Knowledge, Attitudes and Practices (KAP) survey to assess health care provider and adult population perceptions towards immunization and vaccine-preventable diseases (VPDs), particularly with regard to measles and rubella (MR),

Survey Report

Georgia
2017

Acknowledgement

The present Knowledge, Attitudes and Practices (KAP) survey to assess health care provider and adult population perceptions in Georgia towards immunization and vaccine preventable diseases (VPDs), particularly with regard to measles and rubella (MR), was conducted by L. Sakvarelidze National Center for Disease Control and Public Health (NCDC) with financial support from US Centers for Disease Control and Percention (CDC; in the scope of CDC and NCDC collaborative agreement # 5U19GH000963-05) and World health Organization (WHO) Regoinal Office for Europe.

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Abbreviations

DNK – Do not know

EPI – Expanded Program on Immunization

FG - Focus Group

HCP – Health Care Provider

HCW – Health Care worker

Hib - *Haemophilus influenzae* type b

HPV - Human Papilloma Virus

KAP - Knowledge, Attitudes and Practices

MoH- Ministry of Health

MMR - Measles, mumps, rubella

NCDC – National Center for Disease Control and Public Health

OPV – Poliomyelitis Vaccine

PCV - Pneumococcal vaccine

PR – Prevalence Ratio

SOP - Standard operation procedures

TIP - Tailoring Immunization Program

VPD - Vaccine-preventable diseases

WHO – World Health Organization

Background:

Although Georgia, along with the rest of the WHO European Region, is committed to measles and rubella elimination, the country remains endemic for both viruses. There is a substantial susceptibility to measles and rubella in the adult population, as evidenced by the recent large-scale outbreak (over 11,500 cases during 2013-2015) in which adults accounted for 60% of cases, as well as by the serosurveys conducted in 2009 and 2015. In response to the measles outbreak, MMR vaccine was made available free of charge to adults up to 30 years of age, but the uptake was minimal, including among HCWs.

Despite important steps made for improvement, overall immunization communications and advocacy in the country still requires strengthening through up-to-date data collection on knowledge, attitudes, and perceptions of HCWs and general population, development of comprehensive communication strategies, improved planning and implementation of health promotion actions.

The national Immunization KAP (knowledge, attitude and practice) survey in Georgia conducted by NCDC with UNICEF support in 2016, as well as relatively small survey on immunization and measles in the region of Adjara in 2015, clearly indicate the existence of gaps in knowledge and unjustified vaccine safety concerns among both HCWs and general population. These concerns were considered to play a crucial role in the near-failure of measles-rubella supplementary immunization campaign in 2008.

The proposed survey helped to define the constraints and challenges the HCWs face in relation to measles and rubella immunizations, and identifies the preventing or motivating factors for vaccine-related behavior of adults, so that the approaches and strategies to achieve measles and rubella elimination in Georgia can be developed.

The survey provided important country-specific current information which can be used to design appropriate strategies and interventions needed in Georgia at the present stage of the program for achieving measles and rubella elimination. In addition, in combination with the results of the KAP survey focused on childhood immunization (implemented by NCDC in 2016 in collaboration with UNICEF using GAVI funds), the results can help to tailor immunization program by designing and implementing distinct communication and administrative strategies to achieve measles and rubella elimination and improve routine immunization coverage.

Project Goals

The purpose of the survey was to explore current vaccine-preventable diseases (VPD) related knowledge, attitudes and practices among HCWs and adult population in Georgia focusing on measles and rubella in order to identify barriers and enabling factors to vaccination, and to establish a baseline to plan for interventions related to measles and rubella elimination in the country.

Methodology

Conceptual framework of the proposed study project was based on the Guide to Tailoring Immunization Programs' (TIP)[1]. Qualitative as well as quantitative survey methods was utilized to identify and evaluate key stakeholders' concerns, beliefs, practices and information gaps related to immunization decision-making patterns related to VPDs and immunization focusing on measles and rubella (MR), information channels and trustworthiness of information sources at the community level.

The proposed study covered adult population and medical professionals (family doctors, nurses) in three areas of the country, including: Tbilisi, Gurjaani municipality and Kutaisi.

Specifically there was planned to be conducted:

- **A cross-sectional** survey using multistage cluster sampling methodology among 1000 participants (500 in Tbilisi and 500 in Gurjaani municipality)
  - Target group - general population aged 18-29 years
- **A total of 9 focus group (FG) discussions** among:
  - Family doctors involved in delivering immunizations - 4 FGs (2 in Tbilisi, one each in Gurjaani municipality and Kutaisi)
  - Nurses involved in delivering immunizations - 3 FGs (in Tbilisi, Gurjaani municipality and Kutaisi)
  - Medical students - 1 FG (in Tbilisi)
  - Non-medical students - 1 FG (in Tbilisi)

- **Rationale for site selection:**
  - **Tbilisi –** the largest city, accounted for nearly half of all measles cases in 2013-2015 which occurred predominantly among young adults, the lowest coverage (15%) in the 2008 MR immunization campaign, large concentration of universities and colleges.
  - **Gurjaani municipality**– a rural district in Kakheti region (in eastern Georgia) with lower incidence of measles in recent outbreak and higher coverage in the 2008 MR immunization campaign.

Sample size calculation:

The sample size was calculated with Epi-info stat-calculator for population survey using standard parameters: the level of confidence 1.96, margin of error (confidence limit) 0.05, design effect 1.5 and baseline level of the indicators 0.75 (assumed % of MMR vaccine acceptance), minimum sample of 425 population was needed for each site with 25 clusters.

[1] The Guide to Tailoring Immunization Programmes (TIP) - WHO/Europe
http://www.euro.who.int/__data/assets/pdf_file/0003/187347/The-Guide-to-Tailoring-Immunization-Programmes-TIP.pdf

Based on the results of the nationwide immunization coverage survey, we expected to obtain information from at least 85% of selected participants. The final number of participants targeted for each survey site after incorporating the 15% non-response rate was 500 per site resulting in 25 clusters with 20 participants in each.

■ **Survey Site Sampling Frame**

Multistage cluster sampling was utilized to select study participants. Selection was performed separately for each of the survey sites (Tbilisi and Gurjaani municipality).

Stage 1 – 25 primary sampling units (PSUs)/clusters defined as census enumeration units (EUs) were selected by simple random sampling (SRS) within each selected strata (survey site) using the National Statistics Department data.

Stage 2 - In each PSU, 20 secondary sampling units (SSU) defined as households were selected by SRS.

Stage 3 – One tertiary sampling unit (TSU) defined as an eligible participant from the selected household (SSU) was selected randomly using Kish Grid.

Table 1. Numbers of participants (based on population estimates from National Statistics Department data) by location and sample sizes targeted for the survey

#	Survey site / strata	Population aged 18-29 years*	Sample size targeted	Number of clusters	Number of participants per cluster	Response rate expected	Expected number of participants enrolled
-	**Tbilisi**	178,200	500	25	20	0.85	425
-	**Gurjaani**	8600	500	25	20	0.85	425

** Estimated from the GEOSTAT data by age group and admin unit*

■ **Qualitative Survey**

Qualitative survey with FG methodology was conducted to obtain information on immunization gaps/barriers from the caregivers and immunization providers focusing on the key determinants that influence participation in vaccination including:

1. Environmental opportunity factors
2. Supportive ability factors
3. Personal motivation factors.

A series of nine FGs was conducted in both areas targeted by quantitative survey and in Kutaisi – a large city in western Georgia which has substantial problems with delivering immunization

services. Four FGs was conducted among doctors involved in immunizations, three - among nurses involved in immunizations, and one each – among medical and non-medical students (Table 2.)

Table 2. Focus Group discussions participants and survey sites

Focus Groups, No.	*Category of respondents*	*Site*
4	Family doctors involved in immunizations	Tbilisi, Kutaisi, Gurjaani municipality
3	Nurses involved in immunizations	Tbilisi, Kutaisi, Gurjaani municipality
1	Medical Students	Tbilisi
1	Non-medical students	Tbilisi

- **Recruitment Procedures**

Convenience sampling method was utilized to recruit and screen participants for FGs. Recruitment of doctors and nurses involved in immunizations occurred through the list of full-time employees obtained from the administration. Students were recruited through student organizations at the universities using information flyers.

