



Republic of Turkey  
Ministry of Health

**MINISTRY OF HEALTH**  
**GENERAL DIRECTORATE OF HEALTH PROMOTION**

# **TURKEY HANDWASHING SURVEY**

**ANKARA 2012**



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## **ABBREVIATIONS**

**WHO:** World Health Organization

**THR:** Turkey Handwashing Survey

**HHS:** Hand washing Habits Score

**DALY:** Disability Adjusted Life Years

**RR:** Relative Risk

**IRR:** Incidence Rate Ratio

**TÜİK:** Turkish Statistical Institute

**APRS:** Address-based Population Registration System

**OR:** Odds Ratio

**CI:** Confidence Interval



## ABSTRACT

The lower respiratory diseases and diarrhea are taking part on the first two lines of the disease burden distribution leading to death worldwide. It is stated by the World Health Organization (WHO) that the hygiene education and the promotion of handwashing are simple and cost-effective practices of decreasing the diarrhea cases to 45% (**WHO, 2011**). The handwashing is not only one of the basic prevention methods for oral fecal transmitted diseases but also for other respiratory tract diseases. The intervention studies has shown that the promotion of the handwashing is decreasing the frequency of the respiratory systems diseases (between 6% and 44%) (**Rabie, 2006**).

The studies made both in the developed countries and the developing countries have shown that the frequency of the handwashing is not on the desired level (**Curtis, 2011**). In spite of this, the promotion of the hygienic behaviors do not require improving new technologies or products; besides, the hygiene behaviors are easily applicable, low-cost and effective implementations (**Curtis 2011; Drummond, 2009**). It is being calculated that every 1 Dollar investment for improvement of the hygiene has a return of 9 Dollars (**WHO, 2011**).

The health promotion programs providing hygiene incentive will have to determine clearly on what kind of behaviors the changes will be made. Therefore, the hygiene promotion studies have to specify the hygiene behaviors and specific behaviors carrying risk against the health (**Curtis, 2000**).

The "Turkey Handwashing Survey (THS)" which is the first research characteristic of national handwashing habits, is aimed to find out the handwashing habits and behaviors and their contribution to the socioeconomic variables.

The sampling is determined regarding the address-based population registration system of the country where all the addresses are registered and regarding the household unit. The stratified cluster sampling method is used and strata is grouped as urban-rural. As the join metric of the household participation on the research is defined to interview with at least one person over 12 and older age. The interview is completed by 3672 household of 5085 household (72.2%); it is conducted a face to face questionnaire with 6854 persons.

The 61.6% of the interviewed persons has indicated that they are washing hands daily more than 10 times, 26.9% 6–10 times, 10.4% 3–5 times and 1.0% 1–2



times. The frequency of the persons who are washing their hands more than 10 times, is by the male 47.9%, female 69.5%, rural 60.8%, urban 62.1%.

Using the hard soap is more common on the rural (rural 65.7%, urban 48.2%); liquid soap (rural 41.9%, urban 60.1%), wet napkin (rural 2.3%, urban 7.0%) and using paper towel (rural 2.75, urban 7.6%) is more common in the urban.

Within the situations mentioning that the hands are always being washed, after the toilet (91.1%), after wake up in the morning (85.7%), after touching the trash (83.5%), after cleaning the nose (83.1%), on the first lines of the frequency of handwashing.

The frequency of people washing hands after the toilet within the country is 91.1%, on the rural 90.7%, on the urban side 91.4%. The frequency of always washing hands before the meals is within the country 61.1%, on the rural 59.0% and on the urban side 62.4%.

The frequencies of washing the hands before the meals, after the toilet and daily more than 10 times are higher on the older age groups, the females, the higher education levels and the frequency of washing the hands before the meals is higher on the people living in the cities ( $p < 0.05$ ).

The importance of handwashing by preventing from the diseases is evaluated as superlatively important by 78% of the interviewed persons, 20.5% very important, 1.2% important, 0.4% less important.

The reasons of not handwashing although it should be done are as follows: To forget (34.1%), not to have tap or washing place (29.4%), not to find time (24.3%), lack of soap or other washing materials (10.9%), not to have a hygienic place for handwashing (9.5%), not to reach to the lavatory easily (8.0%), not to feel any need (6.8%), to have adverse effects of the washing materials (2.4%).

The reasons of not handwashing are grouped as individual reasons (to forget, not to find time, not to feel need, to have adverse effects of the washing materials) and as environmental reasons (lack of the soap and other handwashing materials, not to have a hygienic place for handwashing, not to reach to the lavatory easily, not to have tap or handwashing place) and combined reasons of both individual and environmental factors. The 53.3% mentioned that they are not handwashing because of the individual reasons, 39.2% because of the environmental reasons and 7.5% because of the combined reasons. The frequency



of mentioning not to washing hands because of the environmental reasons is getting higher on the older age groups, on the urban side, and on the higher education level ( $p < 0.001$ ).

In order to determine the handwashing habits, 22 questions are asked whether they are washing their hands or not related to different situations (before the meals, after the toilet, coming home, after shaking hands, after money exchange, after touching trash, etc), the results are graded and the "Handwashing Habits Score" (HHS) is obtained. The grading of the results is made by using for "never" 0, "rarely" 1, "sometimes" 2, "mostly" 3, "always" 4. All the grading for 22 questions is added and the HHS is raised. According the linear regression model results, the HHS is increasing on the older age groups ( $\beta = 0.148$ ,  $p < 0.001$ ), females ( $\beta = 0.061$ ,  $p < 0.001$ ), people living in the cities ( $\beta = 0.306$ ,  $p < 0.001$ ) and higher education levels ( $\beta = 0.191$ ,  $p < 0.001$ ) ( $p < 0.001$ ).

The handwashing before the meals having threshold importance, in order to prevent from the diseases contaminant by water and food (the frequency of always washing hands before meals 61.1%) is coming up as a health behavior which shall be promoted.

The disadvantaged groups of handwashing behavior are determined the adolescence age group, males, people living on the rural and having low education level. It can be given priority to these groups by implementing the health promotion programs in order to improve the hygiene. The awareness level of the interviewed persons according to the importance of handwashing for prevention from the infectious diseases is encouraging for the designed health promotion programs.

The 39.2% of the interviewed persons, who are not washing hands because of the environmental factors, although they have to wash hands, is reminding to give place to create supporting health environment efforts beside the health education in the scope of the health promotion. The frequency of not handwashing because of the environmental factors being high in the cities and high education level is making to think that the expectation of having proper environment for handwashing is high on these groups. Taking these results into consideration for Turkey, who is about to complete the urbanization process, can make a major contribution by establishing healthy cities.



## 1. INTRODUCTION and OBJECTIVE

The hygiene and the health are two intertwining concepts. While the hygiene has the lexical meaning “health science”, it is known that it is originated from the daughter Hygeia of the Esculape who is accepted as the father of the medicine in mythology and all the health prevention implementations at the present day can be determined as hygiene (**Güler, 2004**).

It is estimated that there 2.6 milliard people worldwide who are deprived of adequate hygiene resources. This case constitutes a risk for diseases infected by water like diarrhea, dysentery, typhoid and hepatitis A (**WHO, 2011**). The people are always under the influence of the external environmental polluters, they are touching with their hands to the contaminating factors on the outside. Although the cleaning is an individual subject and the routine implementations are changing by person to person, the necessity of handwashing before the meals and after the toilet is especially indicated (**Güler, 2004**).

The lower respiratory diseases (94.5 million DALY and 6.2% of the total DALY) and diarrhea (72.8 million DALY and 4.8% of the total DALY) are taking part on the first two lines of the disease burden distribution leading to death worldwide (**WHO, 2008**). The infections of the digestive system and respiratory tract are causing more morbidity and mortality on the children and on low socioeconomic levels. Such that, in the countries belonging to the low income group, the disease burden rate of these two diseases are higher to the total disease burdens. (The lower respiratory infections are corresponding to the 9.3% of the total DALY and diarrhea to the 7.2%) (**WHO, 2008**). On the other hand, the acute respiratory infections (17%) and diarrhea (17%) are taking the first place on the death reasons of the ages under 5 years. (**WHO, 2008**).

It is stated by the World Health Organization (WHO) that, the hygiene education and the promotion of handwashing are simple and cost-effective practices of decreasing the diarrhea cases to 45% (**WHO, 2011**). The meta analysis’ results including 60 different studies where the activities of the drinking water spring, the sanitation possibilities and hygiene behaviors are examined, are shown that all these efforts are decreasing the diarrhea morbidity almost half and half (RR:0.98–0.51) (**Fewtrell, 2004**).



There are many studies showing that specifically the improvement of handwashing is decreasing substantially the diarrhea morbidity (**Curtis, 2000**). The meta-analysis including the randomized controlled studies, in order to decrease the diarrhea frequency by the children and adults, is verifying the results of the health promotion operations. It is stated by the population-based studies (8 studies) in the countries of high income groups, where the promotion of the handwashing is questioned in the schools and hospitals, that the diarrhea episodes are decreasing 29% (IRR: 0.71, %95 CI: 0.60 – 0.84); it is stated by the population-based studies (5 studies) in the countries of lower-middle income groups that the diarrhea episodes are decreasing 31% (IRR: 0.69, %95 CI: 0.55–0.87) (**Ejemot, 2008**). Although there are few studies indicating where the handwashing is constituted an impediment on which stage of oral fecal infections, the most of them is stating that the handwashing before the meals and after the toilet has a connection with the decrease of the diarrhea morbidity (**Curtis, 2000**).

The handwashing is one of the primary prevention not only from the oral fecal diseases but also from the respiratory infected diseases. The studies made with the different age groups of students and the people having a communal life are confirming this result. After the studies made in the daily nurseries and care centers, the respiratory infections and the common cold frequency are decreased till to 32% with the handwashing promotion (**Carabin, 1999, Roberts 2000, Niffenegger 1997**). After the study made among the school students, the respiratory infections are decreased till to 21% with the handwashing promotion (**Master, 1997**). After the study made among the college students, the upper respiratory infections symptoms (40%) and the absenteeism (43%) are decreased with the handwashing promotion (**White, 2003**). On a study made among the soldiers, the healthcare application related to the respiratory infections is decreased after the implementation of handwashing program (45%) (**Ryan, 2001**). On a population based study, by promoting handwashing in households, the pneumonia incidence by the children is decreased 50% (**Luby, 2005**). The meta analysis study consisting of 8 intervention studies evaluating the connection of the handwashing with the respiratory infections has stated by all of the studies that the handwashing is decreasing the respiratory tract infections' frequency (between 6% and 44%) (**Rabie, 2006**).



The WHO has determined the purposes on its global action plan for prevention and controlling of pneumonia under main topics as protection, prevention and treatment. Under the range of the title protection, which aim is to supply to the children a healthy environment, are lined as; breast-feeding during the whole six months period, adequate nutrition, to prevent the low birth weight, to decrease the closed area pollution and handwashing (**WHO-UNICEF, 2009**).

The handwashing frequencies studies have resulted that the frequencies are not on the desired levels. For example, the frequency of the handwashing after the toilet is among the 11 underdeveloped and developing countries is 3% (Ghana) and 42% (India). The handwashing studies among the developed countries can sometimes not reach to the desired points, a study made in England has resulted that the 65% of the females and 31% of the males are washing hands after the toilet and the 43% of the mothers are washing the hands after changing the diaper (**Curtis, 2011**).

Although the hygiene has connection with the two main reasons of child death, namely diarrhea and respiratory diseases, it is a public health problem which its importance is underestimated. Providing physical access to the adequate water resources is not enough solely, therefore there is a need for the supports in order to promote hygiene behaviors for improving these efforts' efficiency. The development of the hygiene behaviors does not require the improvement of new technologies and products; they are easily implemented, low-cost and effective applications (**Curtis 2011; Drummond, 2009**). It is being calculated that every 1 Dollar investment for improvement of the hygiene has a return of 9 Dollars (**WHO, 2011**).

Although the basic role in preventing the infected diseases is well known, the hygiene behaviors have a sophisticated structure including the need and the convenience to the social values. The health promotion programs providing the hygiene supports have to declare clearly on which behaviors they are targeting the changes. Therefore, the hygiene promotion studies have to determine the core meanings of the hygiene behaviors and to define the specific behaviors carrying risks for the health (**Curtis, 2000**).

