simpson et al., 1997)

An evaluation was carried out by an independent evaluation team in December 2007 and penned in a final evaluation report at the end of the entire project.

On the one hand the report, written by Dr Abdel Fattah Abdalla Taha, confirmed that the project objectives, which were mentioned in chapter 1.2, have been reached. He described the results of the PHAST trainings as following: “The villagers paid more attention to cleaning themselves (personal hygiene), their clothes, houses and environment. They built racks to keep their kitchen tools away from animals, used soap for washing hands before eating and after the toilet and started digging household latrines. Before the trainings started, there were no latrines and people used to go to bushes behind the village. Other community health interventions included the distribution of mosquito nets, digging tools for household latrines and school latrines. Furthermore interventions were done, such as the construction of three school latrines, the conduction of san plat training, and the distribution of water barrels and blackboards

for schools”. (Taha, 2007)

Taha also claimed a significant reduction of common diseases, especially diarrhoea and eye diseases, due to the PHAST training. However he did not mention the methods used for the evidence of this statement. On the other hand the report clearly showed that the effectiveness of the PHAST training has not been completely fulfilled. According to the auditor it could not be given a guarantee of sustainability of those undertaken activities due to needs for follow ups and support. The women participation on the training was not satisfied. Their awareness need to be increased. (Taha, 2007)

Under the umbrella of the GRC a KAP Survey about the PHAST training run in Rashad locality as well. The main objective of this survey was to find out how much the benefit from the undertaken PHAST training for the people in this rural area was. The used methods in type of questionnaires with only closed questions and several answer possibilities did not measure the effectiveness of the PHAST training itself, but whether the people practice it. The items were similar to this research and included hand washing; sanitation; diarrhoea (definition, prevention, treatment, danger) and water. This survey also included an observation concentrated on latrines, faeces, used hygienic materials, water storage, children look etc. to check the cleanness of the visited compounds and their residents. Unfortunately there were no results available yet.

Different studies argue that people will not change their water, sanitation and hygiene behaviour as a result of health awareness. Other results of studies show that people, who have never heard that germs cause diseases, can not understand the connection between their behaviour and subsequent illness. Even if they are taught, the argument goes, they will not care. It is said that such people have traditional beliefs about the causes of diseases and that these will prevail no matter what is taught. Further researches argue that people may understand health messages but they will change only through a desire to acquire status, prestige, convenience or privacy, and that hygiene and sanitation should be promoted only on these bases. (WHO Afro, 2009)

Past experiences have shown that programs which include both, changing in hygiene behaviour and in facilities were more effective in controlling diarrhoeal diseases than those which only included change in facilities. (Bolt & Cairncross, 2005) There was

often a tendency to concentrate more on physical activities. So, training on PHAST methodology make sure that activities in order to change hygiene behaviour are not neglected. (Wood et al., 1998a)

## **5 Conclusion**

In summary, an association between the undertaken PHAST training and other health interventions and the change in hygiene behaviour in children and women under consideration of the KAP model in order to prevent diarrhoeal diseases could not be proven complete scientifically. The results of the research showed an evidenced based improvement in knowledge in children and women between cases compared to controls in terms of water, sanitation and hygiene issues. However attitude and practice could not be significantly proven by the used methods. Additionally the time duration was not long enough to assess the practice in order to make scientific based statements. However due to the results of passive observations are assumed that various good hygiene activities have usually been performed, some could be seen in action. The results based on the observations referring to peoples' attitude tend to be that people have not completely understood the importance of hygiene and sanitation for their health.

According to the WHO, health interventions, such as drinking water supply and sanitation facilities that were done in the project support good hygiene practices to prevent diarrhoeal diseases. However quantitative figures, for example prevalence, incidence and mortality rates that were received on site were neither complete nor valid to make statements about a decrease in diarrhoeal diseases, even through people appraised that a reduction after the PHAST training have been reached. Nevertheless there is need for the whole package which includes training as well as other mentioned health interventions to reduce cases in diarrhoeal diseases.

Furthermore the test results allow the conclusion that the PHAST training should more and deeper concentrate on modes of transmission. It needs more creative methods and tools, for example dramas and videos, to transmit hygiene messages to illiterate people in order to keep the learnt lessons as well as to achieve awareness of good and bad hygiene behaviour and of preventive activities. PHAST training and its transformation needs company in practicing as well as long lasting supervision. It needs more time than expected. It has to be concentrated on women and children due to the reason that firstly, women play the key role in this issue in their community and secondly, children's

behaviour is more likely to change than adult's behaviour according to scientific findings. Children are also the future generation of the country.

In conclusion, PHAST methodology is an appropriate method to improve knowledge but needs the right and patient application and performance to change practises and attitude towards hygiene and sanitation. Therefore a significant proved change in hygiene behaviour explicitly related to the PHAST training could not be made.

The results of the study are not representative for the whole target population in Rashad locality, but for the investigated villages.

A causal correlation between the PHAST training and the change in hygiene behaviour in order to prevent diarrhoeal diseases should be further proven by a cohort study or RCT, so that the occurrence of a causal correlation might be investigated over a long lasting time period. Finally the results of this study can be used to generalize new hypotheses and potential causal factors for further investigations.

The results of this study clearly gave some critical considerations. Therefore the implementation of the PHAST methodology, its advertisement and promotion and other health interventions as well as the ambitious objectives of the entire project are recommended either to adapt or to improve for prospective projects (e.g. ARC Kadugli Project) in this field. In fact it needs the whole package of training in combination with water supply and sanitation.