All participants were selected according to predefined screening criteria to increase representativeness of viewpoints and generalizability of obtained results. Each FG included 8-10 participants.

***General Criteria**:*

(1) Persons selected for participation in the FG should not know each other; also the persons from the same locality are not recommended to participate at the same group discussions (only if there are specific requirements)
(2) Qualitative survey assistant did not recruit more than 10 person for each group discussion
(3) The persons invited at the FG are not allowed to have been previously involved in other FG discussions within the same study.

Specific Criteria:

Health Care Workers' FG:

(1) actively practicing physicians/nurses
(2) full-time employees of health care units
(3) Family doctors/nurses involved in immunization.

Medical students:

(1) Full-time students of medical university

(2) Students from 4th and higher grade.

Non-medical students:

(1) Full-time students of any accredited universities

(2) Students studying in any department EXCEPT medicine or other relevant fields such as public health, epidemiology, biology.

■ Data Management and Statistical Analysis

1. Quantitative survey

Data was entered and verified in Epi-info programs installed in tablets. Data management and quantitative statistical analysis was conducted using Epi-info and SPSS software. Data quality assessments were conducted before analysis was performed. Descriptive, bivariate and multivariate analysis was performed to assess major factors correlated with vaccine acceptance in the target population.

Descriptive analysis was performed and frequency distributions of responses were calculated. To compare responses from two survey regions and gender data was stratified by the region and gender, frequencies was calculated and Chi Square Test of Independence and T test was performed. Bivariate analysis was conducted to assess factors associated with rejection of MMR vaccination. For this purposes the survey characteristics were dichotomized and chi-square tests were performed to determine association between categorical variable. Prevalence ratios and p values were calculated and variables with p values ≤ 0.05 was considered to be significantly associated with outcome variable (MMR acceptance status).

2. Qualitative survey

FG sessions were audiotaped and professionally transcribed verbatim. A survey assistant took notes during the sessions. At the end of each FG session moderator and survey assistant reviewed their notes and verbatim reports to make sure that they make sense in relation to the study questions. Comments or any observations made during the interview were also added or clarified. Study coordinator interviewed the interviewers/moderators with regard to their experiences in the field. This de-briefing covered any problems encountered in administering the guide as well as any new themes or findings from the field.

Transcripts, audiotapes and notes from the focus groups were reviewed independently by two investigators. All surnames and other personally identifying information that might have been inadvertently mentioned were deleted from the transcripts.

Content analysis techniques were utilized to develop coding categories and themes. Codes developed independently by the two investigators were compared and discussed, and differences were reconciled. Through this iterative process a single coding system was developed for phrases, sentences or paragraphs. The process of coding and development of themes was inductive in nature.

■ Ethical considerations and protection of human subjects

The proposal was reviewed by US CDC Human Subject Research Coordinator and determined to represent program evaluation and not human subject research. Similar determination as non-research activity was obtained from the Ehical Review Committee at NCDC.

■ Description of survey procedures

3. Qualitative survey

After recruitment and screening of FG participants, they were invited to survey sites (NCDC central office in Tbilisi and its regional branches in other sites). Potential participants were enrolled after obtaining written informed consent. Consent was obtained from participants on-site immediately before joining the FG. Permission was obtained from respondents to tape-record FG discussions with provisions and assurances made for confidentiality.

4. Quantitative survey

Interviewers were conducted at participants homes. Selected households were visited and eligible participants were identified according to selection criteria and KISH grid methodology. Potential participants were enrolled after provision of information leaflets and obtaining verbal consent. All information was entered on site in electronic databases installed in tablets. At the end of the day, each interviewer was responsible for the review of entered data and their upload to the server as described in standard operation procedures (SOP) for the survey. Interviewers worked in groups and reported to field coordinator regarding any deviations, issues or questions during the fieldwork or data entry procedures.

Results:

1. Demographic Data

Quantitative survey field work (household interviews) were conducted during October-December, 2017 in Tbilisi and Gurjaani municipality (Table 3).

From the randomly selected 1000 households, 948 (94.8%) eligible respondents were identified and available ("reached respondents"), among which 864 (response rate, 91.1%) agreed to participate in the survey. From 864 participants recruited, 439 (50.8%) were from Tbilisi and 425 (49.2%) were from Gurjaani municipality.

The descriptive data on survey participants is given in Table 3. About 60% of participants were female and 40% were male. Half of participants were aged 25-29 years, were not married, did not have a child, were unemployed and had secondary school or lower education status. A vast majority of participants were ethnic Georgians (96%), Orthodox Christians (88%), did not belong to socially disadvantaged group (group defined by government who are provided with monthly financial support and other benefits) (89%) and never been internally displaced due to the war (96%).

Additionally, stratified analysis by two survey regions (Tbilisi as urban vs. Gurjaani municipality as rural settlement) was conducted to assess differences in the responses on the survey questions among the given two population. Though demographic characteristics somewhat differed in two regions there was no major difference except for marital status, number of children, education and employment status. Specifically, respondents living in the region compared with the capital city (Gurjaani municipality vs. Tbilisi, respectively) were more likely to have low education status, more likely to be unemployed and receiving social assistance from the government, more likely to be in marital relationship and have children (Table 3).

Table 3. Socio-Demographic characteristics of respondents, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%	%	%	*P*
Study site					
Tbilisi	439	50.8	---	---	---
Gurjaani	425	49.2	---	---	
Respondent sex					
Male	357	40.3	37.1	43.6	*0.029*
Female	529	59.7	62.9	56.4	
Age, years					

18-19	131	14.8	18.3	11.3	*0.000*
20-24	320	36.2	39.4	32.9	
25-29	433	49.0	42.3	55.9	
Education					
Secondary school	434	50.2	35.4	65.6	*0.000*
Professional/Technical school	97	11.2	9.1	13.4	
University/College	334	38.6	55.6	21.0	
Ethnicity					
Georgian	828	95.8	93.4	98.4	*0.000*
Other	36	4.2	6.6	1.6	
Religion					
Orthodox Christian	831	87.7	94.1	98.4	*0.010*
Other	33	12.3	5.9	1.6	
Marital status					
Currently married	420	44.3	40.7	56.6	*0.000*
Other	446	55.7	59.3	43.4	
Employment status					
Employed	297	34.7	37.8	31.3	*0.000*
Student	136	15.8	25.6	5.7	
Unemployed	426	49.5	36.6	63.0	
Professional background					
Medical/nursing	78	9.4	8.7	10.1	*0.006*
Not medical	743	89.5	91.3	87.6	
DNK	9	1.1	0.0	2.2	
How many children do you have?					
0	345	47.7	57.3	37.7	*0.000*
1	162	22.4	20.7	24.2	
2	177	24.5	17.9	31.3	
3	35	4.8	3.8	5.9	
4	4	0.6	0.3	0.8	
Do you receive social assistance from the government?					
Yes	92	10.7	6.2	15.3	*0.000*
No	770	89.3	93.8	84.7	
Have you ever been forced to move from your house because of war or civil unrest?					
Yes	33	3.9	5.3	2.4	*0.022*
No	822	96.1	94.7	97.6	