The collaborative and population-based studies -conducted in order to get the effective results of the behavior changes- are indicating that, the



socioeconomic and cultural determinants of the health should be taken into consideration (**Rheinländer, 2012**). The studies investigating the socioeconomic determinants in relation with handwashing habits show that economic level, education level, gender, the opportunities reaching the water and settlements are variables in relation with handwashing frequency. (**Halder, 2010; Luby, 2008; Schmidt, 2009; Jeong, 2007; Park, 2010; Güleç, 2000; Drummond, 2009**)

As the insufficient hygiene does not always cause diseases or the negative effects can come up later, it is difficult for people to observe the connection between the preventive behaviors and their results. Especially the handwashing behaviors gained by the children are building an important indicator and it is difficult to obtain behavior changes later. The social environments; to have people who are washing hands in the environment are also determinants for obtaining the handwashing behaviors. In addition to these, the environmental factors like having adequate handwashing opportunities can also be indicators (**Drummond, 2009**).

Changing human behaviors is difficult and it is corresponding to unclear processes. The programs- in order to prevent from the loss of the resources and to reach to the aim, should be based on the few messages, which its importance regarding the public health are proved (**Curtis, 2000**). It is stated that, through carrying out the intervention studies regarding the promotion of the hygiene behaviors by taking into consideration the defined specific groups will have more successful results (**Buunk-Werkhoven, 2011**). The planners of the public health programs can face a difficult election in order to find out the specific hygiene application to be improved. In that the elements which have the highest risk for the health shall be rational for taking into consideration. However on the health promotion programs during the preparation period or before the intervention, it is difficult or impossible to consider the whole risk factors. Like on the other health promotion programs, the human behaviors and the connection between these behaviors and the determinants should be taken into consideration on designing of the program of the handwashing promotion programs. (**Curtis, 2000**).

The “Turkey Handwashing Survey (THS)” which has the first research characteristic of national handwashing habits, is aimed to find out the handwashing habits and behaviors and their relations to the socioeconomic variables.

## 2. MATERIAL and METHOD

### 2.1 Sampling

The sampling of the study is determined by TÜİK (Turkey Statistical Institution) according to APRS (Address-based Population Registration System) data base household unit.

By determining the sample by TÜİK, all settlements are covered within the scope, only the settlements which population were 1% less than the total population and which could not reach the enough household number were let out of the scope (little villages, nomad groups, hamlets, etc.). The corporate population which building only 2% of the total population (school, care house, nursery, rest homes, hospital, etc) were also let out of the scope of the study. By the calculation of the sample volume, the unanswered situations were also taken into consideration and therefore the replacement was not used for the households and individuals.

As the sample method, the multi-staged stratified cluster sampling method was used. On the first stage, the groups, on the second stage, the households elected from the groups were selected.

The stratifying was made regarding the settlements; according to the settlements for stratifying the variables "urban/rural" was used. The settlements with a population of more than 20.000 were defined as urban and the settlements with either 20,000 or less were defined as rural by TÜİK.

For the urban settlements and the rural settlements having a municipality, the grouping was made by TÜİK after taking into consideration 100 addresses for each group, the rural settlement without municipality was taken into consideration as one group. The groups were selected regarding the systematic sampling method. The households were elected from each selected group within the systematic sampling method.

From the urban settlements were selected 243 group and from each group 15 households and that made totally 3645 household, and from the rural settlements 96 group and from each of them 15 households were selected and that made totally 1440 household samplings.



It was aimed to make interview with at least one person over the age of 12 from every household being within the scope of the research and to practice an interview with at least one person from each household was considered as including standard for the research. However, the survey was implemented to everybody who were at home by the visiting and who accepted to take part in the survey and who were older than 12. The interviews are completed by 3672 of 5085 households which are on the sample (Table 2.1). The other households (1413) are consisting of households, where the study could not be made, because of there were no people at home, there were nobody who was older than 12 years during the study, they did not accept to take place on the study and finishing the survey without completed. The change of the houses in the scope of the sample where it was interviewed regarding the settlement is shown on the Table 2.1:

**Table 2.1:** The number of the houses, interviewed in the scope of the sampling, THS 2009

| Number of Houses |        |       |       |
|------------------|--------|-------|-------|
| Settlement       | Sample | Study | %     |
| Urban            | 3645   | 2466  | 67.65 |
| Rural            | 1440   | 1206  | 83.75 |
| Total            | 5085   | 3672  | 72.21 |

Within the scope of the research, face to face interviewing technique and survey were applied to 6854 persons. The change of the interviewed persons regarding the settlement is on the Table 2.2:

**Table 2.2:** The percentage distribution of the interviewed persons according to their settlement, THS 2009

| Settlement | Number | %      |
|------------|--------|--------|
| Urban      | 4220   | 61.6   |
| Rural      | 2634   | 38.4   |
| Total      | 6854   | 100.00 |





## 2.2 Implementation

The household population is determined by TÜİK as a community consisting of persons who have a relationship or not, but living in the same house or in the part of the same house, who are eating from the same pot, not separating their income and outcome, taking place by the management of the house (**TÜİK, 2011**).

During the study, the household within the scope of the study were visited and the survey was conducted with the face to face method to the persons, who were at home, were over 12 and who accepted to take part in the survey,

By forming the questionnaire, it was benefited from the questions of a data collecting survey, which are used for a study of determining the handwashing information and behaviors and the relation to their sociodemographic characteristics of persons who applied to a health center in Ankara during 5 work days (**Üner, 2009**).

On the survey, there were main questions regarding the birthdate, gender, education level, profession, marital status, social security level and questions regarding handwashing behaviors like daily handwashing frequency, reasons for not washing hands by the situations where the hands have to be washed, the materials used by handwashing and the behavioral questions for different situations (before the meals, after the toilet, coming home, after handshaking, after money exchange, after touching the trash, etc) which are questioning the handwashing habits of the interviewed persons.

The data collection stage of the study was practiced by the local health authorities on March 2009. The "Turkey Handwashing Survey Survey Practice Guidelines" is prepared for using purposes during the study in the provinces. In the practice guidelines, the information like the application format of the survey, the duties and responsibilities of the province authorities during the research application, the duties and responsibilities of the pollsters, the points to be taken into consideration during the survey, the inputting of the data to the computer program and the process transmitting the datas to the Ministry of Health are mentioned. The "Turkey Handwashing Pollster's Information Form" is formed for the pollsters in order to use during the studies on the field. The pollsters are



chosen by the local health authorities from the people who are worked before in the society based research studies and who are midwives, nurses or health officers.

### **2.3 Classification of Variables**

In order to examine the changes of the specific variables of the reasons of interviewed persons not handwashing, the stated reasons are grouped as individual reasons (forgetting, not finding time, not need, the adverse affects of the washing materials), environmental reasons (lack of the soap and other handwashing materials, not easily reachable position of the lavatory, not being hygienic of the handwashing place, not having tap or handwashing place), combined reasons (both individual and environmental reasons).

In order to determine the handwashing habits, there are 22 questions asked whether they are washing their hands or not by different situations (before the meals, after the toilet, coming home, after shaking hands, after money exchange, after touching trash, stc) and the results are graded and the "Handwashing Habits Score" (HHS) is obtained. The grading of the results is made by using for "never" 0, "rarely" 1, "sometimes" 2, "mostly" 3, "always" 4. All the grading for 22 questions is added and the HHS is raised.

### **2.4 Statistical Method**

For different groups (age group, gender, settlement, education level, and social security situation) regarding HHS, the variance analysis and t test are used in order to make the comparison between the groups. For the student t test of the effecting factors of HHS, the linear regression model is comprimised.

While comprimising the regression model, variables are grouped regarding the age group (12-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81 and above), the gender (male, female), the settlement (rural, urban), the education level (no education, primary incomplete, first level primary, second level primary, high school, college/university).

The statistically significant level is accepted as  $p < 0.05$ ,

### 3. FINDINGS

#### 3.1 Descriptive Variables

On the scope of the survey, there are 6854 persons from 3672 household. The average age of the persons is 39.9 (SD:17.7); median is 38 (minimum :12 maximum :101). Within the scope of the study, the 63.6% of the persons are female and 36.4% male.

**Table 3.1:** The percentage distribution of age groups of the interviewed according to their genders, THS 2009

| Age Groups   | Female |      |       | Male |      |       | Total |       |
|--------------|--------|------|-------|------|------|-------|-------|-------|
|              | No     | %*   | %**   | No   | %*   | %**   | No    | %**   |
| 12-20        | 623    | 58.3 | 14.3  | 445  | 41.7 | 17.8  | 1068  | 15.6  |
| 21-30        | 978    | 71.2 | 22.4  | 395  | 28.8 | 15.8  | 1373  | 20.0  |
| 31-40        | 885    | 64.9 | 20.3  | 479  | 35.1 | 19.2  | 1364  | 19.9  |
| 41-50        | 707    | 63.2 | 16.2  | 411  | 36.8 | 16.5  | 1118  | 16.3  |
| 51-60        | 563    | 60.9 | 12.9  | 362  | 39.1 | 14.5  | 925   | 13.5  |
| 61-70        | 369    | 61.4 | 8,5   | 232  | 38.6 | 9.3   | 601   | 8.8   |
| 71-80        | 183    | 55.1 | 4,2   | 149  | 44.9 | 6.0   | 332   | 4.8   |
| 81 and above | 50     | 68.5 | 1.1   | 23   | 31.5 | 0.9   | 73    | 1.1   |
| <b>TOTAL</b> | 4358   | 63.6 | 100,0 | 2496 | 36.4 | 100.0 | 6854  | 100.0 |

\* : row percentage

\*\* : column percentage

The 61.6% of the interviewed persons are from urban, and 38.4% from rural. If we take a look to the education level distribution, the first place is consisting of the primary education (42.0%), this is followed closely by the high school (15.1%), second primary school (14.6%) and primary incomplete (14.5%). The largest frequency of the interviewed person is occupied by the house works (49.5%), and it is followed by the people who are still educating (9.7%) and the retired persons (9.6%). The 69.4% of them are married. The 13.1% of the interviewed have no social security, the 76.3% have social security and the 10.5% have health card for uninsured people (Table 3.2).



**Table 3.2:** Some defining characteristics of the interviewed persons, THS 2009

| Specifications                   | No   | %    |
|----------------------------------|------|------|
| <b>Settlement</b>                |      |      |
| Rural                            | 2634 | 38.4 |
| Urban                            | 4220 | 61.6 |
| <b>Education</b>                 |      |      |
| No education                     | 994  | 14.5 |
| Primary incomplete               | 488  | 7.1  |
| First level primary              | 2877 | 42.0 |
| Second level primary             | 999  | 14.6 |
| High School                      | 1034 | 15.1 |
| College/University               | 462  | 6.7  |
| <b>Working Status</b>            |      |      |
| Looking for a job                | 281  | 4.1  |
| Continuing education             | 665  | 9.7  |
| Seasonal worker                  | 135  | 2.0  |
| Not able to work                 | 153  | 2.2  |
| Housework                        | 3395 | 49.5 |
| Retired                          | 658  | 9.6  |
| Income earner                    | 27   | 0.4  |
| Officer                          | 209  | 3.0  |
| Worker                           | 503  | 7.3  |
| Shopkeeper                       | 227  | 3.3  |
| Other                            | 601  | 8.8  |
| <b>Marital Status</b>            |      |      |
| Single                           | 1565 | 22.8 |
| Married                          | 4754 | 69.4 |
| Widowed                          | 436  | 6.4  |
| Divorced                         | 99   | 1.4  |
| <b>Social Security Status</b>    |      |      |
| No social security               | 897  | 13.1 |
| Have social security             | 5215 | 76.3 |
| Health card for uninsured people | 720  | 10.5 |

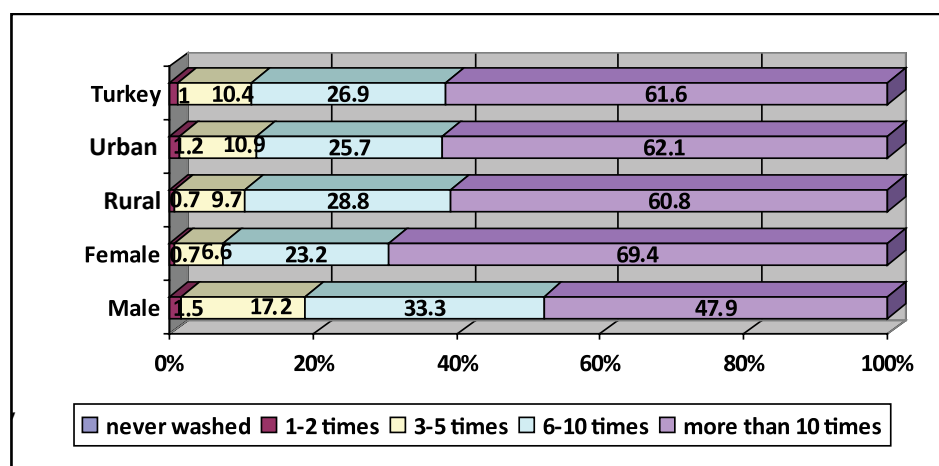
### 3.2 Daily handwashing number

The interviewed persons stated that 61.6% of them were washing their hands daily more than 10 times, 26.9% between 6 and 10 times, 10.4% between 3 and 5 times, and 1.0% between 1 and 2 times. The frequency of the persons

who are washing their hands more than 10 times is by men 47.9%, by women 69.5%, rural 60.8%, urban 62.1%. On Table 3.3 and Figure 3.1 the change of daily handwashing number in the last 30 days can be seen.