## References

- ARC (2008). HPP II Project No. 9ACPSU9 – Design No 12958/1 (1). Period covered: 01/09/2005 – 31/12/2007, Vienna.
- Beaglehole, R., Bonita, R. & Kjellström T. (1993). Basic Epidemiology. WHO, Geneva.
- Benenson, A. (1990). Control of communicable diseases in man: an official report of the American Public Health Association. 15<sup>th</sup> edition. Washington DC.
- Bolt, E. & Cairncross, S. (2005). Personal hygiene behaviour. WELL organization, p. 1.
- Boot, M. & Cairncross, S. (1993). Actions Speak. The study of hygiene behaviour in water and sanitation projects. Delft: IRC and LSHTM.
- Bortz, J. & Döring, N.(2005). Forschungsmethoden und Evaluation. Springer Verlag, pp. 106-110.
- Cairncross, S. (2003b). Editorial: Handwashing with soap – a new way to prevent ARIs? *Tropical Medicine & International Health* 8 (8), pp. 677-679.
- Curtis, V. & Cairncross, S. (2003). Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *Lancet Infectious Diseases* 3, pp. 275-281.
- Fewtrell, L., Kay, D., Enanoria, W., Haller, L., Kaufmann, R.B. & Colford, J.M. (2005). Water, sanitation and hygiene interventions to reduce diarrhoea in developing countries; a systematic review and meta-analysis. *Lancet Infectious Diseases* 5(1), pp. 42-52.
- Gordis, L. (2004). Epidemiology. W.B. Saunders Company. Philadelphia. USA, pp. 288-291.
- Janz, N.K. & Becker, M.H. (1984). The Health Belief Model: A Decade later. *Health Education Quarterly*. Vol. 11, pp. 1-47.

Jung, C.G. (1971). *Psychological Types*. Princeton University Press. New Jersey, p. 687.

Lamnek, S. (1995). *Qualitative Sozialforschung*. Band 1. Methodologie. 3. Auflage. Belz Psychologie Verlags Union, pp. 96-104.

Pencheon, D. et al. (2001). *Oxford Handbook of Public Health Practice*. Oxford University Press. New York.

Reinking, D. & Alvermann, D.E. (2005). What are evaluation studies, and should they be published in RRQ? *Reading Research Quarterly*. Vol. 40, No. 2, pp. 142-146.

Rimer, B.K. (1997). Models of individual Health Behaviour. in: Glanz, K., Lewis, F. M. & Rimer, B.K. et al. *Health Behavior and Health Education- Theory, Research and Practice*. 2<sup>nd</sup> edition. San Francisco. California. Jossey- Bass Publisher, pp. 37-40.

Schwarzer, R. (2004). *Psychologie des Gesundheitsverhaltens*. Eine Einführung in die Gesundheitspsychologie. 3. Auflage. Hogrefe. Göttingen.

Scrimshaw, S. & Hurtado, E. (1987). Rapid assessment procedures for nutrition and primary health care: anthropological approaches to improving programme effectiveness. The United Nations University, UNICEF, UCLA Latin American Center. Tokyo. Japan.

Simpson-Hébert M., Sawyer, R. & Clarke, L. (1997). The PHAST Initiative. Participatory Hygiene and Sanitation Transformation: A new approach to working with communities. WHO/EOS/96.11. Geneva, pp. 1-8.

Simpson, J. & Weiner, E. (1989). *A New English Dictionary on Historical Principles (NED)*. 2<sup>nd</sup> edition. Oxford University Press. United Kingdom.

Sudan Net (2009). Fast Facts of Sudan. <http://www.sudan.net/>, assessed 05<sup>th</sup> February 2009.

Taha, A.F.A. (2007). Integrated Rural Community Development Project Final Evaluation Report Rashad – South Kordofan, p. 7.

UN (1948). Universal Declaration of Human Rights. General Assembly Resolution 217 A (III). New York. [www.un.org/Overview/rights](http://www.un.org/Overview/rights), accessed 13<sup>th</sup> March 2009.

UN (2000). Millennium Declaration. *The Millennium Development Goals*. Millennium Summit. New York, [www.un.org/millenniumgoals](http://www.un.org/millenniumgoals), accessed 12<sup>th</sup> February 2009.

WHO (2000). Water sanitation Health. Diseases. Diarrhoea. Water-Related Diseases. [http://www.who.int/water\\_sanitation\\_health/diseases/diarrhoea/en/](http://www.who.int/water_sanitation_health/diseases/diarrhoea/en/), accessed 25<sup>th</sup> February 2009.

WHO (2006a). Mortality profile. Sudan. [http://www.who.int/whosis/mort/profiles/mort\\_emro\\_sdn\\_sudan.pdf](http://www.who.int/whosis/mort/profiles/mort_emro_sdn_sudan.pdf), assessed 05<sup>th</sup> February 2009.

WHO (2006b). WHO Statistical Information System. Core Health Indicators. Statistics. [http://apps.who.int/whosis/database/core/core\\_select\\_process.cfm?countries=sdn&indicators=PopAccessImprovedWaterUrban&indicators](http://apps.who.int/whosis/database/core/core_select_process.cfm?countries=sdn&indicators=PopAccessImprovedWaterUrban&indicators), accessed 06<sup>th</sup> July 2009.

WHO (2008). Sudan. Statistics. World Health Statistics 2008. Figures are for 2006 unless indicated. <http://www.who.int/countries/sdn/en/>, assessed 25<sup>th</sup> June 2009.

WHO Regional Office for Africa -Afro (2009). Water Sanitation and Health. <http://www.afro.who.int/wsh/> , assessed 2<sup>nd</sup> February 2009.

Wood, S., Sawyer, R. & Simpson-Hébert, M. (1998a). PHAST- Step by step Guide: A participatory approach for control of diarrhoeal disease: Introduction to the PHAST step-by- step guide. Part I. WHO/ EOS/98.3. Geneva, pp. 3-16.

Wood, S., Sawyer, R. & Simpson-Hébert, M. (1998b). PHAST- Step by step Guide: A participatory approach for control of diarrhoeal disease: Step- by step activities. Part II. WHO/ EOS/98.3. Geneva, pp. 23-87.

## **Statutory Declaration**

I declare that I have developed and written the enclosed Master Thesis completely by myself, and have not used sources or means without declaration in the text. Any thoughts from others are clearly marked. The Master Thesis was not used in the same or in a similar version to achieve an academic grading or is being published elsewhere.