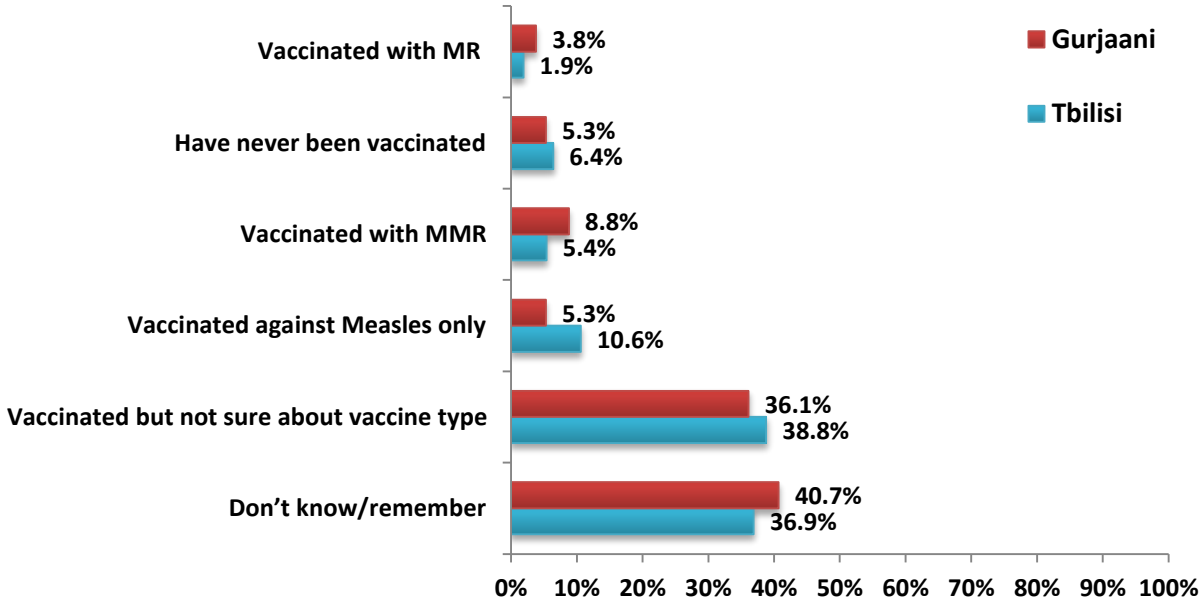
2. Immunization Status, Measles and Rubella Disease History Data

Vast majority of participants (96%) reported to be vaccinated in their childhood (till 15 years old) and only 17% reported to have received vaccines after they reached the age 15. Very few respondents (6%) reported to have ever refused to get vaccines in the past. The most frequently named reasons for refusal with 16% of responses included low risk perception, false contraindications such as allergic status (12% of responses) and neurologic diseases (12% of responses), afraid of vaccines (12% of responses) and afraid of shots (12% of responses), Did not know (12% of responses), HCW did not recommend (8% of responses), reported to be frequently ill (7% of responses), did not need (5% of responses), pregnant (5% of responses) and other reasons (2%). (Table 4)

On the question regarding measles and rubella disease history in the past, about half (51%) reported that have never had these diseases, 22% did not know, 16% reported history of measles, 5% - history of rubella and 6% had both diseases. Among those who reported to have at least one of these diseases in the past, 69% reported that the diagnosis was made by a HCW clinically, 9% by a physician based on laboratory test results and, the rest either were diagnosed by other persons, were self-diagnosed, or did not remember (7%, 4% and 12%, respectively) (Table 4).

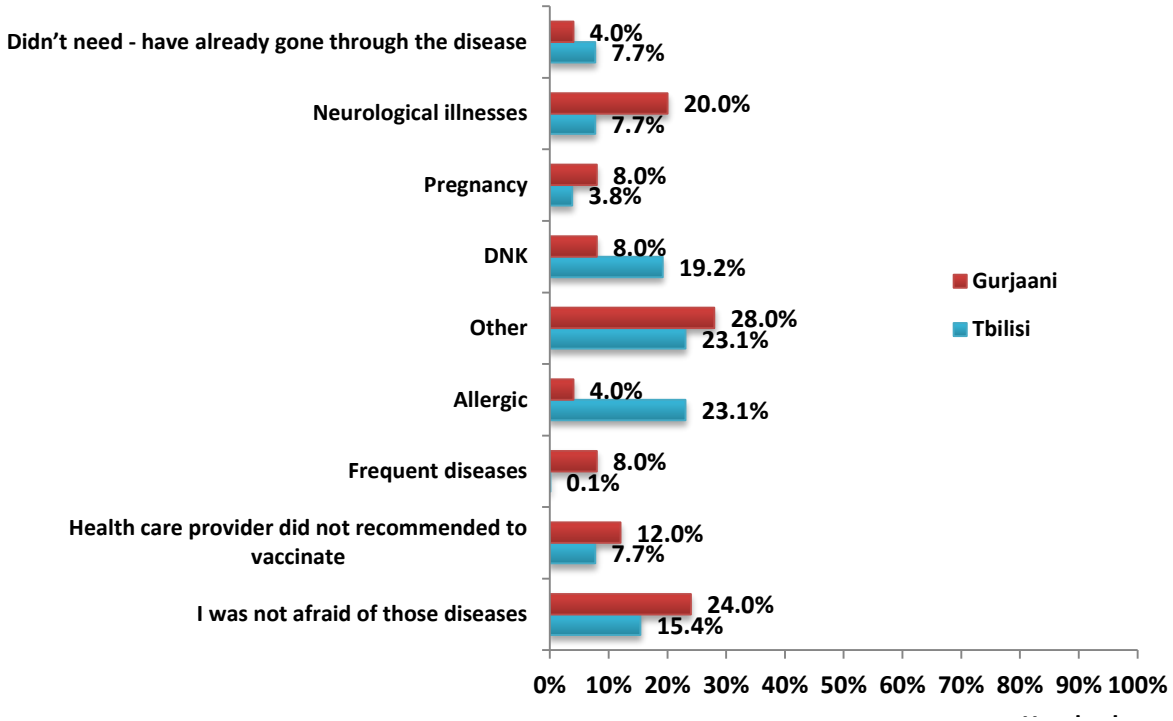
Participants were asked if they had ever been vaccinated against measles and rubella. Very few respondents reported to be vaccinated, including 8% who were vaccinated with monovaccine measles, 7% who were vaccinated with MMR, and 3% who received MR vaccine during the 2008 campaign. Majority of respondents did not know their vaccination status (39%), were not sure if they were vaccinated for the given infections and 6% reported not to be vaccinated against measles and rubella. Respondents responses on MMR vaccination status was differed among respondents living in Tbilisi compared to respondents from Gurgaani municipality (Figure 1).

Fig. 1. MMR Vaccination Status, Tbilisi vs. Gurjaani municipality data, Measles and Rubella KAP Survey, 2017



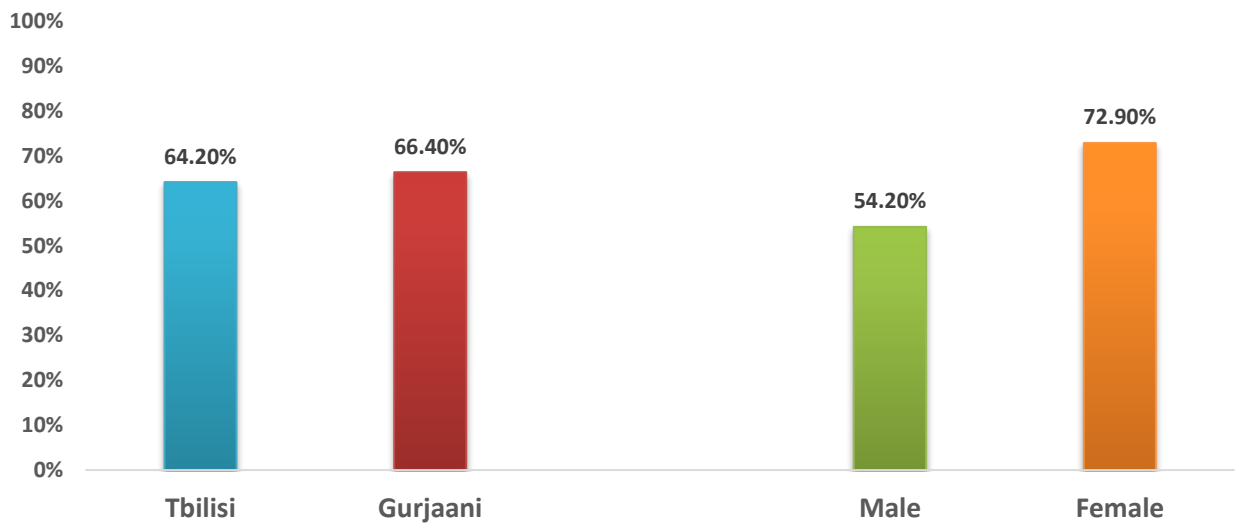
Participants' vaccination and infection disease history status differed among respondents of two regions. Though according to responses childhood vaccination status was similar in two regions, in Gurgaani municipality more respondents reported to be vaccinated in adulthood compared to respondents from Tbilisi (22% vs. 12% respectively). Interestingly reasons for refusal for vaccination also differed among participants of these two region. While among Tbilisi residents the most frequently named reason for vaccine refusal in childhood was named allergic status, among Gurjaani municipality it was not being afraid of vaccine preventable diseases (Figure 2).