**Table 3.3:** The percentage distribution of daily handwashing number in the last 30 Days, THS 2009

| Daily Hand washing Number | Turkey         |              |                | Rural          |              |                | Urban          |              |                |
|---------------------------|----------------|--------------|----------------|----------------|--------------|----------------|----------------|--------------|----------------|
|                           | Total (n=6854) | Man (n=2496) | Woman (n=4358) | Total (n=2634) | Man (n=1066) | Woman (n=1568) | Total (n=4220) | Man (n=1430) | Woman (n=2790) |
| Never washed              | 0.1            | 0.1          | 0.1            | 0.0            | 0.0          | 0.0            | 0.1            | 0.2          | 0.1            |
| 1-2 times                 | 1.0            | 1.5          | 0.7            | 0.7            | 1.1          | 0.4            | 1.2            | 1.7          | 0.9            |
| 3-5 times                 | 10.4           | 17.2         | 6.6            | 9.7            | 15.4         | 5.9            | 10.9           | 18.6         | 7.0            |
| 6-10 times                | 26.9           | 33.3         | 23.2           | 28.8           | 34.1         | 25.2           | 25.7           | 32.7         | 22.1           |
| More than 10 times        | 61.6           | 47.9         | 69.4           | 60.8           | 49.4         | 68.5           | 62.1           | 46.8         | 69.9           |



**Figure 3.1:** The percentage distribution of daily handwashing number in the last 30 days, THS 2009

### 3.3 The materials used by the handwashing process

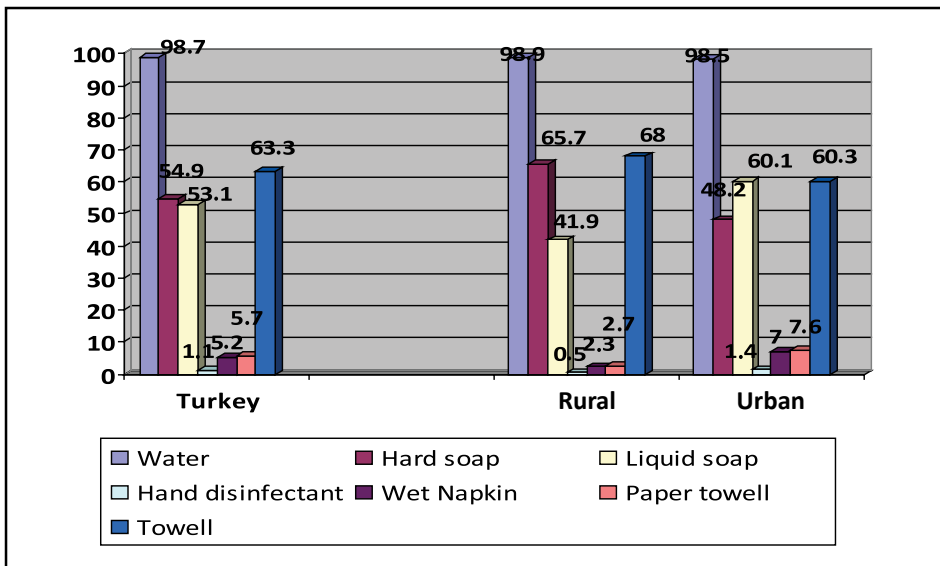
The 98.7% of the interviewed persons are using water for cleaning their hands . While using hard soap on the rural is more common (rural 65.7%, urban 48.2%), the use of liquid soap is more common on the urban (rural 41.9%, urban 60.1%). The wet napkin (rural 2.3%, urban 7.0%) and paper towel are used more on the urban district (rural 2.7%, urban 7.6%).The 63.3% of the interviewed persons are using by hand cleaning paper towel. (Table 3.4, Figure 3.2).

**Table 3.4:** The percentage distribution of the materials used by hand washing, THS

2009

| Materials         | Turkey             | Rural              | Urban              |
|-------------------|--------------------|--------------------|--------------------|
|                   | % (*)<br>(n=6.854) | % (*)<br>(n=2.634) | % (*)<br>(n=4.220) |
| Water             | 98.7               | 98.9               | 98.5               |
| Hard soap         | 54.9               | 65.7               | 48.2               |
| Liquid soap       | 53.1               | 41.9               | 60.1               |
| Hand disinfectant | 1.1                | 0.5                | 1.4                |
| Wet napkin        | 5.2                | 2.3                | 7.0                |
| Paper towel       | 5.7                | 2.7                | 7.6                |
| Towel             | 63.3               | 68.0               | 60.3               |

\*: The percentages were calculated according the numbers of answers divided to the total person number (n). One person can give more than one answer.



**Figure 3.2:** The percentage distribution of the materials used by handwashing, THS 2009\*

\*: The percentages were calculated according the numbers of answers divided to the total person number (n). One person can give more than one answer.

### 3.4 Some habits related with the handwashing

Within the situations where the hands are always washed, after the toilet (91.1%), waking up in the morning (85.7%), after touching trash (83.5%), after

cleaning the nose (83.1%). are placed on the top . Within the situations where the hands are never washed;; after handshake (33.4%), before the toilet (27.5%), money exchange (25.3%), before touching patients (25.1%). (Table 3.5) are placed on the top.

**Table 3.5:** The percentage distribution of some habits according the handwashing (Turkey), THS 2009

| Handwashing Habits                                | Number | %     |        |           |        |        |
|---|--------|-------|--------|-----------|--------|--------|
|   |        | Never | Rarely | Sometimes | Mostly | Always |
| I wash my hands before the meals                  | 6843   | 2.0   | 5.1    | 10.3      | 21.5   | 61.1   |
| I wash my hands after the meals                   | 6848   | 0.7   | 2.5    | 7.4       | 17.1   | 72.3   |
| I wash my hands before the toilet                 | 6846   | 27.5  | 19.8   | 20.5      | 10.3   | 21.9   |
| I wash my hands after the toilet                  | 6843   | 0.4   | 0.3    | 0.8       | 7.4    | 91.1   |
| I wash my hands when I come home                  | 6841   | 4.3   | 9.0    | 20.5      | 18.7   | 47.5   |
| I wash my hands after handshaking with the people | 6837   | 33.4  | 23.0   | 24.9      | 8.0    | 10.7   |
| I wash my hands before going to sleep             | 6844   | 15.3  | 14.6   | 21.3      | 17.3   | 31.5   |
| I wash my hands after touching the animals        | 6826   | 1.7   | 2.1    | 5.3       | 15.0   | 75.9   |
| I wash my hands when I wake up in the morning     | 6836   | 0.7   | 1.5    | 2.0       | 10.2   | 85.6   |
| I wash my hands after diaper                      | 6480   | 12.5  | 1.8    | 2.7       | 8.2    | 74.8   |
| I wash my hands before eating anything            | 6833   | 4.0   | 8.2    | 19.1      | 21.3   | 47.4   |
| I wash my hands when I see them dirty             | 6841   | 0.2   | 0.6    | 2.8       | 14.9   | 81.5   |
| I wash my hands before preparing meals            | 6771   | 5.3   | 3.5    | 7.7       | 15.4   | 68.1   |
| I wash my hands after exchanging money            | 6839   | 25.3  | 16.3   | 18.8      | 11.3   | 28.3   |
| I wash my hands after cleaning my nose            | 6838   | 0.6   | 1.4    | 3.2       | 11.7   | 83.1   |
| I wash my hands after touching the trash          | 6836   | 0.5   | 0.9    | 3.1       | 12.0   | 83.5   |
| I wash my hands before I touch the sick people    | 6827   | 25.1  | 18.5   | 20.4      | 11.7   | 24.3   |
| I wash my hands after I touch the sick people     | 6827   | 4.1   | 5.9    | 12.2      | 18.1   | 59.7   |
| I wash my hands after I comb my hair              | 6828   | 17.7  | 13.5   | 19.7      | 15.2   | 33.9   |
| I wash my hands after house cleaning              | 6695   | 7.9   | 3.8    | 7.5       | 17.0   | 63.8   |
| I wash my hands after dishwashing                 | 6665   | 13.5  | 5.3    | 7.7       | 13.6   | 59.9   |
| I wash my hands after doing laundry               | 6622   | 16.6  | 6.5    | 9.7       | 14.4   | 52.8   |
| After I wash my hands I towel                     | 6830   | 0.9   | 1.3    | 4.7       | 12.5   | 80.6   |

Within the situations of the rural citizens, where the hands are always washed after the toilet (90.7%), in the morning after wakeup (85.7%), after touching the trash (80.9%) and after cleaning the nose (80.3%) are at the first line. Within the situations of the rural citizens,, where the hands are never washed, after shaking hands (39.3%), after money exchange (35.1%), before touching sick people (30.5%), before the toilet (30.5%) (Table 3.6) are at the first line.



**Table 3.6:** The percentage distribution of some habits according the hand washing (countryside), THR 2009

| Handwashing Habits                                | Number | %     |        |           |        |        |
|---|--------|-------|--------|-----------|--------|--------|
|   |        | Never | Rarely | Sometimes | Mostly | Always |
| I wash my hands before the meals                  | 2632   | 2.7   | 5.6    | 11.9      | 20.8   | 59.0   |
| I wash my hands after the meals                   | 2633   | 0.6   | 2.4    | 8.4       | 17.3   | 71.3   |
| I wash my hands before the toilet                 | 2633   | 28.5  | 17.2   | 22.6      | 10.9   | 20.8   |
| I wash my hands after the toilet                  | 2632   | 0.4   | 0.2    | 1.0       | 7.7    | 90.7   |
| I wash my hands when I come home                  | 2632   | 5.9   | 10.5   | 24.7      | 20.9   | 38.0   |
| I wash my hands after handshaking with the people | 2630   | 39.3  | 22.7   | 23.0      | 6.9    | 8.1    |
| I wash my hands before going to sleep             | 2631   | 16.0  | 13.9   | 22.5      | 17.6   | 30.0   |
| I wash my hands after touching the animals        | 2627   | 1.5   | 1.8    | 5.1       | 15.4   | 76.2   |
| I wash my hands when I wake up in the morning     | 2630   | 0.6   | 0.9    | 1.9       | 10.9   | 85.7   |
| I wash my hands after diaper                      | 2518   | 17.7  | 2.5    | 2.9       | 8.5    | 68.4   |
| I wash my hands before eating anything            | 2630   | 4.0   | 7.9    | 20.3      | 23.5   | 44.3   |
| I wash my hands when I see them dirty             | 2632   | 0.4   | 0.6    | 3.2       | 18.2   | 77.6   |
| I wash my hands before preparing meals            | 2608   | 7.5   | 4.1    | 8.2       | 16.0   | 64.2   |
| I wash my hands after exchanging money            | 2630   | 35.1  | 18.1   | 17.7      | 9.2    | 19.9   |
| I wash my hands after cleaning my nose            | 2631   | 0.8   | 1.5    | 3.9       | 13.5   | 80.3   |
| I wash my hands after touching the trash          | 2628   | 0.6   | 1.0    | 3.8       | 13.7   | 80.9   |
| I wash my hands before I touch the sick people    | 2629   | 30.5  | 18.6   | 20.7      | 10.8   | 19.4   |
| I wash my hands after I touch the sick people     | 2627   | 4.5   | 5.7    | 13.4      | 19.8   | 56.6   |
| I wash my hands after I comb my hair              | 2629   | 17.4  | 11.7   | 19.8      | 16.5   | 34.6   |
| I wash my hands after house cleaning              | 2582   | 11.7  | 3.8    | 7.3       | 18.3   | 58.9   |
| I wash my hands after dishwashing                 | 2576   | 16.6  | 4.6    | 6.1       | 14.4   | 58.3   |
| I wash my hands after doing laundry               | 2566   | 20.6  | 5.2    | 7.2       | 15.0   | 52.0   |
| After I wash my hands I towel                     | 2629   | 1.0   | 1.3    | 5.0       | 15.7   | 77.0   |