Hamburg, 30<sup>th</sup> July 2009

---

Annett Weidner

## **WHO Key Hygiene Behaviour Facts**

Prevention of diarrhoeal diseases including cholera

### **Water sources:**

- All children, women and men in the community should use safe water sources for drinking, washing of clothes and bathing.
- Water should be efficiently used and not wasted. Wastewater should be properly disposed of.
- Improved water sources should be used with care and maintained in good conditions. There should be not risk of contamination of water sources from nearby latrines, wastewater drainage, animals or chemicals.

### **Water treatment:**

- If necessary, simple treatment procedures should be carried out. This will often mean the chlorination of drinking water supplies.
- If necessary, water should be filtered to remove any solid material before chlorination.

### **Water collection:**

- Drinking water should be collected in clean vessels, without coming in contact with hands. Water should be transported in a covered container.

### **Water storage:**

- Water should be stored in vessels which are covered and regularly cleaned.
- Drinking water should be stored in a separate container from other domestic water, wherever possible.

### **Drinking water:**

- Drinking water should be taken from the storage vessel with a dipper or ladle so that hands, cups or other objects cannot contaminate the water.

### **Water use:**

- Adequate amounts of water should be available and employed for personal and domestic hygiene. It is estimated that 30-40 litres per person per day are needed for personal and domestic hygiene.

### **Food handling:**

- Hands should be washed with soap or ash before preparing food.
- Vegetables and fruits should be washed with safe water. And food should be properly covered.
- Kitchen utensils should be washed with clean water as soon as possible after use and stored in a clean place.

**Excreta disposal:**

- All members of the community should use sanitary excreta disposal facilities at home, work and school.
- All faeces, especially those of babies, young children and sick people, should be safely disposed of.
- Latrines should be regularly cleaned and maintained.
- Latrines, seepage pits or drainfields from aquaprivies and septic tanks, should all be sited so that the pit contents cannot wash into water sources or enter the groundwater.
- Handwashing facilities, including soap and ash, should be available, and hands should always be washed after defecation, after handling the faeces of babies, before feeding and eating, and before preparing food.

**Sullage disposal:**

- Household wastewater should be disposed of or reused properly. Measures should be taken to ensure that wastewater is not left to create breeding places for mosquitoes and other disease transmission vectors or to contaminate water sources.

## **The Principles on PHAST methodology**

### **Health-related community development principles of PHAST**

- Communities can and should determine their own priorities for disease prevention.
- People within a community collectively possess an enormous depth and breadth of health-related experience and knowledge. Within most African (and developing world) communities there already exists a rich knowledge base that includes both traditional and modern wisdom.
- Communities are capable of arriving at a consensus regarding the hygiene behaviours and sanitation systems most appropriate to their specific ecological and cultural environment.
- When people understand why improved sanitation is to their advantage, they will act. For all people, regardless of their educational backgrounds, are capable of understanding that faeces carry disease and can be harmful, and can learn to trace and describe the faecal-oral route of this disease transmission within their own environment.
- There is a manageable set of barriers that can help to block this transmission. Communities can identify appropriate barriers, based on their own perception of effectiveness and according to local resources (cost).

These principles are derived from the collective experience of the authors and close colleagues who have worked with communities around the world, some using participatory methods for development and others carrying out anthropological studies.

### **New principles on hygiene and sanitation promotion**

The PHAST initiative has also built on some of the more recently developed principles on how to promote sanitation more effectively. Some of these were expressed in WHO Informal Consultations held in 1992 and 1993 and have since been expressed and affirmed elsewhere. The pro-motional principles built into the PHAST methodology are as follows:

- Any sustainable improvement in hygiene and sanitation must be based on a new awareness of the complex interaction between behavioural and technological elements.
- The best way to achieve sustainable improvement is to take an incremental approach, starting with the existing situation in a community and building up a series of changes.
- Improvement in hygiene behaviour alone has been shown to have a positive health impact whereas improvement in sanitation facilities alone may not bring health benefits. Therefore, greater emphasis needs to be put on improving hygiene behaviour, but the ideal situation would be one where improvement in both behaviour and facilities can take place simultaneously.

## **Interview manual: School children**

Interview day (date and time):

Time duration: 60 min

School:

Groups of 8-10 children:

Procedure: short introduction about what we want to do now, description of the target, relevance, the voluntary and anonymous basis of this interview is also affirmed

### **Item 1: Warming up**

Notification:                      age:                                              sex:

Numbers:

Participants of the PHAST training:                      yes                       no

Building a circle

Game: chair changes or memory game by using drawings in order to get access to the group, warming up the children

### **Item 2: General questions**

2.1. Do you know what this is? (soap)

2.2. When do you use it?

2.3. Who has ever heard about hygiene and sanitation?

2.4. If yes, what exactly about that?

2.5. Where have you heard about this issue?



2.6. When do you wash your hands?

2.7. What is this? (drawings of a latrines: **G4 und G 15**)



2.8. Do you have such one here?

2.9. Who has such one at home?





2.10. Why do you use it, for what?

2.11. Have you ever suffered from diarrhoea?







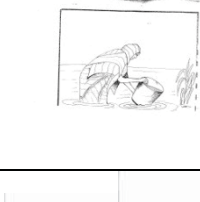

**Item 3: Behaviour**

Which of the following drawings show good or bad behaviour?





Showing drawings and children should allocate them in these categories. Children get one answer sheet. (X means right answers)

Behaviour/ Number of drawings	Drawings	Good 	Bad 	I don't know ?????????
<b>sanitation</b>				
E 24		X		
E 35		X		

Annex III






E 55			X	
<b>hand washing</b>				
E 36		X		
E 42		X		
<b>water</b>				
E 9		X		
E 26			X	
E 29			X	
E 54			X	
E 19 + E 22		X		

Annex III



<b>food preparing and handling</b>				
E 2			X	
E 51 + E 41		X		
E 23			X	
E 7			X	

**Item 4: Modes of transmission**

What can be modes of transmission (direct and indirect) of diarrhoeal germs?









<b>Behaviour/ Number of drawings</b>	<b>Drawings</b>	<b>yes</b> 	<b>no</b> 	<b>I don't know</b> ?????????
D 23		X		
E55		X		
D 18			X	

Annex III



hands		X		
food		X		

**Item 5: Prevention**

What activities or staff can prevent to get diarrhoea?