Fig. 2. Reasons for Vaccine Refusal in Childhood, Tbilisi vs. Gurjaani Municipality Data, Measles and Rubella KAP Survey, 2017



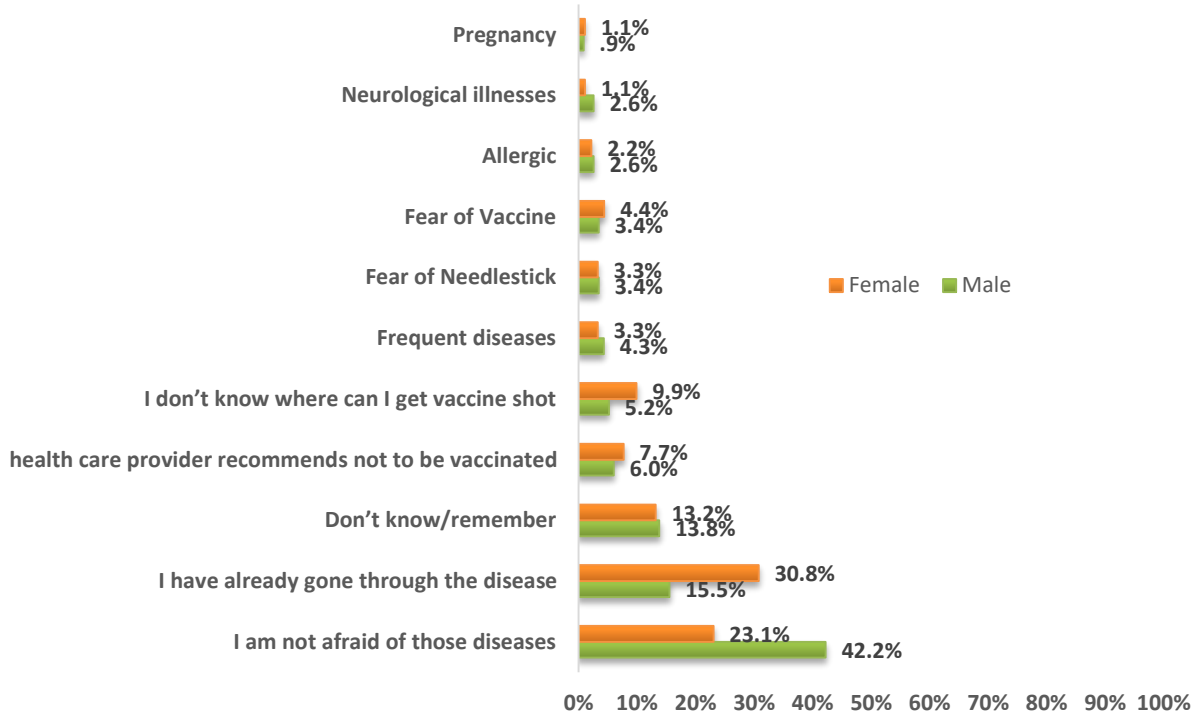
Those who did not report to be vaccinated against measles and rubella were asked if they would be willing to get MMR shot. Out of 495 respondents 65% agreed, 26% disagreed and 9% were not sure if they would get MMR vaccine if offered free. There were no significant difference between residents of two survey region (64% Tbilisi vs. 66% Gurjaani), though females appeared to agree on MMR vaccination more than males (73% Female vs. 54% Males) (Figure XX).

Fig. 3. Participants agreed to get MMR Vaccine, by Gender and Reach Site, Measles and Rubella KAP Survey, 2017



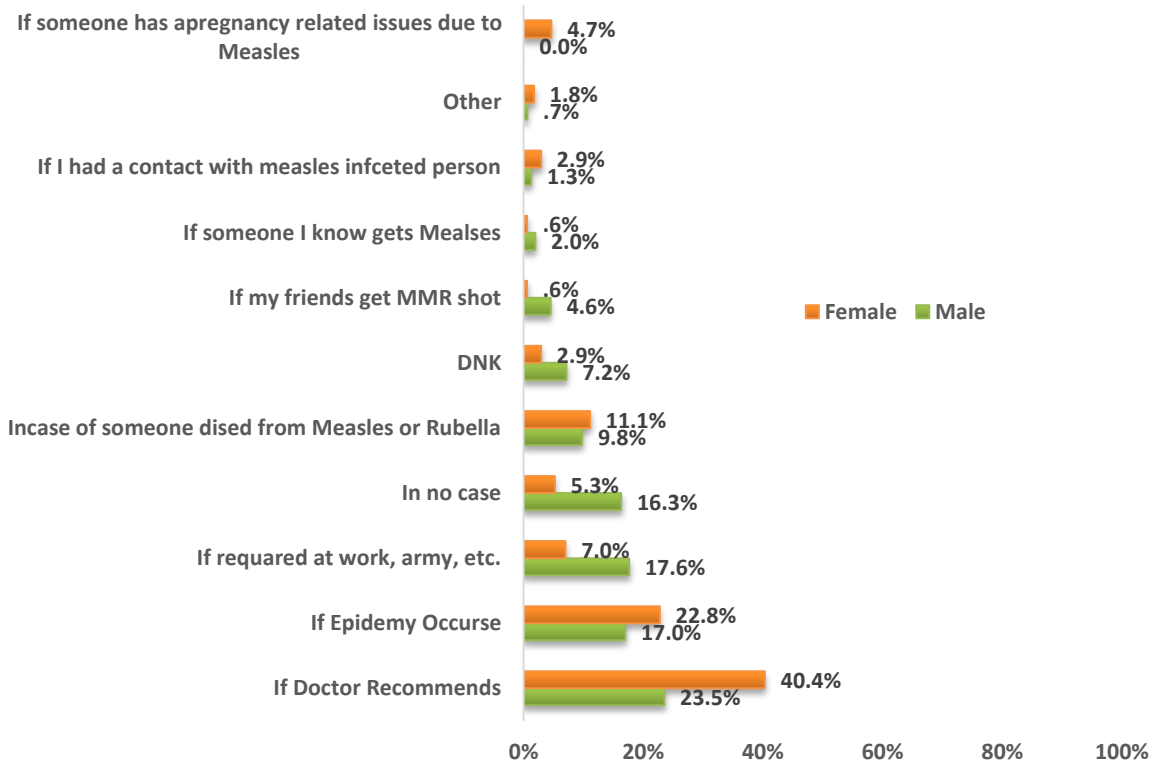
The top four the most frequently named self-reported reasons for refusal for MMR vaccination in the future included: low risk perception (70 respondents), respondents did not see a need in immunization since already contracted the diseases (46 respondents), did not have any specific reason (28 respondents), did not know where he/she could get a vaccination services (15 respondents) and HCW did not recommended (14 respondents). Reasons for refusal among participants representing two regions did not differ significantly, though there was identified some differences among different gender groups. Specifically, the main reason for refusal for man was named no fear of measles and rubella, while for women it was history of infection with measles and rubella (Figure 4).