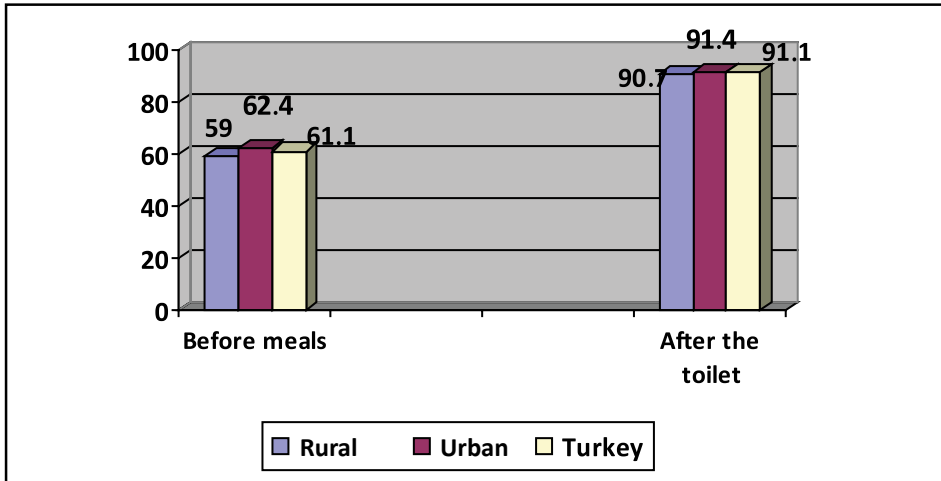
Within the situations of the urban citizens where the hands are always washed regarding the frequency, after the toilet (91.4%), following this; after wake up in the morning (85.6%), after touching trash (85.2%) and after cleaning the nose (84.9%) are on the top of handwashing. Within the situations of the urban citizens, where the hands are never washed, after shaking hands (29.6%), before the toilet (26.8%), before touching sick people (21.7%), after money exchange (19.0%) (Table 3.7) are at the first line.



**Table 3.7:** The percentage distribution of some habits according the handwashing (urban), THS 2009

| Handwashing Habits                                | Number | %     |        |           |        |        |
|---|--------|-------|--------|-----------|--------|--------|
|   |        | Never | Rarely | Sometimes | Mostly | Always |
| I wash my hands before the meals                  | 4211   | 1.6   | 4.7    | 9.3       | 22.0   | 62.4   |
| I wash my hands after the meals                   | 4215   | 0.7   | 2.6    | 6.8       | 16.9   | 73.0   |
| I wash my hands before the toilet                 | 4213   | 26.8  | 21.5   | 19.2      | 9.9    | 22.6   |
| I wash my hands after the toilet                  | 4211   | 0.2   | 0.4    | 0.7       | 7.3    | 91.4   |
| I wash my hands when I come home                  | 4209   | 3.3   | 8.0    | 17.8      | 17.3   | 53.6   |
| I wash my hands after handshaking with the people | 4207   | 29.6  | 23.2   | 26.1      | 8.7    | 12.4   |
| I wash my hands before going to sleep             | 4213   | 14.9  | 15.1   | 20.5      | 17.1   | 32.4   |
| I wash my hands after touching the animals        | 4220   | 1.8   | 2.2    | 5.4       | 14.8   | 75.8   |
| I wash my hands when I wake up in the morning     | 4206   | 0.7   | 1.8    | 2.1       | 9.8    | 85.6   |
| I wash my hands after diaper                      | 3962   | 9.2   | 1.3    | 2.5       | 8.0    | 79.0   |
| I wash my hands before eating anything            | 4203   | 3.9   | 8.4    | 18.4      | 19.9   | 49.4   |
| I wash my hands when I see them dirty             | 4209   | 0.2   | 0.6    | 2.5       | 12.8   | 83.9   |
| I wash my hands before preparing meals            | 4163   | 3.9   | 3.2    | 7.4       | 15.0   | 70.5   |
| I wash my hands after exchanging money            | 4209   | 19.0  | 15.2   | 19.5      | 12.8   | 33.5   |
| I wash my hands after cleaning my nose            | 4220   | 0.5   | 1.3    | 2.7       | 10.6   | 84.9   |
| I wash my hands after touching the trash          | 4208   | 0.5   | 0.8    | 2.6       | 10.9   | 85.2   |
| I wash my hands before I touch the sick people    | 4198   | 21.7  | 18.4   | 20.2      | 12.4   | 27.3   |
| I wash my hands after I touch the sick people     | 4200   | 3.9   | 6.1    | 11.5      | 17.0   | 61.5   |
| I wash my hands after I comb my hair              | 4199   | 18.0  | 14.6   | 19.6      | 14.3   | 33.5   |
| I wash my hands after house cleaning              | 4113   | 5.6   | 3.8    | 7.7       | 16.1   | 66.8   |
| I wash my hands after dishwashing                 | 4089   | 11.7  | 5.8    | 8.7       | 12.9   | 60.9   |
| I wash my hands after doing laundry               | 4056   | 14.1  | 7.4    | 11.3      | 14.0   | 53.2   |
| After I wash my hands I towel                     | 4201   | 0.9   | 1.3    | 4.5       | 10.5   | 82.8   |

Whereas the frequency of handwashing after the toilet throughout the country is 91.1%, this figure is on the rural 90.7% and on the urban 91.4%. Whereas the frequency of permanent handwashing before the meals is throughout the country 61.1%, it is 59.0% on the rural and 62.4% on the urban side (Figure 3.3).



**Figure 3.3:** The frequencies of persons washing their hands always before meals and after toilet, THS 2009

### 3.5 Some attitudes related with the handwashing

The 55.2% of the interviewed person throughout Turkey are mentioning that they have to take off their rings while handwashing, 85.1% of them to wash the hands minimum 15 seconds, 93.5% of them to dry the hands after handwashing. The 55.6% of the people living in the urban and the 54.6% living on the rural accept the statement "The rings shall be taken off by handwashing". The 84.7% of the people living in the urban and the 85.8% living on the rural accept the statement "the hands shall be washed minimum 15 seconds" and The 93.9% of the people living in the urban and the 92.7% living on the rural accept the statement "after handwashing the hands shall be dried" (Table 3.8).

**Table 3.8:** The percentage distribution of some attitudes related with the handwashing, THS 2009

| Behaviors related with the handwashing             | Female<br>n(rural):1568<br>n(urban): 2790 |          |         | Male<br>n(rural):1066<br>n(urban):1430 |          |         | Total<br>n(rural): 2634<br>n(urban):6854 |          |         |
|--|---|----------|---------|--|----------|---------|--|----------|---------|
|  | Agree                                     | Disagree | No idea | Agree                                  | Disagree | No idea | Agree                                    | Disagree | No idea |
| <b>Rural</b>                                       |   |          |         |  |          |         |  |          |         |
| While handwashing the rings should be taken off    | 52.9                                      | 41.3     | 5.8     | 57.1                                   | 36.6     | 6.3     | 54.6                                     | 39.4     | 6.0     |
| The handwashing should be taken minimum 10 seconds | 86.2                                      | 7.6      | 6.3     | 85.4                                   | 8.4      | 6.2     | 85.8                                     | 7.9      | 6.2     |
| After handwashing they should be dried             | 93.0                                      | 4.7      | 2.3     | 92.3                                   | 4.0      | 3.7     | 92.7                                     | 4.4      | 2.8     |
| <b>Urban</b>                                       |   |          |         |  |          |         |  |          |         |
| While handwashing the rings should be taken off    | 55.2                                      | 41.1     | 3.8     | 56.6                                   | 36.4     | 7.0     | 55.6                                     | 39.5     | 4.9     |
| The handwashing should be taken minimum 10 seconds | 83.7                                      | 9.4      | 6.9     | 86.5                                   | 8.3      | 5.2     | 84.7                                     | 9.0      | 6.3     |
| After handwashing they should be dried             | 93.4                                      | 4.8      | 1.8     | 95.0                                   | 3.8      | 1.2     | 93.9                                     | 4.5      | 1.6     |
| <b>Turkey</b>                                      |   |          |         |  |          |         |  |          |         |
| While handwashing the rings should be taken off    | 54.3                                      | 41.2     | 4.5     | 56.8                                   | 36.5     | 6.7     | 55.2                                     | 39.5     | 5.3     |
| The handwashing should be taken minimum 10 seconds | 84.6                                      | 8.7      | 6.7     | 86.0                                   | 8.3      | 5.6     | 85.1                                     | 8.6      | 6.3     |
| After handwashing they should be dried             | 93.2                                      | 4.8      | 2.0     | 93.9                                   | 3.9      | 2.2     | 93.5                                     | 4.5      | 2.1     |

The 78% of the interviewed persons are thinking that the handwashing has a very-high importance for prevention from the diseases, 20.5% of them are thinking that it is very important, 1.2% important and 0.4% less important (Table 3.9).

**Table 3.9:** The percentage distribution of the attitudes related with the prevention from the diseases, THS 2009

|                           | Turkey          |                |                  | Rural           |                |                  | Urban           |                |                  |
|---------------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|
|                           | Total<br>n=6811 | Male<br>n=2626 | Female<br>n=4185 | Total<br>n=2626 | Male<br>n=1063 | Female<br>n=1563 | Total<br>n=4185 | Male<br>n=1422 | Female<br>n=2763 |
| Less important            | 0.4             | 0.5            | 0.3              | 0.5             | 0.6            | 0.4              | 0.3             | 0.5            | 0.2              |
| İmportant                 | 1.2             | 1.5            | 1.0              | 1.5             | 1.7            | 1.4              | 1.0             | 1.1            | 0.9              |
| High-level important      | 20.5            | 23.3           | 18.7             | 23.3            | 23.8           | 22.9             | 18.7            | 20.7           | 17.7             |
| Very high level important | 78.0            | 74.7           | 80.0             | 74.7            | 73.9           | 75.2             | 80.0            | 77.8           | 81.2             |



### 3.6 The reasons why they do not wash their hands although they have to

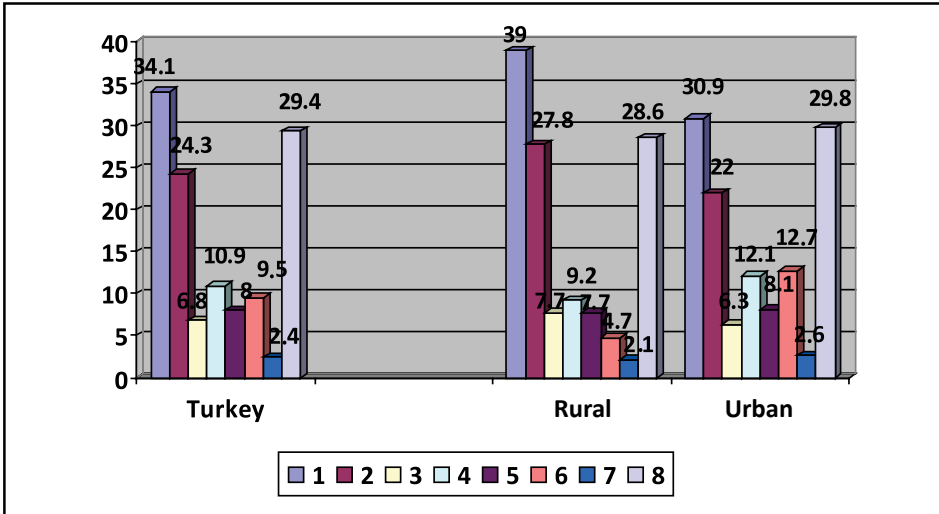
The reasons why not washing hands although having to; are to forget (34.1%), not having proper place or tap for handwashing (29.4%), not having time (24.3%), the lack of soap and other washing materials (10.9%), not to have hygienic place for handwashing (9.5%), being the lavatory not easily reachable (8.0%), not feeling the need (6.8%), the adverse effects of the cleaning materials (2.4%). The 30.9% of the people living in urban settlement are placing the reason; to forget, than 29.8% not having the proper place or tap for handwashing, 22.0% not to find time, while the 39.0% of the people on the rural are placing the reason to not having time and then the 39.0% to forget, the 28.6% not having the proper place or tap for handwashing and the 27.8% not to have time.

The distribution regarding the total person number from the interviewees who are not washing hands although they have to- be mentioned on the table.