Behaviour/ Number of drawings	Drawings	yes 	no 	I don't know ?????????
D 17		X		
D 18		X		
E 2			X	
D 30		X		
E 15			X	
D 11		X		

Annex III

D 29		X		
E 14		X		

**Item 6: Feedback**

6.1. How was the interview?

6.2. How did you feel during testing?

## **Observation: people in the villages**

Households, communities:

Date and time:

Numbers of inhabitants/ observed people:

### **Observation in terms of following situation:**

#### **1. Cleanness and Clothes**

Clean villages?

How look the public place?

Wearing shoes: how many people?

Wearing clean clothes: how many?

Clean houses: how many?

Animals in houses: how many and which animals?

#### **2. Sanitation**

Faeces distributed all over or not?

Which kind of latrines are there?

How many latrines are there?

Latrine utilization?

How many use it?

Other facilities?

Disposal System? wastage, faeces?

### **3. Water**

Flowing water in the houses? (amount)

Water sources (where, how far, safe?)

Clean container/vessels? (how many)

Boiling water before drinking? (how many?)

### **4. Cooking and Eating**

Do they cover the food? (everywhere?)

Food storing?

Clean cooking?

Using crockery and cutlery? Clean?

How looks the food? (cooked, clean water, covered food)

### **5. Hand washing**

When do they wash their hands?

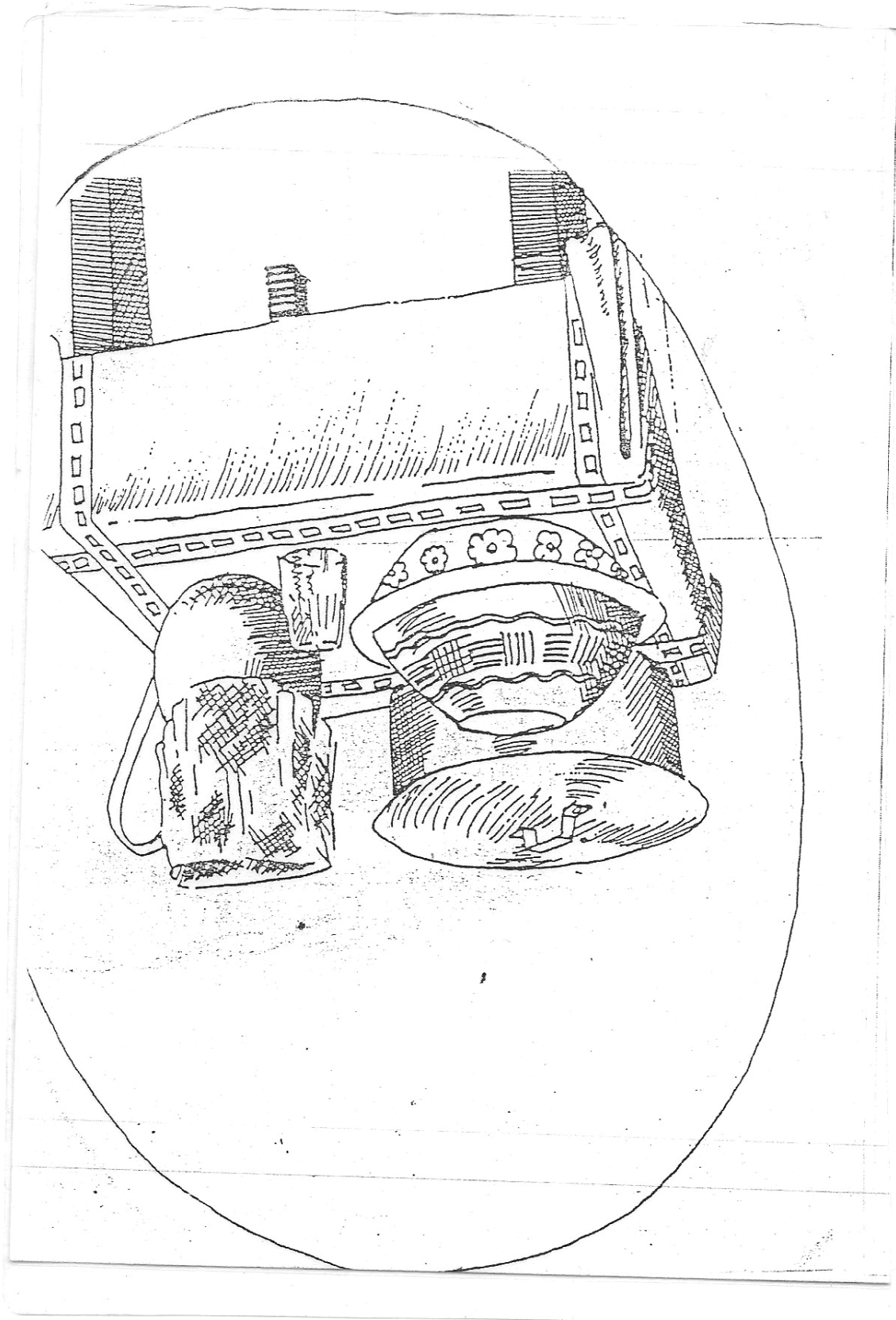
How many wash their hands?