Fig. 4. Reasons for MMR Vaccine Refusal in the Future, Tbilisi vs. Gurjaani Municipality Data, 2 Measles and Rubella KAP Survey, 2017



The respondents who refused to get MMR vaccine in the future were asked in what condition they would change their mind. The frequently named conditions included: HCPs recommendation (105 respondents), in case of the disease epidemic in the country (65 respondents), if it was required at work or at education institutions (39 respondents) and if someone would die from the diseases (34 respondents). Comparison of different gender groups revealed that the more males reported not to change their mind in any circumstances than females (16% vs. 5%, respectively) and compared to women less man reported to change their mind if HCP recommend them, if Measles epidemic occurs in the country or someone dies from the disease. On the other hand compared to women more men reported to change their mind if vaccination become mandatory at work, army or other settings (Figure 5).

Fig. 5. Reasons for Changing Mind on MMR Vaccination, Tbilisi vs. Gurjaani Municipality Data, 2 Measles and Rubella KAP Survey, 2017



Majority of participants (78%) agreed that they would recommend vaccine to their accountancies, 8% did not agree and 14% were not sure.

Participants who reported to have a child were asked if they vaccinate their children. A vast majority of participants reported to vaccinate their children (98%), only 2% reported they did not vaccinate and less than 1% did not remember or were not sure. Again majority of participants (95%) reported that had never refused to get their children vaccinated, only 5% reported that had refused and less than 1% did not remember or were not sure. The most frequently named reasons for refusal on child vaccination included: child been ill during the vaccination due date, fear of vaccine side effects, rumors that provided vaccines are outdated and one of the respondents reported that her father-in-low who is pediatrician decided that her children should not be vaccinated.

Table 4. Immunization Status, Measles and Rubella Infection History Data, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%	%	%	*P*

Have you been vaccinated in childhood (before age 15)?					
Yes	824	95.5	96.6	94.3	*0.261*
No	14	1.6	1.4	1.9	
Don't know/remember	25	2.9	2.1	3.8	
Have you been vaccinated in adulthood (after age 15)?					
Yes	144	16.7	12.1	21.5	*0.001*
No	623	72.2	76.5	67.7	
Don't know/remember	96	11.1	11.4	10.8	
Have you or your parent ever refused your vaccination					
Yes	54	6.3	5.5	7.1	*0.098*
No	703	81.6	80.1	83.0	
Don't know/remember	105	12.2	14.4	9.9	
Reasons of refusal*					
I was not afraid of those diseases	10	16.4	13.3	19.4	
Allergic	7	11.5	20.0	3.2	
Neurological illnesses	7	11.5	6.7	16.1	
Fear of needles	7	11.5	10.0	12.9	
Fear of vaccines	7	11.5	10.0	12.9	
DNK	7	11.5	16.7	6.5	
Health care provider did not recommended to vaccinate	5	8.2	6.7	9.7	
Frequent diseases	4	6.6	6.7	6.5	
Didn't need - have already gone through the disease	3	4.9	6.7	3.2	
Pregnancy	3	4.9	3.3	6.5	
Other	1	1.6	0.0	3.2	
Have you ever been infected with measles or rubella?					
Infected with Rubella Only	45	5.3	6.4	4.1	*0.000*
yes, both	53	6.2	9.6	2.6	
Infected with Measles only	133	15.5	15.3	15.8	

Don’t know/remember	192	22.4	25.6	19.1	
Never had been infected with Rubella/Mumps	434	50.6	43.2	58.5	
How was rubella and measles diagnosed?**					
By myself	10	4.3	2.9	6.3	
By someone other than physician	15	6.5	5.1	8.3	
By physician with laboratory testing	21	9.1	11.8	5.2	*0.108*
Don’t know/remember	27	11.6	8.8	15.6	
By a physician	159	68.5	71.3	64.6	
Have you ever been vaccinated against measles or rubella?					
Vaccinated with MR (in 2008 campaign)	23	2.8	1.9	3.8	
Have never been vaccinated	48	5.9	6.4	5.3	
Vaccinated with MMR	58	7.1	5.4	8.8	
Vaccinated against Measles only	66	8.1	10.6	5.3	*0.012*
Vaccinated against both but not sure about vaccine type	307	37.5	38.8	36.1	
Don’t know/remember	317	38.7	36.9	40.7	
Would you agree to be vaccinated against Measles and Rubella in the future?***					
Yes	323	65.3	64.2	66.4	
No	128	25.9	26.2	25.5	*0.806*
Don’t know/remember	44	8.9	9.6	8.1	
Reasons for non-vaccination in future******					
I am not afraid of those diseases	70	33.3	28.7	38.9	
Don’t need – I have already gone through the disease	46	21.9	25.2	17.9	
Don’t know/remember	28	13.3	11.3	15.8	
I don’t know where can I get vaccine shot	15	7.1	9.6	4.2	
health care provider recommends not to be vaccinated	14	6.7	7.8	5.3	
Frequent diseases	8	3.8	4.3	3.2	

Fear of vaccines	8	3.8	3.5	4.2	
Fear of needles	7	3.3	3.5	3.2	
Allergic	5	2.4	2.6	2.1	
Neurological illnesses	4	1.9	1.7	2.1	
Other	3	1.4	0.9	2.1	
Pregnancy	2	1.0	0.9	1.1	
In which cases would you get Measles and Rubella vaccine?*****					
If health care provider strongly recommends to be vaccinated	105	32.4	57.5	46.8	
If I would get to know about possible epidemic	65	20.1	35.8	28.7	
If it is obligatory in the place I work/study	39	12.0	23.6	14.9	
I would not be vaccinated under any circumstances	34	10.5	16.0	18.1	
If someone dies because of measles/rubella	34	10.5	17.0	17.0	
DNK	16	4.9	4.7	11.7	
If I would get to know about someone with measles and rubella-related pregnancy problems	8	2.5	5.7	2.1	
If my friends were vaccinated	8	2.5	3.8	4.3	
If I have been in contact with someone with measles and rubella	7	2.2	5.7	1.1	
Other	4	1.2	1.9	2.1	
If one of my acquaintances gets infected	4	1.2	1.9	2.1	
Would you recommend your friend / colleague to get vaccine against Measles and Rubella?					
Yes	661	77.9	76.1	79.6	*0.070*
No	69	8.1	7.3	9.0	
Don't know/remember	119	14.0	16.6	11.4	
Do you vaccinate your child? ******					

Yes	385	97.7	97.5	97.8	*0.966*
No	7	1.8	1.8	1.7	
Don't know/remember	2	0.5	0.6	0.4	
Have you ever decided not to have your child get a shot?					
Yes	21	5.3	6.1	4.7	*0.405*
No	375	94.5	93.3	95.3	
Don't know/remember	1	0.3	0.6	0.0	

**Among those who had ever refused get vaccine. Multiple Choice question.*

*** Among those who have ever had measles/rubella*

****Among those who answer "No/likely no" on question: If you have not been vaccinated or don't know if you were vaccinated, would you agree to be vaccinate against Measles and Rubella?*

***** Among those who answer "No/likely no" on question: If you have not been vaccinated or don't know if you were vaccinated, would you agree to be vaccinate against Measles and Rubella? Multiple Choice question.*

****** Among those who have not been vaccinated or doesn't remember vaccination status*

*******Among those who have child*

3. General Knowledge about Vaccines

General knowledge about immunization was assessed among study participants. When asked to self-assess their knowledge on immunization, majority of respondents reported to be partially informed (52%) or uninformed (32%) about immunization in general. Despite overall low information level on immunization percentage of respondents who stated that are well informed about immunization were even lower among Gurjaani municipality survey representatives compared to Tbilisi (1.4% vs. 4.1% respectively). Still about 78% of respondents correctly indicated that vaccination is required to prevent some of the infection diseases, 9% thought that vaccination is required only in childhood, 6% did not know, 5% believed that the vaccines are required to treat infectious diseases and the remaining 1% considered vaccination to be dangerous to their health (Table 5).