**Table 3.10:** The percentage distribution of the interviewed persons according the reasons why they are not washing their hands\*, THR 2009

|   | Turkey (%)*     |                |                  | Rural (%)*      |               |                  | Urban (%)*      |                |                  |
|---|-----------------|----------------|------------------|-----------------|---------------|------------------|-----------------|----------------|------------------|
|   | Total<br>n=4855 | Male<br>n=1846 | Female<br>n=3009 | Total<br>n=1920 | Male<br>n=786 | Female<br>n=1134 | Total<br>n=2935 | Male<br>n=1060 | Female<br>n=1875 |
| Forgetting  | 34.1            | 35.5           | 33.3             | 39.0            | 40.1          | 38.2             | 30.9            | 32.1           | 30.3             |
| Finding no time                                   | 24.3            | 25.5           | 23.6             | 27.8            | 28.8          | 27.2             | 22.0            | 23.0           | 21.4             |
| Feeling no need                                   | 6.8             | 7.9            | 6.1              | 7.7             | 8.7           | 7.0              | 6.3             | 7.4            | 5.7              |
| Lack of soap or other handwashing materials       | 10.9            | 10.4           | 11.3             | 9.2             | 9.9           | 8.6              | 12.1            | 10.8           | 12.9             |
| Being the place of lavatory not easily accessible | 8.0             | 8.1            | 7.8              | 7.7             | 7.3           | 8.0              | 8.1             | 8.8            | 7.7              |
| Being the handwashing place not hygienic          | 9.5             | 7.3            | 10.9             | 4.7             | 3.6           | 5.5              | 12.7            | 10.0           | 14.2             |
| Adverse effect of the handwashing materials       | 2.4             | 1.3            | 3.0              | 2.1             | 0.8           | 3.0              | 2.6             | 1.7            | 3.0              |
| Not to have right place or tap for handwashing    | 29.4            | 29.1           | 29.5             | 28.6            | 29.8          | 27.9             | 29.8            | 28.6           | 30.5             |

\*: The percentages were calculated according the numbers of answers divided to the total person number (n). One person can give more than one answer.



**Figure 3.4:** The percentage change of the interviewed persons according to the reasons why they are not washing their hands, THS 2009

(1: Forgetting, 2: Not finding time, 3: Feeling no need, 4: Lack of soap and other handwashing materials, 5: Being the place of lavatory not easily accessible, 6: Being the handwashing place not hygienic, 7: Adverse effect of the handwashing materials, 8: Not to have the right place or tap for handwashing)

### 3.7 The results of bivariate and multivariate analysis

The participants were grouped as the ones washing hands always before the meals and the ones not washing hands always before the meals (always handwashing, sometimes handwashing, rarely handwashing and never handwashing) and the variances regarding some specific variations of handwashing always before the meals are analyzed. The frequency of handwashing always before the meals is lowest by the age group 12-20, and also lower on the male and rural citizens, the frequency is increasing with the education level. It has been seen that, there are statistically meaningful differences on handwashing always before the meals and the age groups, genders, settlements, education levels and marital status'. (Table 3.11).



**Table 3.11:** The change of the frequency of handwashing always before the meals regarding some depictive variances, THS 2009

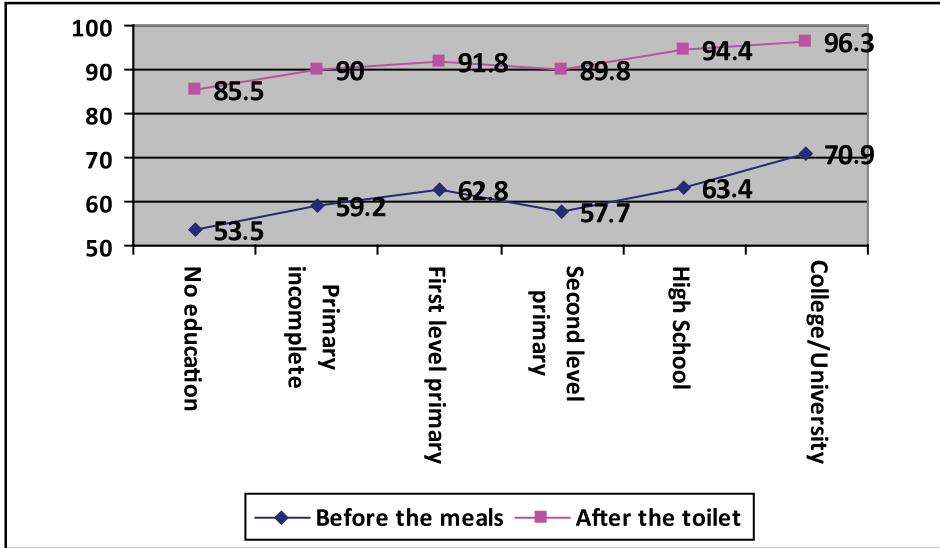
|                        | Always washing hands before the meals (%) |      | p      | OR (CI-%95)             |
|------------------------|---|------|--------|-------------------------|
|                        | Yes                                       | No   |        |                         |
| <b>Age Group</b>       |   |      |        |                         |
| 12-20                  | 48.9                                      | 51.1 | <0.001 | 1.00                    |
| 21-30                  | 56.8                                      | 43.2 |        | <b>1.37</b> (1.17-1.61) |
| 31-40                  | 63.7                                      | 36.3 |        | <b>1.84</b> (1.56-2.16) |
| 41-50                  | 66.2                                      | 33.8 |        | <b>2.05</b> (1.72-2.44) |
| 51-60                  | 65.8                                      | 34.2 |        | <b>2.01</b> (1.68-2.41) |
| 61-70                  | 68.4                                      | 31.6 |        | <b>2.26</b> (1.84-2.79) |
| 71-80                  | 63.6                                      | 36.4 |        | <b>1.82</b> (1.42-2.35) |
| 81 and above           | 63.0                                      | 37.0 |        | <b>1.78</b> (1.09-2.90) |
| <b>Gender</b>          |   |      |        |                         |
| Male                   | 57.5                                      | 42.5 | <0.001 | 1.00                    |
| Female                 | 63.1                                      | 36.9 |        | <b>1.26</b> (1.15-1.40) |
| <b>Settlement</b>      |   |      |        |                         |
| Rural                  | 59.0                                      | 41.0 | <0.01  | 1.00                    |
| Urban                  | 62.4                                      | 37.6 |        | <b>1.16</b> (1.05-1.28) |
| <b>Education Level</b> |   |      |        |                         |
| No education           | 53.5                                      | 46.5 | <0.001 | 1.00                    |
| Primary incomplete     | 59.2                                      | 40.8 |        | <b>1.26</b> (1.01-1.57) |
| First level primary    | 62.8                                      | 37.2 |        | <b>1.46</b> (1.27-1.69) |
| Second level primary   | 57.7                                      | 42.3 |        | 1.18 (0.99-1.41)        |
| High School            | 63.4                                      | 36.6 |        | <b>1.50</b> (1.26-1.79) |
| College/University     | 70.9                                      | 29.1 |        | <b>2.12</b> (1.67-2.68) |
| <b>Marital Status</b>  |   |      |        |                         |
| Single                 | 52.3                                      | 47.7 | <0.001 | 1.00                    |
| Married                | 63.5                                      | 36.5 |        | <b>1.59</b> (1.41-1.78) |
| Widowed                | 65.2                                      | 34.8 |        | <b>1.71</b> (1.37-2.14) |
| Divorced               | 68.4                                      | 31.6 |        | <b>1.97</b> (1.28-3.06) |

The participants were grouped as the ones washing hands always after the toilet and the ones not washing hands always after the toilet (always handwashing, sometimes handwashing, rarely handwashing and never handwashing) and the variances regarding some specific variations of handwashing always after the toilet are analyzed. The frequency of handwashing always before the meals

is lowest on the age group 81 and above, and also lower on the male and rural citizens, the frequency is increasing with the education level. It has been seen that, there are statistically meaningful differences on handwashing always after the toilet between the age groups, genders, settlements, education levels and marital status. (Table 3.12).

**Table 3.12:** The change of the frequency of handwashing after the toilet regarding some depictive variances, THS 2009

|                        | Washing the hands<br>always after the toilet (%) |      | p      | OR (CI-%95)             |
|------------------------|--|------|--------|-------------------------|
|                        | Yes  | No   |        |                         |
| <b>Age Group</b>       |  |      |        |                         |
| 12-20                  | 87.5   | 12.5 | <0.001 | 1.00                    |
| 21-30                  | 90.3   | 9.7  |        | <b>1.33</b> (1.03-1.71) |
| 31-40                  | 92.2   | 7.8  |        | <b>1.69</b> (1.29-2.21) |
| 41-50                  | 92.6   | 7.4  |        | <b>1.77</b> (1.33-2.36) |
| 51-60                  | 93.2   | 6.8  |        | <b>1.95</b> (1.42-2.66) |
| 61-70                  | 93.0   | 7.0  |        | <b>1.89</b> (1.32-2.73) |
| 71-80                  | 90.4   | 9.6  |        | 1.34 (0.89-2.01)        |
| 81 and above           | 80.8   | 19.2 |        | 0.60 (0.33-1.11)        |
| <b>Gender</b>          |  |      |        |                         |
| Male                   | 90.0   | 10.0 | <0.05  | 1.00                    |
| Female                 | 91.8   | 8.2  |        | <b>1.24</b> (1.05-1.47) |
| <b>Settlement</b>      |  |      |        |                         |
| Rural                  | 90.7   | 9.3  | >0.05  | 1.00                    |
| Urban                  | 91.4   | 8.6  |        | 1.01 (0.92-1.29)        |
| <b>Education Level</b> |  |      |        |                         |
| No education           | 85.5   | 14.5 | <0.001 | 1.00                    |
| Primary incomplete     | 90.0   | 10.0 |        | <b>1.53</b> (1.08-2.15) |
| First level primary    | 91.8   | 8.2  |        | <b>1.90</b> (1.52-2.37) |
| Second level primary   | 89.8   | 10.2 |        | <b>1.49</b> (1.14-1.96) |
| High School            | 94.4   | 5.6  |        | <b>2.86</b> (2.08-3.93) |
| College/University     | 96.3   | 3.7  |        | <b>4.46</b> (2.67-7.46) |
| <b>Marital Status</b>  |  |      |        |                         |
| Single                 | 88.8   | 11.2 | <0.01  | 1.00                    |
| Married                | 91.9   | 8.1  |        | <b>1.43</b> (1.18-1.73) |
| Widowed                | 91.7   | 8.3  |        | 1.39 (0.96-2.04)        |
| Divorced               | 89.9   | 10.1 |        | 1.12 (0.57-2.20)        |



**Figure 3.5:** According the education level, the frequency of persons who are washing hands before meals and after toilet, THS 2009

The reasons of not washing hands, for individual reasons (forgetting, having no time, adverse effects of the cleaning materials), environmental reasons (lack of soap and other hand cleaning materials, not having the lavatory in a proper place, not to be the handwashing place hygienic, not having tap and handwashing place) and also combined reasons both individual and environmental reasons were grouped) and the variances regarding some specific variations are analyzed (Table 3.13). Considering the whole interviewed people, it is seen that the 53.3% of them according the individual reasons, the 39.2% according the environmental reasons, and the 7.5% of them according the combined reasons are not washing their hands. Among the frequency of not handwashing reasons, the environmental reasons have the lowest value on the older age group and there are statistically meaningful differences among the age groups ( $p < 0.001$ ). Within the grouped not handwashing reasons, the frequency of the environmental reasons are highest on the urban citizens (43.4%), on the highest education level (55.5%) and there are statistically meaningful differences between the groups for the mentioned variances for not handwashing reasons ( $p < 0.001$ ).