Before eating

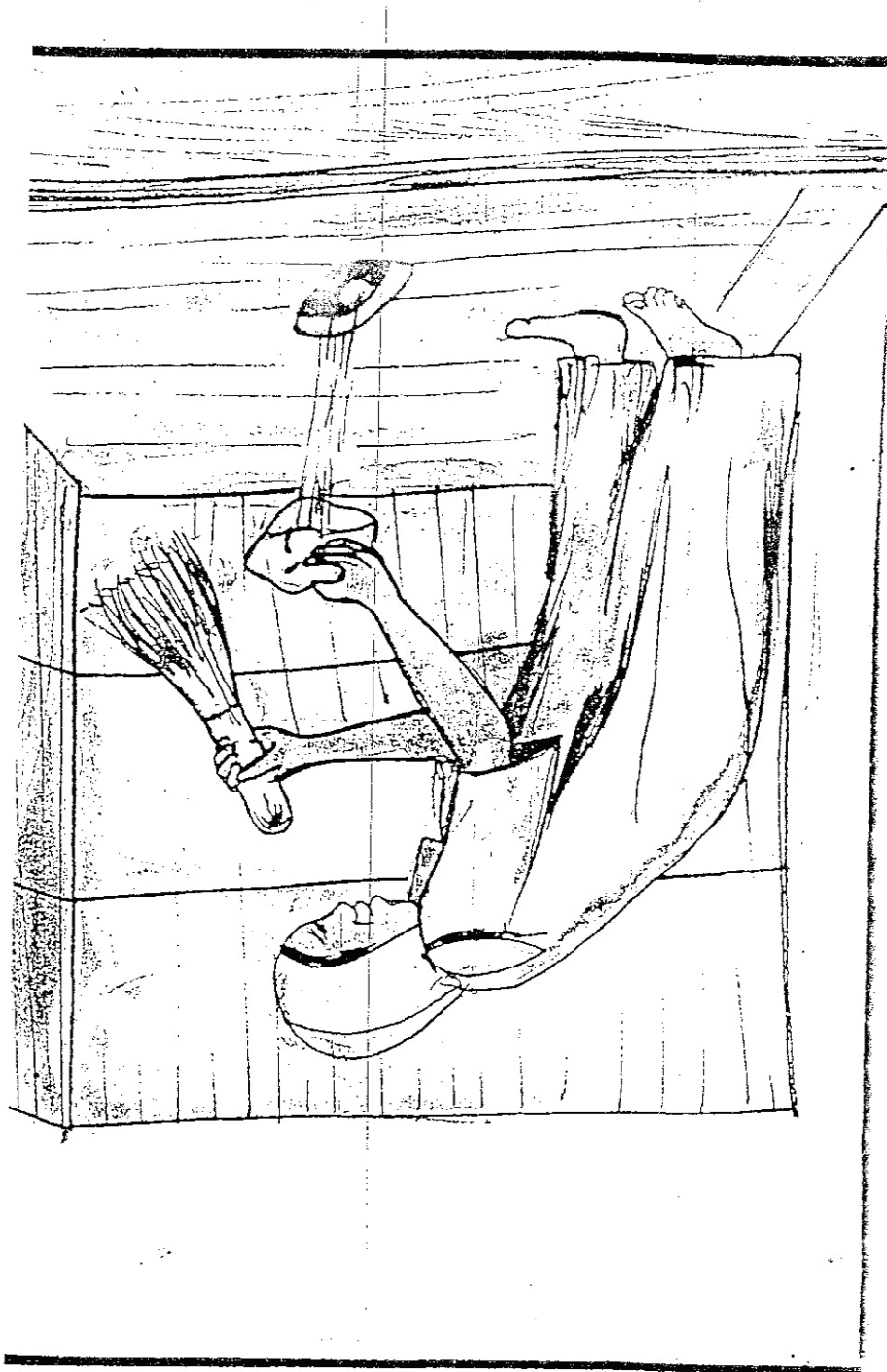
After eating

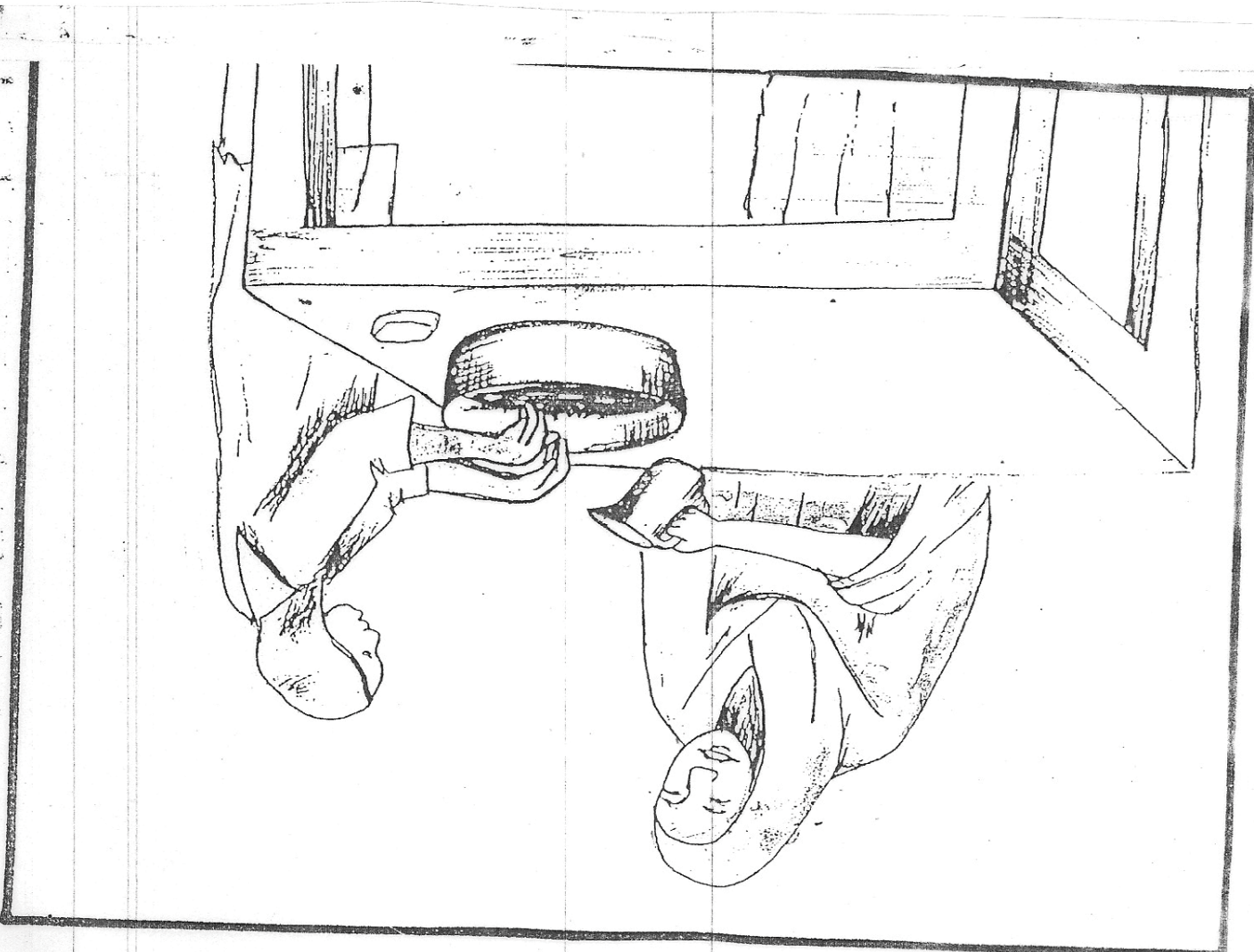
After toilet

### **6. Other observation referring to water and sanitation issues**










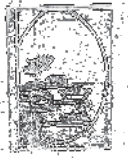















Annex VI

	<b>water</b>		<b>Good</b> 	<b>Bad</b> 	<b>I don't Know</b> ??????
6.	E 9				
7.	E 26				
8.	E 29				
9.	E 54				
10.	E 19 + E 22				
	<b>food preparing and handling</b>				
11.	E 2				
12.	E 51 + E 41				
13.	E 23				
14.	E 7				

Annex VI

**Item 4:**









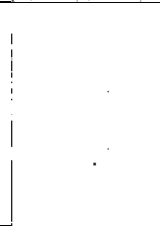

What can be modes of transmission (direct and indirect) of diarrhoeal germs?

Nr	Numbers of drawings	Drawings	yes 	no 	unknown ???????
1.	D 23				
2.	E55				
3.	D 18				
4.	Hands				
5.	Food				

Annex VI

**Item 5:**

What activities or staff can prevent to get diarrhoea?

Nr	Numbers of drawing	Drawing	yes 	no 	unknown ?????????
1.	D 17				
2.	D 18				
3.	E 2				
4.	D 30				
5.	E 15				
6.	D 11				
7.	D 29				
8.	E 14				

## Annex VI

Analysis testing children at school		Summary three villages			cases in age groups			Male			cases in age groups			Female		
numbers per age group	gender: male	6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary
		1	12	6	19											
Number of Question																
Age		6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary
Hand - the water from the floor																
E24	woman cleans shoes using leaves from the floor	1	10	3	14	0	0	0	0	0	0	0	0	0	0	0
E25	woman cleans up the floor (with sand)	0	7	4	11	1	3	2	6	0	0	0	0	0	0	0
E26	person dresses in the nature	1	2	2	5	0	9	3	13	0	0	0	0	0	0	0
hand washing																
E27	person takes water by a small pot from the big barrel for hand washing	0	3	5	13	0	4	1	5	1	0	0	0	0	0	0
E28	woman wash their hands with water and soap	0	11	3	14	0	0	1	1	0	0	0	0	0	0	0
E29	woman wash their child	1	11	4	16	0	1	1	2	0	0	0	0	0	0	0
E30	person washes himself from the big barrel	1	11	2	14	0	1	3	5	0	0	0	0	0	0	0
E31	shikken tanks from the water barrel of the people	1	4	1	6	0	3	4	13	0	0	0	0	0	0	0
E32	women wash water from the floor by going into	1	4	1	6	0	7	3	10	1	1	1	1	1	1	1
E33	woman took water before eating	1	7	6	14	0	3	0	3	1	1	1	1	1	1	1
food preparing and handling																