The most frequently named vaccine complications included: fever (44% of responses) and pain of injection place (32.5%) and 2.5% of responses included other reasons not listed in the questionnaire, such as: allergic reactions, neurological complications including anxiety, disabilities, and even coma.

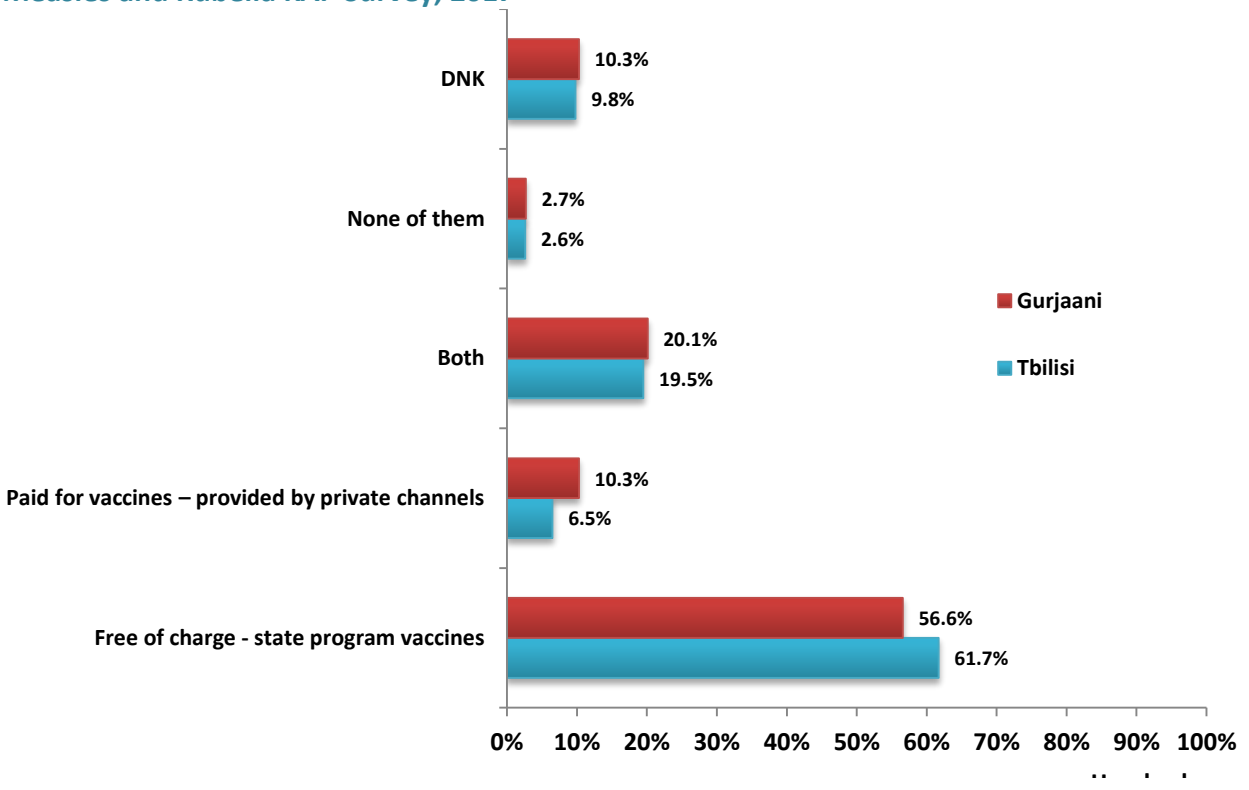
Study revealed participants low risk perceptions related to VPDs. Only 48% agreed that VPDs could cause death, the rest 22% believed that the diseases do not cause death, and 30% did not

know. About 9% of respondents reported to have heard about cases of vaccine-related illness or death, 7% were not sure, and majority (83%) reported had not heard of such cases. More Tbilisi residents reported to be more informed about VPD and vaccine complications than Gurjaani municipality residents.

Participant opinion regarding the type of immunization was divided. One group represented by 51% of respondents believed that immunization must be obligatory, while another group of 45% of respondents believed that it must be voluntary. Only 3% were not sure and 1% believed that it must be compulsory or had other opinion (including the opinion that vaccines should not be offered at all).

More than half of respondents (62%) gave preference to government-purchased vaccines, only 7% gave preference to the vaccine provided by private companies, 20% accepted both, 10% did not know and 3% did not give preference to either of them. Responses on the given subject were different among Tbilisi and Gurjaani municipality representatives, specifically those living in Gurjaani gave preference to Government purchased vaccines (Figure 6).

Fig. 6. Preference of Government Purchased Vaccines, Tbilisi vs. Gurjaani Municipality Data, Measles and Rubella KAP Survey, 2017



Medical facilities were named by vast majority of participants (91%) as the most preferred place for administration of immunization, 4.5% of participants were not sure regarding where they would prefer to be administered the immunization, and only 2.7% named mobile immunization brigade and 1.5% workplace as the preferred place to be vaccinated.

Table 5. General Knowledge of Vaccines, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%	%	%	*P*
In your opinion, are you informed enough about immunization?					
I am informed very well	24	2.8	4.1	1.4	*0.082*
Sufficiently informed	119	13.8	12.6	15.2	
Partially informed	444	51.6	52.1	51.2	
I am not informed	273	31.7	31.3	32.2	
In your opinion, why is it necessary to receive vaccines?					
To prevent all diseases only in children	75	8.8	9.6	7.9	*0.663*
To treat diseases	45	5.3	5.5	5.0	
To prevent some infectious diseases	645	75.5	75.2	75.8	
I think that vaccination is unnecessary, even harmful	11	1.3	0.9	1.7	
Other	24	2.8	3.2	2.4	
DNK/remember	54	6.3	5.5	7.2	
What kind of vaccination is acceptable for you?					
Voluntary	385	44.7	47.8	41.4	*0.112*
Obligatory	438	50.8	47.2	54.6	
Compulsory	5	0.6	0.7	0.5	
Other	7	0.8	0.5	1.2	
DNK/remember	27	3.1	3.9	2.4	
Which vaccines are acceptable for you?					
Free of charge - state program vaccines	531	61.7	56.6	66.9	*0.000*
Paid for vaccines – provided by private channels	56	6.5	10.3	2.6	
Both	168	19.5	20.1	18.9	

None of them	22	2.6	2.7	2.4	
DNK	84	9.8	10.3	9.2	
Have you heard about fatal cases from infectious diseases?					
Yes	417	48.4	55.6	41.0	*0.000*
No	186	21.6	17.4	25.9	
DNK/remember	258	30.0	27.0	33.0	
Have you heard about cases of illnesses death after vaccination?					
Yes	81	9.4	10.7	8.1	*0.040*
No	718	83.4	84.1	82.7	
DNK/remember	62	7.2	5.2	9.2	
Which place is most acceptable for you to get vaccine shot?					
At medical facility	782	90.6	90.9	90.3	*0.386*
At work place/education place	13	1.5	2.1	0.9	
Brigade of special medical mobile team	23	2.7	1.8	3.5	
Other	6	0.7	0.7	0.7	
DNK/remember	39	4.5	4.6	4.5	
What age is appropriate for vaccination?					
Childhood	179	20.8	24.4	17.1	*0.050*
Adults	3	0.3	0.5	0.2	
Both in children and adults	614	71.3	68.6	74.2	
DNK/Difficult to say	65	7.5	6.6	8.5	

4. Measles and Rubella-Related Knowledge

Measles and rubella-related knowledge was evaluated among study participants. On the question how easily can measles and rubella be spread in the community, majority (72%) reported that it is very contagious disease, 6% did not agree and 23% were not sure.

Respondents were asked about measles and rubella transmission ways and complications. More than half (60%) of respondents correctly named air as the main transmission way of the given

infection. However 52% could not name the complications of measles and rubella. The most frequently named complications were stillbirth, pneumonia and death.

On the question if measles and rubella can be treated with antibiotics, more than half of respondents (55%) did not know, 31% agreed and 31% did not agree that antibiotics could be used to treat the given diseases. Interestingly more Tbilisi residents reported that measles can be treated with antibiotics than Gurjaani municipality representatives (16.6% vs. 10.8%, respectively).