**Table 3.13:** The change of grouped not handwashing reasons according some specifications and handwashing numbers, THS 2009

|                        | Grouped not handwashing reasons |               |          | p      |
|------------------------|---------------------------------|---------------|----------|--------|
|                        | Individual                      | Environmental | Combined |        |
| <b>Age Group</b>       |                                 |               |          |        |
| 12-20                  | 62.9                            | 30.9          | 6.2      | <0.001 |
| 21-30                  | 54.1                            | 35.9          | 10.1     |        |
| 31-40                  | 49.6                            | 43.3          | 7.0      |        |
| 41-50                  | 50.3                            | 42.3          | 7.5      |        |
| 51-60                  | 48.9                            | 43.8          | 7.3      |        |
| 61-70                  | 47.9                            | 45.6          | 6.5      |        |
| 71-80                  | 61.4                            | 33.5          | 5.1      |        |
| 81 and above           | 62.2                            | 28.9          | 8.9      |        |
| <b>Gender</b>          |                                 |               |          |        |
| Female                 | 52.2                            | 40.3          | 7.5      | >0.05  |
| Male                   | 55.3                            | 37.2          | 7.5      |        |
| <b>Settlement</b>      |                                 |               |          |        |
| Rural                  | 58.4                            | 32.7          | 8.9      | <0.001 |
| Urban                  | 50.0                            | 43.4          | 6.6      |        |
| <b>Education Level</b> |                                 |               |          |        |
| No education           | 63.2                            | 30.1          | 6.7      | <0.001 |
| Primary incomplete     | 58.7                            | 32.3          | 9.0      |        |
| First level primary    | 52.1                            | 39.8          | 8.1      |        |
| Second level primary   | 60.2                            | 33.6          | 6.2      |        |
| High School            | 45.7                            | 48.0          | 6.2      |        |
| College/University     | 34.8                            | 55.5          | 9.7      |        |

The participants were grouped as the ones who are washing hands daily more than 10 times and till 10 and the variances regarding some specific variations of handwashing daily more than 10 times are analyzed. According the daily handwashing more than 10 times, there are not determined statistically meaningful differences between the rural and urban citizens; but there are determined statistically meaningful differences between the age groups, genders, education levels and marital status'. The frequency of always handwashing before the meals is lowest on the age group 81 and above, and also lower on the male and rural citizens, the frequency is increasing with the education level. It has been seen that there are statistically meaningful differences on handwashing always



after the toilet between the age groups, genders, settlements, education levels and marital status'. Except the age group 70 and above, it has been seen that for the other groups in comparison to the 12-20 age group the daily handwashing frequency is higher. The probability of handwashing more than 10 times in comparison to male is higher on the female (OR: 2.48, 95% CI: 2.23-2.73), by first level primary (OR: 1.17, 95% CI: 1.01-1.36) and college – university higher than primary incomplete (OR: 1.29, 95% CI: 1.03-1.64), by married (OR: 1.66, 95% CI: 1.48-1.86) and divorced (OR: 2.17, 95% CI: 1.39-3.38) higher than singles (Table 3.14).

**Table 3.14:** The change of the frequency of the persons washing hands daily more than 10 times in the last 30 days according some specifications, THS 2009

|                        | The daily handwashing number in the last 30 days (%) |               | p      | OR (CI-%95)             |
|------------------------|--|---------------|--------|-------------------------|
|                        | More than 10 times                                   | Till 10 times |        |                         |
| <b>Age Group</b>       |  |               |        |                         |
| 12-20                  | 50.1   | 49.9          | <0.001 | 1.00                    |
| 21-30                  | 66.3   | 33.7          |        | <b>1.96</b> (1.66-2.30) |
| 31-40                  | 66.5   | 33.5          |        | <b>1.98</b> (1.68-2.33) |
| 41-50                  | 61.8   | 38.2          |        | <b>1.61</b> (1.36-1.91) |
| 51-60                  | 64.8   | 35.2          |        | <b>1.83</b> (1.53-2.20) |
| 61-70                  | 61.6   | 38.4          |        | <b>1.60</b> (1.30-1.96) |
| 71-80                  | 53.9   | 46.1          |        | 1.17 (0.91-1.49)        |
| 81 and above           | 45.2   | 54.8          |        | 0.82 (0.51-1.32)        |
| <b>Gender</b>          |  |               |        |                         |
| Male                   | 47.9   | 52.1          | <0.001 | 1.00                    |
| Female                 | 69.5   | 30.5          |        | <b>2.48</b> (2.23-2.73) |
| <b>Settlement</b>      |  |               |        |                         |
| Rural                  | 60.8   | 39.2          | >0.05  | 1.00                    |
| Urban                  | 62.1   | 37.9          |        | 1.05 (0.96-1.17)        |
| <b>Education Level</b> |  |               |        |                         |
| No education           | 60.2   | 39.8          | <0.001 | 1.00                    |
| Primary incomplete     | 58.8   | 41.2          |        | 0.95 (0.76-1.18)        |
| First level primary    | 63.9   | 36.1          |        | <b>1.17</b> (1.01-1.36) |
| Second level primary   | 55.9   | 44.1          |        | 0.84 (0.70-1.00)        |
| High School            | 61.6   | 38.4          |        | 1.06 (0.89-1.27)        |
| College/University     | 66.2   | 33.8          |        | <b>1.29</b> (1.03-1.64) |
| <b>Marital Status</b>  |  |               |        |                         |
| Single                 | 52.7   | 47.3          | <0.001 | 1.00                    |
| Married                | 64.9   | 35.1          |        | <b>1.66</b> (1.48-1.86) |
| Widowed                | 56.2   | 43.8          |        | 1.15 (0.93-1.42)        |
| Divorced               | 70.7   | 29.3          |        | <b>2.17</b> (1.39-3.38) |

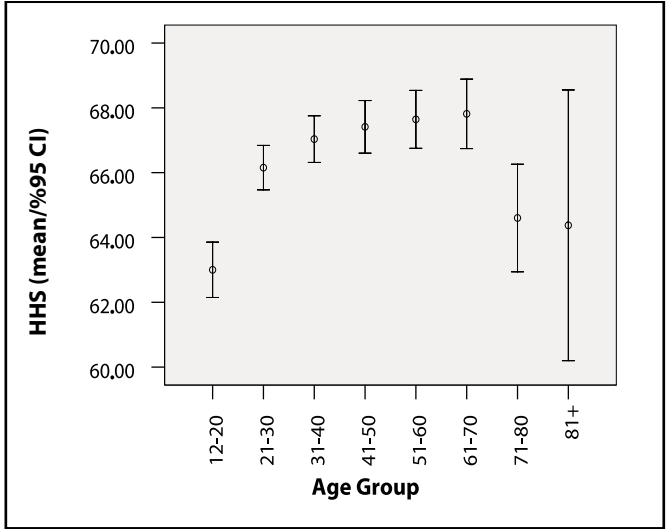
On the Table 3.15, the change of the defining characteristics of HHS formed according to the answers given upon handwashing habits is observed. By examining the HHS according to the age groups, the lowest score average is seen by 12-20 age group. It has been seen that, there are statistically meaningful differences on the age groups for HHS ( $p < 0.001$ ). The difference is originating from more than one group. By examining of the change of HHS according to the education level, the lowest score average is determined by the primary incompletes. Generally, with the increase of the education level, the score average is increasing. There are determined a statistically meaningful difference between the education levels according the HHS ( $p < 0.001$ ). The difference is consisting from more than one group. HHS average is higher on females and urban citizens ( $p < 0.001$ ) (Table 3.16).

**Table 3.15:** The change of handwashing habits' according to some specifications, THS 2009

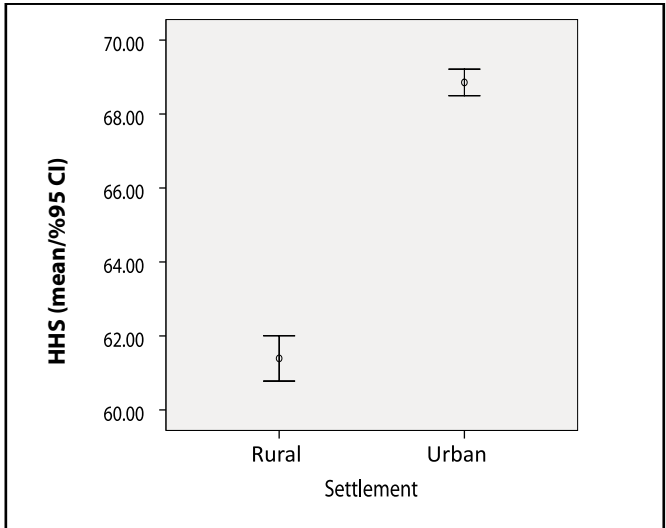
|                        | The handwashing habits score |           | p                |
|------------------------|------------------------------|-----------|------------------|
|                        | Mean (SD)                    | %95 CI    |                  |
| <b>Age Group</b>       |                              |           |                  |
| 12-20                  | 63.0 (13.5)                  | 62.1-63.8 | <b>&lt;0.001</b> |
| 21-30                  | 66.1 (12.5)                  | 65.4-66.8 |                  |
| 31-40                  | 67.0 (13.2)                  | 66.3-67.7 |                  |
| 41-50                  | 67.4 (13.3)                  | 66.6-68.2 |                  |
| 51-60                  | 67.6 (13.3)                  | 66.7-68.5 |                  |
| 61-70                  | 67.8 (12.7)                  | 66.7-68.4 |                  |
| 71-80                  | 64.6 (14.4)                  | 62.9-66.2 |                  |
| 81 and above           | 64.3 (16.7)                  | 60.1-68.5 |                  |
| <b>Gender</b>          |                              |           |                  |
| Male                   | 61.4 (14.5)                  | 60.8-62.0 | <b>&lt;0.001</b> |
| Female                 | 68.9 (11.8)                  | 68.4-69.2 |                  |
| <b>Settlement</b>      |                              |           |                  |
| Rural                  | 64.4 (13.3)                  | 63.8-64.9 | <b>&lt;0.001</b> |
| Urban                  | 67.5 (13.4)                  | 67.1-67.9 |                  |
| <b>Education Level</b> |                              |           |                  |
| No education           | 64.5 (14.3)                  | 63.6-65.4 | <b>&lt;0.001</b> |
| Primary incomplete     | 65.6 (13.8)                  | 64.3-66.9 |                  |
| First level primary    | 66.4 (13.1)                  | 65.9-66.9 |                  |
| Second level primary   | 65.1 (13.0)                  | 64.2-65.5 |                  |
| High School            | 67.3 (13.0)                  | 66.5-68.2 |                  |
| College/University     | 70.2 (11.8)                  | 69.1-71.4 |                  |



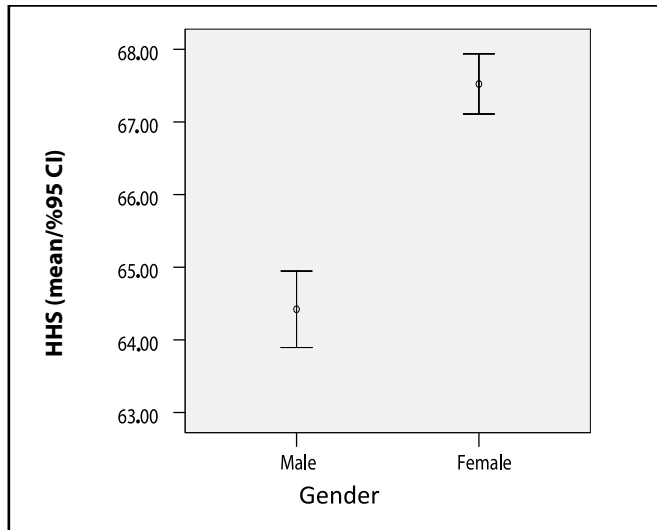
On Figure 3.6-9, the change of the HHS average and confidence intervals (95% CI) according to some specific variations can be seen.



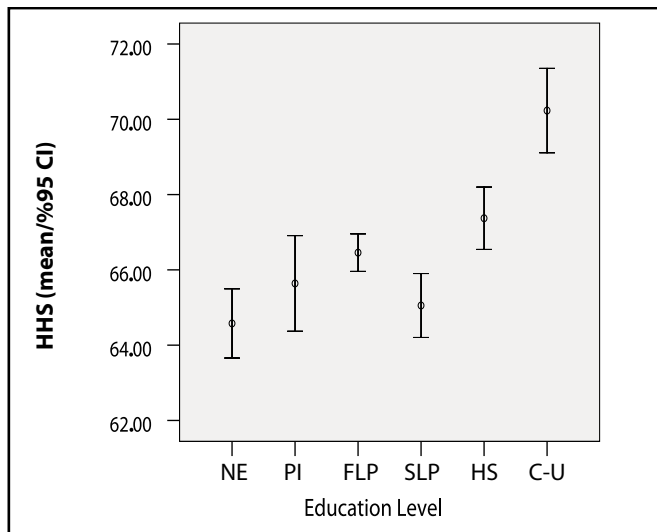
**Figure 3.6:** The change of handwashing habits' score according to the age groups, THS 2009



**Figure 3.7:** The change of hand washing habits' score according the settlement, THS 2009



**Figure 3.8:** The change of handwashing habits' score according the gender, THS 2009



**Figure 3.9:** The change of handwashing habits' score according the education level, THS 2009

(NE: No education, PI: Primary incomplete, FLP: First Level Primary, SLP: Second Level Primary, HS: High School, C-U: College/University)



On the Table 3.16 the linear regression model of some variances influences of handwashing behaviors' score, which is affecting HHS can be seen. According the results of the linear regression model, the HHS is increasing on the older age groups ( $\beta=0.148$ ,  $p<0.001$ ), on the females ( $\beta=0.306$ ,  $p<0.001$ ), on the citizens of urban settlement ( $\beta=0.061$ ,  $p<0.001$ ) and on increasing education levels ( $\beta=0.191$ ,  $p<0.001$ ) ( $p<0.001$ ) (Table 3.17).