E34	child and animal from the same plate	0	3	3	6	0	2	3	13	0	0	0	0	0	0	0
E35	E24-E31 woman washes their hands before preparing food	0	3	4	12	1	3	2	6	0	0	0	0	0	0	0
E36	flies from the uncovered food	0	2	2	4	1	10	4	15	0	0	0	0	0	0	0
E37	people using from the floor with fingers	0	2	3	5	1	9	3	13	0	0	0	0	0	0	0
Hand - modes of transmission																
D23	flies	1	12	6	19	0	0	0	0	0	0	0	0	0	0	0
D24	flies	1	12	6	19	0	0	0	0	0	0	0	0	0	0	0
D25	flies	0	6	2	8	1	3	2	3	0	0	0	0	0	0	0
D26	flies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D27	reusing food using spoon	1	1	2	3	0	2	1	3	0	0	0	0	0	0	0
D28	reusing food using spoon	1	10	6	17	0	2	0	2	0	0	0	0	0	0	0
D29	wearing shoes	1	9	4	14	0	3	2	5	0	0	0	0	0	0	0
D30	using with an animal from one plate	1	3	3	7	0	9	3	13	0	0	0	0	0	0	0
D31	washing hands before cooking	1	3	3	7	0	9	3	13	0	0	0	0	0	0	0
D32	flies on the food	0	3	3	6	1	7	1	13	0	0	0	0	0	0	0
D33	covering food	1	11	6	18	0	0	0	0	0	0	0	0	0	0	0
D34	washing clothes	1	6	4	11	0	3	2	7	0	0	0	0	0	0	0
D35	seating the floor	1	10	6	17	0	1	2	7	0	0	0	0	0	0	0
Analysis testing children at school																
Summary three villages																
numbers per age group	gender: female	6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary
		0	3	2	5											
Number of Question																
Age		6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary
Hand - the water from the floor																
E24	woman cleans shoes using leaves from the floor	0	3	2	5	0	0	0	0	0	0	0	0	0	0	0
E25	woman cleans up the floor (with sand)	0	3	2	5	0	0	0	0	0	0	0	0	0	0	0
E26	person dresses in the nature	0	1	1	2	1	0	2	3	0	0	0	0	0	0	0
hand washing																
E27	person takes water by a small pot from the big barrel for hand washing	0	3	1	4	0	0	0	0	0	0	0	0	0	0	0
E28	woman wash their hands with water and soap	0	3	2	5	0	0	0	0	0	0	0	0	0	0	0
E29	woman washes their child	0	3	2	5	0	0	0	0	0	0	0	0	0	0	0
E30	person washes himself from the big barrel	0	3	2	5	0	0	0	0	0	0	0	0	0	0	0
E31	shikken tanks from the water barrel of the people	0	0	0	0	0	3	2	3	0	0	0	0	0	0	0
E32	women wash water from the floor by going into	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0
E33	woman took water before eating	0	2	1	3	0	1	1	2	0	0	0	0	0	0	0