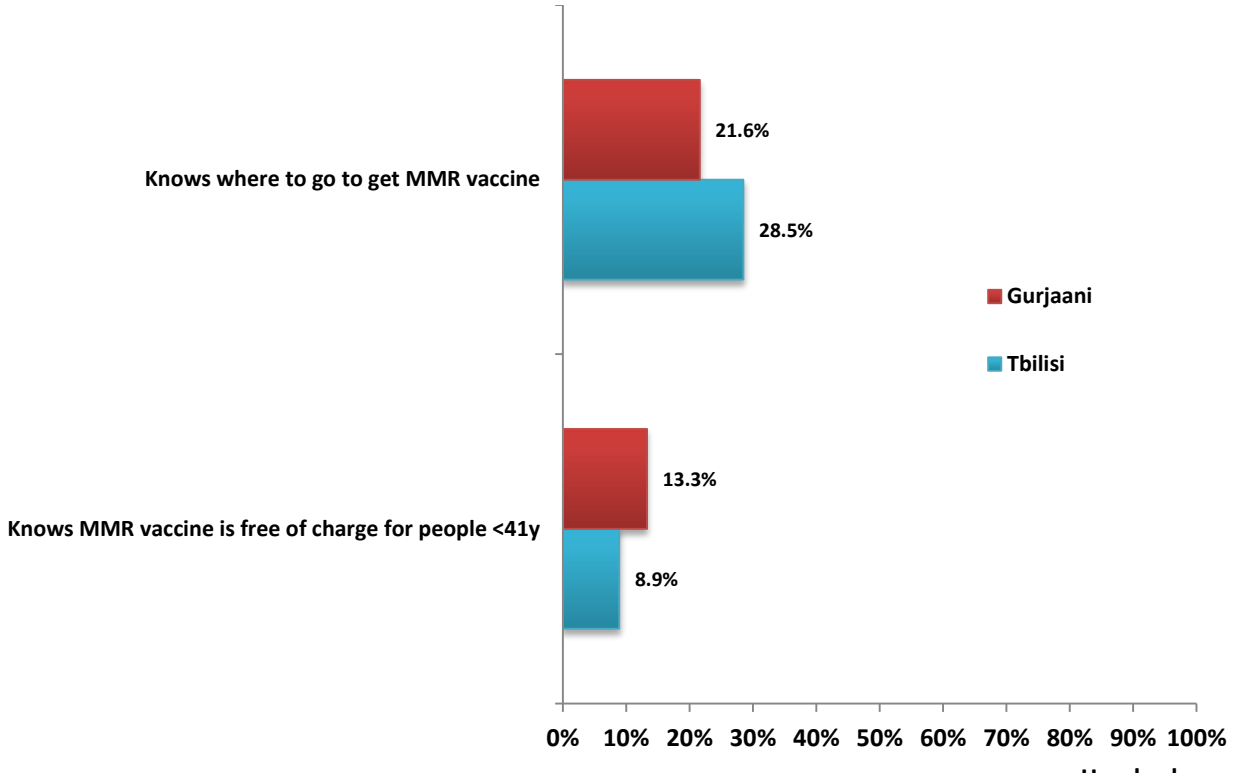
More than half of respondents (57%) agreed that MMR vaccination developed strong lifelong immunity against the diseases, 29% were not sure and 15% did not agree with the statement.

Majority (70%) agreed with the statement that one should be vaccinated if does not have immunity against measles and rubella, though 22% of respondents still were not sure and 8% did not agree with the statement.

Only 24% were informed that MMR vaccination will protect people from mumps as well. More than half of respondents were not sure and 8% believed that MMR does not develop immunity against mumps. Knowledge about mumps related complications were low among participants. More than half did not have any information about this matter. The most frequently named complications included inflammation of the testicles (orchitis) and permanent hearing loss.

Very few (11%) were aware that MMR vaccine is provided free of charge for Georgian citizens under 30 years-old, 10% were not sure and the rest majority of respondents (79%) did not know. Respectively, only 30% of respondents knew where to go for vaccination, 14% were not sure and 58% did not know where they could get vaccine. Importantly, more Gurjaani municipality survey representatives reported to be informed about the fact that MMR vaccines are provided free of charge for people 40 and younger age and also were they should go to get vaccine than Tbilisi survey representatives (Figure 7).

Fig. 7. Knowledge about free MMR Vaccine Services, Tbilisi vs. Gurjaani Municipality Data, Measles and Rubella KAP Survey, 2017



Only 15% of respondents have heard about measles and rubella outbreak in Georgia, while 12% were not sure and majority (73%) have never heard about it. Those who reported to hear about outbreak were asked when took it place in Georgia. About 36% reported that outbreak took place less than 5 years ago, 26% reported 5-9 years ago, 14% believed that outbreak is ongoing currently, 7% reported that it took place 10-15 years ago and 18% were not sure.

Majority of respondents (78%) have never heard about hospitalizations because of measles or rubella, only 18% reported to have heard and 4% were not sure; neither did majority (91%) hear about death cases due to measles or rubella; only 6% have heard about them, and 3% were not sure. Similarly, majority (79%) were not aware about cases of pregnancy complications due to or rubella, 14% reported to have heard about such cases, and 7% were not sure. Similarly, majority never heard about 2008 mass immunization campaign against measles and rubella in Georgia, only 13% reported to have heard about it, and the remaining 18% were not sure.

Table 6. Measles and Rubella-related Knowledge, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%			*P*

Do you think that measles and rubella are easily transmitted diseases?					
Yes	615	71.9	70.5	73.4	*0.601*
No	47	5.5	5.5	5.5	
DNK/remember	193	22.6	24.0	21.1	
Have you ever heard about measles and rubella epidemic in Georgia?					
Yes	130	15.2	16.3	14.0	*0.630*
No	625	72.9	72.2	73.6	
DNK/remember	102	11.9	11.5	12.4	
When did this epidemic occur? *					
10-15 years ago	9	7.1	8.7	5.3	*0.451*
5-9 years ago	32	25.4	21.7	29.8	
Less than 5 years ago	45	35.7	39.1	31.6	
Is occurring now	17	13.5	15.9	10.5	
DNK/remember	23	18.3	14.5	22.8	
Have you heard of hospitalization cases of measles and rubella during recent years?					
Yes	152	17.7	18.9	16.4	*0.626*
No	668	77.9	76.7	79.0	
DNK/remember	38	4.4	4.3	4.5	
Have you heard about measles and rubella fatal cases during last years?					
Yes	47	5.5	7.1	3.8	*0.068*
No	783	91.2	90.2	92.2	
DNK/remember	29	3.4	2.7	4.0	
Have you ever heard about pregnancy complications because of rubella?					
Yes	123	14.3	13.0	15.7	*0.461*
No	678	78.9	80.6	77.2	
DNK/remember	58	6.8	6.4	7.1	

Have you heard about immunization campaign against measles and rubella in 2008?					
Yes	115	13.4	11.2	15.6	*0.107*
No	588	68.4	71.2	65.4	
DNK/remember	157	18.3	17.6	19.0	
Measles and rubella can be treated with antibiotics					
Yes	117	13.7	16.6	10.8	*0.027*
No	266	31.2	28.5	34.0	
DNK/remember	470	55.1	54.9	55.3	
Measles and rubella vaccine provide lifelong immunity against these diseases					
Yes	481	56.5	60.3	52.6	*0.079*
No	126	14.8	13.6	16.0	
DNK/remember	244	28.7	26.1	31.3	
One without measles and rubella immunity should get the vaccine even if he/she is an adult					
Yes	599	70.1	69.2	71.0	*0.148*
No	66	7.7	6.4	9.0	
DNK/remember	190	22.2	24.4	20.0	
The vaccine against measles and rubella currently used in Georgia also protects from mumps disease					
Yes	208	24.2	22.8	25.6	*0.607*
No	70	8.1	8.0	8.3	
DNK/remember	582	67.7	69.2	66.1	
MMR vaccination is free of charge for the population of all age groups below 30 years old					
Yes	95	11.0	8.9	13.3	*0.064*
No	682	79.2	82.2	76.1	

DNK/remember	84	9.8	8.9	10.7	
Do you know where you can get the shot against these diseases?					
Yes	240	28.5	21.6	35.7	*0.000*
No	486	57.7	62.6	52.4	
DNK/remember	117	13.9	15.8	11.9	

** Among those who have ever heard about measles and rubella epidemic in Georgia*

5. Measles, Rubella and Vaccination Related Perceptions and Attitudes

To assess respondents' perceptions and attitude regarding vaccination-related benefits, risk perceptions and barriers 5-scale-response questions (1 - Strongly agree, 2 - Agree, 3 - Don't Know, 4 - Do not agree, and 5 - Strongly do not agree) on different statements about vaccination was utilized.