**Table 3.16:** The linear regression model of some variances influences of handwashing behaviors' score, THS 2009

|   | $\beta^*$ | p      |
|---|-----------|--------|
| <b>Age Group</b>  | 0.148     | <0.001 |
| (12-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81 and above) |           |        |
| <b>Gender</b>   | 0.306     | <0.001 |
| (Male, Female)  |           |        |
| <b>Settlement</b>   | 0.061     | <0.001 |
| (Rural, Urban)  |           |        |
| <b>Education Level</b>  | 0.191     | <0.001 |
| (NE, PI, FLP, SLP, HS, C-U)**                                   |           |        |
| <b>Model</b>  |           | <0.001 |

\*: Standardized  $\beta$  values were used.

\*\* : NE: No education, PI: Primary incomplete, FLP: First Level Primary, SLP: Second Level Primary, HS: High School, C-U: College/University



## 4. DISCUSSION and CONCLUSION

The study is conducted among 6854 people from 3672 households. THS has the feature of the first study practiced on the national level according the handwashing.

The 63.6% of the interviewed persons are females, according to the profession breakdown, the people occupied with the house works are in the first line 49.5%. While conducting population-based surveys about the handwashing behaviors, it is preferred to make the interview with the females among the household population or to choose the houses with children and make the interviews with the mothers (**Luby, 2005; Aunger 2009; Wilson 1993; Hoque, 1995**). This choice of the method is originated especially because of the effects of the females' handwashing behaviors shaping the behaviors of the family members and because of the direct effects of their handwashing behaviors on the health of the family particularly of the children. Therefore, it is thought that the conduction of THS mainly with the contribution of the housewives will not be a substantial deficiency of the study after taking the researched health behavior into consideration.

### 4.1 Handwashing habits

The 61.6% of the interviewed persons has indicated that they are washing hands daily more than 10 times. The frequency of the persons washing hands more than 10 times is on the male 47.9%, female 69.5%, rural 60.8%, urban 62.1%.

A local study including data according the daily handwashing number is conducted in Erzurum, where the females from 15-49 age groups and who have children and who are registered to a family health center are elected as sample, and it is found that the 83.7% of the mothers are washing their hands daily ten or more than ten times. The difference between the two studies can be evaluated as a sample of the expected results between a local study made within the determined sub-groups and a country wide study.

Using the hard soap is more common on the rural (rural 65.7%, urban 48.2%); liquid soap (rural 41.9%, urban 60.1%), using hand disinfectant (rural: %0.5, urban %1.4), wet napkin (rural 2.3%, urban 7.0%) and using paper towel (rural 2.75, urban 7.6%) is more common in the urban; this is stating the difference



regarding the settlement. By preparing the hand hygiene promotions programs the characteristic of the settlement, being on the rural or urban should be taken into consideration. It also not be ruled out that there can be differences by the materials used by handwashing.

Throughout Turkey among the situations, where the hands are always washed, the handwashing after the toilet (91.1%) is on the first line, following it; after wake up in the morning (85.7%), after touching the trash (83.6%), after cleaning the nose (83.1%). Among other handwashing behaviors, where the hands are always washed, the handwashing before the meals 61.1%, after the meals 72.3%, before preparation of the meal 68.1%, after diaper 74.8%, after coming home 47.6%.

There are different results from the studies made in different countries of the world about the frequency of the handwashing. In Korea, according to a population-based survey conducted with 2800 participants, the 79% of the participants are washing hands after the toilet, 73% before the meal, 67% after coming home (**Jeong, 2007**). In Bangladesh, according to a population-based survey, the frequency of handwashing for two different areas is after the toilet 99-98%, after diaper 39-44%, before the preparation of the meal 35-30%, before the meal 79-38%, after touching the animals 17-20% (**Ray, 2010**). In Bengal, according to a population-based, the 59% of the participants are washing hands after the toilet, 64% before preparing the meal, 21.7% after diapering (**Ray, 2009**). In Kenya, according to a survey conducted among the mothers who have children under the 5 years of age, the 62% of the mothers are washing hands after the toilet, 42% before preparing the meal, 49% before feeding their children (**Aunger, 2009**).

The hand hygiene surveys are made either population-based or the students of a school or the people who made application to a health center. In Turkey, there are the results regarding to two local studies made among the females about handwashing before the toilet and after it. A local study including data according to the daily handwashing number is conducted in Erzurum, where the 350 females from 15-49 age groups and who have children and who are registered to a family health center are selected as sampling, and it is found that the 38.6% of them are washing their hands before the toilet, 100% after the toilet,





98.3% after diaper, **(Arıkan, 2011)**. In Ankara, according to a population-based study made among 386 females of 15-49 age groups, 67.9% of the females are washing their hands before the toilet, 97.2% after the toilet **(Ocakın, 2010)**.

The handwashing behaviors surveys conducted in Turkey are generally the studies within the scope of school health. According to a study made in Ankara among the primary schools, 72.8% of the students are washing their hands in the morning after wake up, 87.3% before the meals, 78.6% after the meals, 89.6% after the toilet, 83.2% when the hands get dirty **(Güleç, 2000)**. On a study made in İstanbul in two primary schools, the frequency of the handwashing both before and after the toilet is 60.3%. The 55.5% of the students are washing their hands with water and liquid soap and the 41.1% with water and hard soap. **(Önsüz, 2008)**. In Sivas, according to a study made among three primary schools with different socioeconomic levels, 96.1% of the students are washing hands before the meals, 90.8% after the meals, 92.9% after playing games **(Çetinkaya, 2005)**. In Ankara, according to a study made among the high school students, 78.3% of the students are washing the hands before the meals, 14.4% after the meals, 5.6% before the toilet, 97.7% after the toilet, 30.2% after coming home **(Şimşek, 2010)**. In Ankara, according to another study made among the high school students, 81.0% of the students are washing the hands before the meals, 78.2% after the meals, 82.6% after coming home, 99.1% after the toilet **(Kaya, 2006)**.

The handwashing after the toilet and before the meals are corresponding to a critical point by prevention of the oral fecal diseases and therefore it is dissociating from the other handwashing behaviors. The handwashing behavior after the toilet is the behavior with the most frequency not only determined by the studies like THS and other studies conducted in Turkey and in the other countries. According to the THS, the handwashing frequency after the toilet is 91.8% by the females in comparison to the males (90.0%). Although the handwashing frequencies after the toilet in Ankara (97.2%) and in Erzurum (100%) according to the population-based researches among the females and the frequencies from the school health studies in Ankara (97.7%-89.5%-99.1%) are higher than THS, it can be told that these results are reflecting the specifications of the local characteristics and of the defined groups **(Kaya, 2006; Güleç, 2000; Ocakın, 2010; Şimşek, 2010; Arıkan, 2011)**. Although the research results of



the mentioned other countries are determining the handwashing frequency after the toilet as 59-99% and this figure is in Turkey 91%, which can be considered as higher than the others, the not handwashing of one of ten persons after the toilet is indicating that there is a social group which shall be reached (**Jeong, 2007; Ray, 2009; Ray, 2010**).

Although the handwashing before preparation of the meals and/or before eating the meals have an equal importance as the handwashing after the toilet, the handwashing before the meals has a lower frequency than the handwashing after the toilet similar like the other studies of THS. The research results of the other mentioned countries are also indicating that the handwashing frequency before the meals, 38%-79%, is lower than the frequency of handwashing after the toilet (**Jeong, 2007; Ray, 2010; Ray, 2009; Aunger, 2009**). The results of the school health studies made in Ankara are also indicating that the handwashing frequency before the meals is lower than the frequency of handwashing after the toilet (in return 87.3%/89.6% - 81.0%/99.1%- 78.3%/97.7%) (**Güleç, 2000; Kaya, 2006; Şimşek, 2010**).

The handwashing habits for the different situations according to the fight against the water and food infected diseases are very important, however the handwashing frequencies after the toilet are high, the handwashing frequencies before the meals are low and this means that the efforts are one sided. For our country, where four of ten people are determining that he/she is not washing hands before the meals is indicating that there is a lack for infection of the diseases which are infected through water and food. On the other hand, the surveys conducted in the schools are indicating higher frequencies than the population-based survey THS, meanwhile the higher education level is an indication of the hygienic behaviors and it is presenting the effect of the education from a different viewpoint, it is also displaying that the schools have an importance by getting health promoting behaviors and they are effective places for these purposes.

Almost all (98.5%) of the interviewed persons believes that the handwashing has a very high importance or high importance on preventing from the diseases. This frequency is high on the both genders (females 98.7%, males 98.0%) and on the both settlements (rural 98.0%, urban 98.7%). The difference between the frequencies of the attitudes preventing from the infectious diseases



and some of the handwashing behaviors like the handwashing before the meals is also indicating the aspect between the attitudes according the health behaviors and the practices of these behaviors in hand hygiene specialty. These results are also reminding the difficulty of the processes of changing the behaviors of the persons according the health promotion programs and these shall be taken into consideration. (Curtis, 2000). On the other hand, the high awareness level of the importance of the handwashing on the prevention from the infectious diseases can be determined as a convenient base for the activities according the promotion of the handwashing.

The distribution of the reasons of not washing hands, although having to wash, can be lined as follows; forget (34.1%), not having proper place or tap for handwashing (29.4%), not having time (24.3). Forgetting and not finding time can give an opinion regarding the individual reasons of not changing the health attitudes to the behaviors. Not having the proper handwashing place (29.4%) indicates that among the hand hygiene promotion works there should be also job descriptions according the improvements of physical conditions. Not having the soap or other cleaning materials (8.7%), not easily reachable of the lavatory (6.3%), not being hygienic of the handwashing place (7.6%) are also supporting this implication.

When the reasons of not handwashing are grouped, the frequency of the environmental affects being only 40% (not having soap and other hand cleaning materials, not easily reachable of the lavatory, not being hygienic of the handwashing place, not having tap or handwashing place) indicates the necessity to promotion of handwashing behavior and the efforts regarding the environmental health from another standpoint. The physical problems of the lack of the handwashing behaviors can be originated from the restricted water resources of not being proper of the handwashing place in the hygienic manner or the lack of the proper cleaning materials. The lack of the proper water sources can be originated from the lack of the substructure on the rural or on the underdeveloped countries. The environmental reasons of not washing hands are higher on the urban in THS, therefore it is thought that the problem in the cities are originated from the lack of hygienic settings for the handwashing or the lack of proper cleaning materials. Generally, while the education level is getting higher, the environmental reasons of the frequencies of not washing hands and



the expectation for better circumstances are getting higher. THS is indicating with the results about the handwashing behaviors, that for a country like Turkey, where the urbanization period is still on the completing stage, the environmental health problem shall be discussed in the scope of the urban health.

#### **4.2 Determinants of Handwashing behavior**

The handwashing before the meals and after the toilet have a basic importance of preventing from the oral fecal infected diseases especially on the rural and the survey results in Turkey have shown that these handwashing behaviors should be at the levels which have to be improved, therefore there were especially made bivariable comparisons regarding the examination of the changes of these behaviors. The handwashing frequency before the meals among the other age groups; the handwashing frequency after the toilet among the other age groups except 81 and above is higher than the 12-20 age groups. The handwashing frequency before the meals and after the toilet is higher among the females. There are significant differences between the genders for the both behaviors. The handwashing frequencies are getting higher with the education level. While making a comparison regarding the lowest education level there are significant differences among the other education levels (except the secondary primary level graduates according to the handwashing before the meals).

After the examination of the changes of the determinants of the daily handwashing numbers among the subgroups where the handwashing were more than ten times on 30 days, there are found similar results. Among the older age groups the frequency of the handwashing is higher. There are statistically significant differences on the daily handwashing more than 10 times between the other age groups, except 70 and above, and the 12-20 age groups there are significant differences between the genders. The handwashing numbers more than 10 times on the last 30 days are higher by the females. There are significant differences among the education levels. By the comparison of the groups, there are determined significant differences only on the primary graduates and college graduates regarding the lowest education level group.

The results of the linear regression analysis which is constituted in order to examine the handwashing habits have shown that the HHS is getting higher on the older age groups, females, urban citizens and higher education levels.