Food preparing and handling												
E2: child and animal from the same plate	0	0	0	0	0	0	0	0	0	0	0	0
E3: E1 + E4 woman washes her hands before preparing food	0	2	2	4	0	0	1	0	0	0	0	0
E23: E18 woman washes her hands before preparing food	0	0	0	0	0	0	3	2	5	0	0	0
E7: people eating from the floor with fingers	0	0	0	0	0	0	3	2	5	0	0	0
<b>Hand-to-hand transmission</b>												
D23: E18	0	3	2	5	0	0	0	0	0	0	0	0
E55: E55	0	3	2	5	0	0	0	0	0	0	0	0
D18: E55	0	2	1	3	0	0	1	1	2	0	0	0
D18: E55 hands	0	3	2	5	0	0	0	0	0	0	0	0
D18: E55 food	0	0	0	0	0	0	3	1	4	0	0	0
<b>Hand-to-object and food-to-hand transmission</b>												
D17: E17 reusing food, using spoon	0	3	2	5	0	0	0	0	0	0	0	0
D18: E18 wearing shoes	0	1	1	2	0	0	2	1	3	0	0	0
E2: E2 eating with animal from one plate	0	3	2	5	0	0	0	0	0	0	0	0
D20: E20 washing hands before cooking	0	1	1	2	0	0	0	0	0	0	0	0
E15: E15 E18 on the floor	0	3	2	5	0	0	1	0	2	2	0	0
D11: E11 covering food	0	3	2	5	0	0	0	0	0	0	0	0
D29: E29 washing clothes	0	1	1	2	0	0	2	1	3	0	0	0
E14: E14 cleaning the floor	0	3	2	5	0	0	0	0	0	0	0	0

Analysis testing children at school	Total three villages				Male and Female cases in age groups				Summary cases			
	8-10 years		11-12 years		8-10 years		11-12 years			Summary		
	6-7 years	8-10 years	11-12 years	8-10 years	11-12 years	6-7 years	8-10 years					
numbers per age group	1	15	8	24								
gender: male and female												
Number of Question	6-7 years	good/yes	11-12 years	Summary	6-7 years	bad/ no	11-12 years	Summary	6-7 years	11-12 years	no answer/ not valid	Summary cases
Age	6-7 years	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	Summary	6-7 years	11-12 years	no answer/ not valid	Summary cases
Item3...huckunabakaur												
sanitation												
E24 woman clean, takes soap pieces from the floor	1	13	7	21	0	0	0	0	0	0	2	1
E33 woman cleans up the latrine (with sand)	0	10	6	16	1	3	2	6	0	0	2	2
E53 person defecates in the urine	1	3	2	6	0	11	4	15	0	1	0	1
hand washing												
E16 person takes water by a small pot from the big barrel for handwashing	0	11	6	17	0	4	1	5	1	0	0	1
E12 woman wash their hands with water and soap	0	14	7	21	0	1	1	1	0	0	1	2
E9 woman washes their child	1	14	6	21	0	1	1	2	0	0	0	1
E26 person washes himself from the big barrel	1	14	4	19	0	1	3	4	0	0	0	1
E19 sicken drinks from the water barrel of the people	1	4	1	6	0	11	6	17	0	0	0	1
E54 woman catches water from the river by using tub	1	4	1	6	0	10	5	15	0	1	1	2
E19 + E22 woman boil water before drinking	1	9	7	17	0	4	1	5	0	1	0	1
food preparing and handling												
E23 child and animals from the same plate	0	3	3	6	0	17	5	22	0	0	1	0
E51 + E41 woman wash their hands before preparing food	0	10	6	16	1	4	2	7	0	0	1	0
E22 person from the uncovered food	0	2	2	4	1	13	6	20	0	0	0	0
E71 people eating from the floor with fingers	0	2	3	5	1	12	5	18	0	0	1	0
Hand... modes of transmission												
D23 flies	1	15	8	24	0	0	0	0	0	0	0	0
D18 shoes	0	8	3	11	1	6	3	10	1	2	0	0
hands	0	14	7	21	0	1	0	1	0	0	0	0
food	0	7	3	10	0	8	4	12	0	0	1	0
Hand... modes of transmission												
D17 reheating food using spoon	1	13	8	22	0	2	0	2	0	0	0	0
D18 wearing shoes	1	12	6	19	0	3	2	5	0	0	0	0
E22 eating with an metal from one plate	1	4	4	9	0	11	4	15	0	0	0	0
D30 washing hands before cooking	1	11	5	17	0	3	2	5	0	1	0	1
E18 flies on the food	0	4	3	7	1	11	5	17	0	0	0	0
D11 covering food	1	14	8	22	0	0	0	0	0	0	0	0
D29 washing clothes	1	7	5	13	0	7	3	10	0	0	1	0
E14 cleaning the floor	1	13	8	22	0	1	0	1	0	0	0	1

Legend

red = right answer

yellow: more than 70% wrong answers





Food preparing and handling												
E2: child and animal from the same plate	0	8	3	14	0	4	2	0	1	1	1	1
E3: E1 + E4: woman washes her hands before preparing food	0	7	4	11	0	6	1	7	0	0	1	1
E2:3: his store the uncovered food	0	7	3	10	0	6	2	5	1	1	1	1
E7: people eating from the floor with fingers	0	3	2	5	0	10	3	13	1	1	1	1
<b>Hand - modes of transmission</b>												
D 2:3: his	0	10	4	14	0	4	1	5	0	0	0	0
E5:5: faces	0	5	3	8	0	7	2	9	2	2	2	0
D 1:8: shoes	0	10	2	12	0	3	5	9	1	1	1	0
hands	0	7	3	10	0	5	1	6	2	1	1	0
food	0	6	1	7	0	8	4	12	0	0	0	0
<b>Hand - activities and food handling practices</b>												
D 17: reheating food, using spoon	0	12	4	16	0	2	1	3	0	0	0	0
D 18: wearing shoes	0	7	4	11	0	7	1	8	0	0	0	0
E2: eating with an hand from one plate	0	8	1	9	0	4	4	8	2	2	2	0
D 20: washing hands before cooking	0	3	2	5	0	8	3	11	1	1	1	0
E1:5: person her food	0	3	2	5	0	10	2	12	1	1	1	0
D 11: covering food	0	3	3	6	0	6	2	8	0	0	0	0
D 29: washing clothes	0	5	4	9	0	8	1	9	1	1	1	0
E 14: cleaning the floor	0	6	3	9	0	7	1	8	1	1	1	0

Analysis testing children at school		Total three villages			Male and Female			controls in age groups			no answer/ not valid			Summary controls		
numbers per age group	gender: male and female	8-10 years	11-12 years	Summary	6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years	6-7 years	8-10 years	11-12 years
Age	Number of Question	good/yes	good/yes	Summary	bad/ no	bad/ no	bad/ no	I don't know	I don't know	I don't know	Summary	Summary	Summary	Summary	Summary	Summary
6-7 years	0	26	10	36												
8-10 years																
11-12 years																
<b>Umm3 - haramshakour</b>																
<b>sanitation</b>																
E24	woman cleans, takes soap, faces from the floor	0	24	9	34	0	2	1	0	0	0	0	0	0	0	0
E25	woman cleans up the line (with sand)	0	16	7	23	0	10	3	13	0	0	0	0	0	0	0
E28	person defecates in the area	0	15	5	20	0	9	3	12	0	2	2	4	0	0	0
<b>hand washing</b>																
E16	person takes water by a small pot from the big barrel for hand washing	0	15	6	21	0	11	1	12	0	0	0	3	0	0	0
E12	woman wash their hands with water and soap	0	18	8	26	0	7	2	9	0	1	0	0	0	0	0
E9	woman washes their child	0	23	9	32	0	3	0	3	0	0	1	1	0	0	0
E26	person washes himself from the big barrel	0	15	6	21	0	11	4	15	0	0	0	0	0	0	0
E29	shakken tanks from the water barrel of the people	0	10	4	14	0	13	5	18	0	2	1	3	0	1	1
E24	woman catches water from the river by going into	0	10	5	15	0	13	3	16	0	3	2	5	0	0	0
E19 + E22	woman boil water before drinking	0	17	6	23	0	9	4	13	0	0	0	0	0	0	0
<b>food preparing and handling</b>																
E2	child and animals from the same place	0	15	4	19	0	9	5	14	0	1	1	2	0	1	0
E51	E14 woman washes their hands before preparing food	0	15	7	22	0	10	3	13	0	0	0	0	0	0	0
E2	person from the uncovered food	0	7	5	12	0	18	5	23	0	1	0	1	0	0	0
E7	people coming from the floor with fingers	0	6	3	9	0	18	6	24	1	1	1	3	0	0	0
<b>hand modes of transmission</b>																
D23	lice	0	22	9	31	0	4	1	5	0	0	0	0	0	0	0
E55	feces	0	15	5	20	0	9	5	14	0	2	0	2	0	0	0
D18	shoes	0	16	5	21	0	9	4	13	0	1	1	2	0	0	0
D18	shoes	0	14	5	19	0	10	3	13	0	2	2	4	0	0	0
D18	shoes	0	13	3	16	0	12	7	19	0	1	0	1	0	0	0
<b>Umm - al - Rajah / al - Rajah - al - Anshab</b>																
D17	reusing food using spoon	0	24	9	33	0	2	1	3	0	0	0	0	0	0	0
D18	wearing shoes	0	15	6	21	0	11	3	14	0	0	1	1	0	0	0
E2	eating with an hand from one plate	0	14	4	18	0	10	5	15	0	2	1	3	0	0	0
D20	washing hands before cooking	0	11	3	14	0	14	7	21	0	1	0	1	0	0	0
E18	flies on the food	0	13	4	17	0	12	4	16	0	2	1	3	0	0	0
D11	covering food	0	15	6	21	0	11	4	15	0	0	0	0	0	0	0
D29	wearing clothes	0	14	9	23	0	11	4	15	0	1	1	2	0	0	0
E14	cleaning the floor	0	11	5	16	0	14	4	18	0	1	1	2	0	0	0
<b>Rajah</b>																
<b>Analysis testing children at school</b>																
<b>controls in age groups</b>																
6-7 years		4	6	10												
8-10 years																
11-12 years																
<b>numbers per age group</b>																
<b>gender : male</b>																
6-7 years		4	6	10												
8-10 years																
11-12 years																
<b>Number of Question</b>																
Age		good/yes	good/yes	Summary	bad/ no	bad/ no	bad/ no	I don't know	I don't know	I don't know	Summary	Summary	Summary	Summary	Summary	Summary
6-7 years		4	6	10												
8-10 years																
11-12 years																
<b>Umm3 - haramshakour</b>																
<b>sanitation</b>																
E24	woman cleans, takes soap, faces from the floor	4	6	10												
E25	woman cleans up the line (with sand)	4	6	10												
E28	person defecates in the area	0	0	0	4	6	10									
<b>hand washing</b>																
E16	person takes water by a small pot from the big barrel for hand washing	4	6	10												
E12	woman wash their hands with water and soap	4	6	10												
<b>water</b>																
E9	woman washes their child	4	6	10												
E26	person washes himself from the big barrel	4	6	10												
E29	shakken tanks from the water barrel of the people	0	0	0	4	6	10									
E24	woman catches water from the river by going into	1	1	1	4	5	9									
E19 + E22	woman boil water before drinking	4	6	10												