The differences between the groups are leading us to think that in order to promote the hand hygiene, the adolescents and the older people can be selected as focus groups. The results of the older people can be occurred because of the lack of taking care themselves; this result can be a reminder of creating care or support mechanisms for those age groups and to take measures for the improvement of hygiene behaviors. 12-20 age groups are still a studying group, therefore the solution offers for that group should be made within the scope of the health promotion in the schools. The behavioral changes gained during the adolescent period can continue the life long and the interventions made during this period will be long lasted.

The females are more successful than the males for the handwashing behaviors either after the toilet and before meals or daily handwashing numbers or within the scope of HHS. The studies are presenting that the females are more sensitive than the males by the handwashing. In New Zealand, according to a study the frequency of the handwashing after the toilet is higher by the females (92.4%) than the males (81.0%), the frequency of using the soap is higher by the females (76.5%) than the males (66.2%). On the other hand the time of the handwashing by the males is shorter than the females (**Garbutt, 2007**). There are studies in Korea and USA which are indicating that the handwashing frequency is higher on the females (**Jeong, 2007; Johnson, 2003**).

The school health studies made in Turkey identify that the female students are more successful especially in the terms of both the handwashing frequency and the hygiene behaviors. In Ankara, according to a study made among the high school students, the handwashing frequency before the meals is on the boys 82.6%, the girls 79.7%, after meals on the boys 76.1%, on the girls 82.4%, after coming home on the boys 74.3%, on the girls 90.1%, after the toilet on the boys 98.2%, on the girls 100% (**Kaya, 2006**). In Ankara, according to a study made in two primary schools, the frequency of the handwashing is before the meals on the girls, 90.5%, boys 84.2%, after the meals on the girls 84.0%, the boys 73.4%, after the toilet on the girls 88.2%, on the boys 91.0%, after getting dirty hands on the girls 81.1%, on the boys 85.3% (**Güleç, 2000**). In Ankara, according to a study among the high school students the hygiene score of the girls are higher than the boys (**Şimşek, 2010**).



The studies made in different countries among different populations with different characteristics there are obtained a connection between the hygiene behaviors and genders and this is pointing out the decisiveness of gender roles among the health related behaviors. The females can constitute the target group for the intervention studies with their decisiveness roles on the children getting behaviors and on the cleaning behaviors of the household and they can act as role model for the promotion of handwashing.

The variables according to the linear regression model affecting the HHS are higher among the urban citizens. After considering the distribution of these results according to the changes of the settlements, it can be determined that the settlement, rural or urban, can be a reason of the changes both for hygiene perception and the hygiene behaviors.

The studies made on that subject are also indicating that the handwashing frequency is changing regarding the settlement specifications. According to a study conducted in Bengal, after the toilet 98% of the urban citizens, rural citizens 71%, before the meals 36% of the urban citizens, 13% of the rural citizens, before preparing the meals, 2% of the urban citizens, 1% of the rural citizens, after diaper, 69% of the urban citizens, 5% of the rural citizens were washing their hands (**Ray, 2006**). In Trabzon, according to a study made in two primary schools, one in the rural, the other in the, 97.3% of the students on the rural, 87% in the urban after wake up in the morning, 90.5% on the rural, 89.0% in the urban before the meals, 97.3% on the rural, 93.9% in the urban after the meals, 58.1% on the rural, 15.9% in the urban before the toilet, 98.6% on the rural, 98.8% in the urban after the toilet are washing their (**Çan, 2004**).

The results according the relationship between the handwashing habits and the settlement are indicating that the people living on the rural should be taken into consideration primarily by the handwashing promotion studies. In the countries like Turkey, where the migration from the rural to cities are continuing or where in the cities new immigrated social sections are taking place, there should be taken into consideration not only rural citizens but also the new immigrated persons in the cities.

There are differences among the education levels on the handwashing before the meals, after the toilet, the situation washing the hands more than 10



times daily. The variables according to the linear regression model affecting the HHS are indicating that the scores are getting higher with the education level. When the highest education group (university graduates) is compared with the lowest education group (primary incomplete) the obtained OR values for the handwashing daily more than 10 times is 1.29; always washing hands before the meals is 2.12; always washing hands after the toilet is 4.46; these results are indicating the importance of the education level on the handwashing behaviors. On the other hand these results can also indicate that the education levels can affect the handwashing behaviors on different levels. The results generally are indicating that the lower education levels shall be taken into consideration on the health promotion programs regarding the hand hygiene.

There are also other population based studies determining the relationship between the education level and the handwashing behaviors. For example in Bangladesh, the handwashing behaviors have a connection to the education levels of the females (**Hoque, 1995**). The school health studies conducted in Turkey are indicating that there is a relation between the education level of the mother and the hygiene attitude of the student. A study conducted in Ankara among the high school students has obtained a positive relation between the mother's education level and the hygiene level and another study has shown the connection between the education level both of the mother and father and the hygiene level of the (**Kaya, 2006; Şimşek, 2010**). In Trabzon, according to a study among the primary schools the linear regression analysis results of the individual hygiene factors the education level of the mother has indicated as a positive factor about the hygiene level (**Çan, 2004**). These results show the importance of the education levels of the females by shaping the hygiene behaviors and they are also indicating the importance of the improvement of the hand hygiene by the females because of their dominant situation among the children's and family's behaviors.

The education level is one of basic determinants of socioeconomic level with the income level and the profession. Although during this study the direct relation of the handwashing behaviors with the socioeconomic level are not studied, the differences among the education levels can be an indicator of the handwashing behaviors with the socioeconomic levels. Other studies are indicating the connection of the handwashing behaviors with the socioeconomic



levels. In Bangladesh, according to a household study, the handwashing frequency of the examined people are changing regarding the welfare of the household from the poorest to the richest as 33%, 46%, 58%, 77%, 91% (**Luby, 2008**). In Ankara, according to study conducted in the schools of Altındağ and Çankaya districts, the handwashing frequency of the students from Çankaya, where the welfare and socioeconomic levels of the families are better than in Altındağ, is higher. (Before the meals, Çankaya 86.6%, Altındağ 87.9%, after the meals Çankaya 82.9%, Altındağ 74.7%, after the toilet Çankaya 93.9%, Altındağ 85.7%, getting the hands dirty Çankaya 92.7%, Altındağ 74.7%) (**Güleç, 2000**). According to a study conducted in Sivas between three different socioeconomic level primary schools, the frequency of the hygiene behaviors is higher in the better socioeconomic level school (**Çetinkaya, 2005**). On a population-based study made in Ankara between the females in reproductive age group, there were not stated a difference on the handwashing after the toilet regarding the socioeconomic levels, but there were a difference on the handwashing before the toilet, on the highest income group the handwashing frequency (52.1%) before the toilet is lower than the lowest income group (79.8%). In spite of this, the frequency of bathing is higher in the higher income and higher education groups and there are differences between the groups (**Ocaktan, 2010**). The studies are generally agree that, the socioeconomic parameter are the determinants both for the handwashing behaviors and generally the hygiene behaviors. So the socioeconomic determinants of the health are showing up by the requirements of being healthy and the hygiene behaviors. By creating the handwashing behaviors promotion programs, the behavior characteristics of the different socioeconomic groups and their needs should be taken into consideration beside the reach levels to the physical hygienic facilities.

It should not be forgotten that, the hygiene promotion studies are affected through the socioeconomic determinants also by the reach to the physical facilities. For example; reaching the water is the most important determinant for the handwashing. If the water source is 1 km away from the house, the mothers have to limit the handwashing (**Curtis, 2000**). According to a study made in Bangladesh, the frequency of having the proper physical opportunities in the house is on the poorest group 4% and it is 96% in the richest group (**Luby, 2008**).





On this study, except the discussed variables affecting the handwashing behaviors, there are many variables which are specifying these behaviors. An interesting example regarding this, a study made in USA regarding the public toilets where there were no visual signs the 61% of the females and 37% of the males were washing hands with soap and where there were visual signs the 97% of the females and 35% of the males are washing hands with the soap. 55% of the males and 2% of the females are drying their hands in the toilet without visual signs, and 53% of the males and 38% of females were drying their hands in the toilet with the visual signs (**Johnson, 2003**).

### **4.3 Handwashing promotion**

As a situation detection study, the THS has no target to evaluate any intervention, therefore it is not including any data regarding the results obtained by the handwashing promotion. However, the literature information includes evidence-based data regarding the positive health results through the handwashing promotion.

The intervention studies targeting the handwashing promotion in the schools are dissociating both because of the ease of the implementation and the long lasting potential of the obtained behavior changes. The studies are sampling the feasibility of the intervention made during this period. An intervention study made in Ankara among the 6-14 age group nursery children, the handwashing frequency with the education is raised for the handwashing before the meals from 75.4% to 96.9%, after the meal from 84.6% to 98.5%, after the toilet from 95.4% to 100%, after coming from outside from 67.7% to 92.3%, after getting the hands dirty from 98.5% to 100% (**Şahin, 2008**).

The deliverables outcome from the study results regarding the handwashing promotion are also encouraging in order to make interventions. The swab samples of a microbiological study, it has been indicated that there were 60% decrease of the colony numbers (**Ray, 2009**). Within the population based studies, it is determined that there are decreases on the diarrhea and pneumonia frequencies according the handwashing promotion. There are results according the decrease of diarrhea incidences between 27%-89% is related with the promotion of handwashing with the soap (**Curtis, 2000**). On a population-based study made in Pakistan, during a year, it has gone to the houses weekly,



it has given soap in order to encourage using the soap and the symptoms of the population of the house are recorded. The pneumonia incidence of the children under the age of 5 is decreased to 50% in the control group where the handwashing promotion implementation is made (95% CI: 65%–34%), the diarrhea incidence by the children under the age of 15 is decreased by 53% (95% CI: 65% – 34%) **(Luby, 2005)**.

The researches are explaining the successful results especially by the children and young people on the frequency of the respiratory tract and digestive systems. The studies conducted in the groups from the children at the nursery till the university students are in that direction. According to a study conducted between the nursery children has shown that within the promotion of the handwashing both the speed of the diarrhea incidence (IRR:0.73 95% CI:0.54-0.97) and also the upper respiratory infections incidence ratio (IRR:0.80 95% CI:0.68-0.93) are decreased **(Carabin, 1999)**. On the 3-5 aged children from the daily care center there made an observation study for 21 weeks, the handwashing promotion has decreased the common cold 32% **(Niffenegger, 1997)**. The handwashing promotion study conducted in the 5-12 aged school children has obtained a decrease of 21% by the absence caused of the respiratory infections **(Master, 1997)**. On a study made in the student residences on the universities after putting gel included hand cleaning materials to the rooms, baths, resting rooms, there were obtained a decrease of the upper respiratory tract infection symptoms frequency between 14.8% and 39.9% and decrease of the school absence 43% **(White, 2003)**. After the application of a handwashing program among the navy soldiers of USA a 45% decrease of respiratory tract infections are obtained **(Ryan, 2001)**.

Another study has important results according the continuity of the changes obtained after the intervention and the handwashing behaviors told to the interviewed persons and the reality to be taken into consideration. In Indonesia after a intervention study including face to face health education to the mothers and giving soap to them there and after two years following the study there were made evaluations, it was determined that the mothers were not handwashing after the diaper and before the meals before the education, but after the two years of the intervention all of the mothers were washing hands after the toilet



and before the meals with soap, 60% of them before the preparation of the meal and 56% after the toilet, 43% after the diaper. Regarding the same study the 94% has told that they were washing hands with the soap before the meals but only 79% could show the soap to the interviewers. On the evaluation made after the two years of the intervention the diarrhea incidence was lower than the incidence before the intervention but higher than the incidence after the intervention (**Wilson, 1993**).

#### **4.4 Conclusion**

The handwashing before the meals having threshold importance, in order to prevent from the diseases contaminant by water and food (the frequency of always washing hands before meals 61.1%) is coming up as a health behavior which shall be promoted.

The disadvantaged groups of handwashing behavior are determined the adolescence age group, males, people living on the rural and having low education level. It can be given priority to these groups by implementing the health promotion programs in order to improve the hygiene. The awareness level of the interviewed persons according to the importance of handwashing for prevention from the infectious diseases is encouraging for the designed health promotion programs.

The 39.2% of the interviewed persons, who are not washing hands because of the environmental factors, although they have to wash hands, is reminding to give place to create supporting health environment efforts beside the health education in the scope of the health promotion. The frequency of not handwashing because of the environmental factors being high in the cities and high education level is making to think that the expectation of having proper environment for handwashing is high on these groups. For Turkey, which is trying to complete the urbanization process, to take these results into consideration can make a major contribution by establishing healthy cities.



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