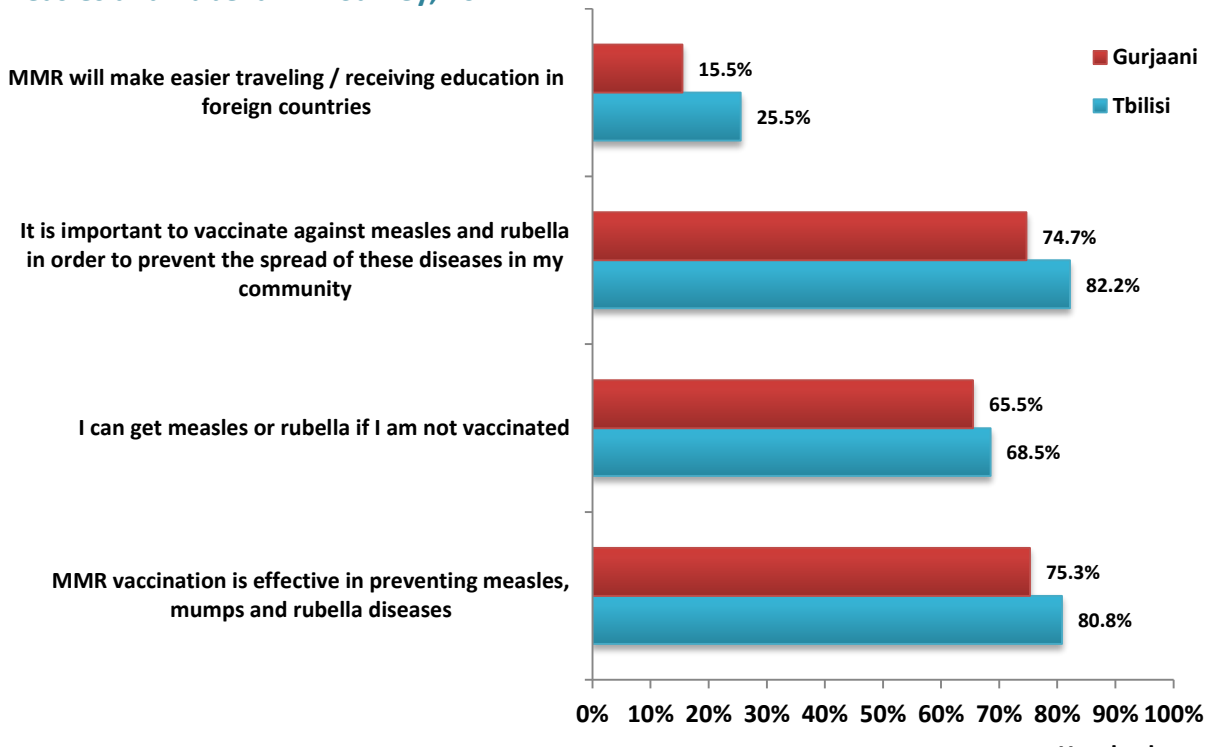
Majority of respondents agreed (60%) or strongly agreed (18%) that "It is important for adults to receive all recommended vaccines". However, majority also agreed (43%) or strongly agreed (16%) that vaccination is more important for children than adults, only 30% did not agree with statements and the rest either strongly did not agree (3%) or were not sure (8%).

Almost 70% agreed that vaccination is the effective way of developing immunity against infection diseases in general and against measles and rubella in particular, that vaccines are safe and it is important to vaccinate against measles and rubella in order to prevent the spread of the diseases in my community. More than 70% responded that were not sure (59%) or did not agree (17%) with the statement – "I think that being vaccinated for measles, rubella and mumps will make it easier for me to travel or study abroad" . Majority believed that benefit of MMR vaccination exceeds the risks (agreed – 59% and strongly agreed – 11%) and reported not to be afraid of vaccine related complications (do not agree – 57% and strongly do not agree – 5%).

More than half believed that if not vaccinated, they could get infected with measles or rubella (agreed – 61% and strongly agreed – 7%), however fewer respondents believed that if infected with measles or rubella, they could develop serious health problems (agreed – 46% and strongly agreed – 6%). About 40% were not sure or did not believe that measles or rubella could cause serious health problems during pregnancy. When asked specifically which infection (measles, mumps or rubella) are they more afraid, majority of respondents reported that they were not afraid of any of them (30%) or were not sure (25%). Still, mumps was named as the most dangerous to respondents (18%), followed by measles (12%) and rubella (8%). Almost 60% of respondents did not agree on the statement that they are more susceptible to measles or rubella compared to others (do not agree –52% and strongly do not agree – 8%).

Compared to Gurjaani municipality survey representatives more Tbilisi survey representatives agreed or strongly agreed with the statements that MMR vaccine is effective measure to prevent the diseases, that if not vaccinated they could get the disease, getting vaccinated with MMR will make easier traveling / receiving education in foreign countries and that It is important to vaccinate against measles and rubella in order to prevent the spread of these diseases in their community (Figure 8).

Fig. 8. MMR Vaccine Benefit Related Perceptions, Tbilisi vs. Gurjaani Municipality Data, Measles and Rubella KAP Survey, 2017



Majority of respondents did not name distance to vaccine provider clinic as an issue, and 85% did not agree that their residence is far from the clinics were they can get a vaccine. Neither did they agree on the statements that they are too busy to get vaccinated (do not agree –73% and strongly do not agree – 12%). However responses on the statement "It seems painful to get vaccine injection" varied - 50% did not agree, 36% were not sure and 14% agreed with the statement. Significant difference was identified among two region survey representatives on the vaccination barriers related issue, specifically more respondents from Gurjaani municipality named distance as an issue (5.5% vs. 2.7%), though less considered the vaccination painful (10.8% vs. 16.3%).

ough majority did not agree that MMR vaccine provided by state is of low quality (do not agree – 60% and strongly do not agree – 16%), still, there were respondents who were not sure (19%) or who questioned the quality of state-provided vaccines (5%).

Table 7. Measles, Rubella and Vaccination Related perception, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%			*P*
Adults should receive all recommended vaccines					
strongly agree	157	18.3	17.5	19.1	*0.096*
agree	511	59.6	57.4	61.8	
don't know	110	12.8	15.9	9.5	
disagree	72	8.4	8.2	8.6	
strongly disagree	8	0.9	0.9	1.0	
Vaccines are more important for children than adults					
strongly agree	135	15.8	16.2	15.3	*0.624*
agree	366	42.7	43.7	41.6	
don't know	64	7.5	7.5	7.4	
disagree	265	30.9	30.3	31.6	
strongly disagree	27	3.2	2.3	4.1	
Vaccination is effective method to strengthen immunity (resistance) of organism against infectious diseases					
strongly agree	157	18.4	18.8	18.0	*0.426*
Agree	581	68.1	69.3	66.9	
don't know	94	11.0	10.3	11.8	
Disagree	17	2.0	1.1	2.9	
strongly disagree	4	0.5	0.5	0.5	
Vaccines are safe					
strongly agree	97	11.3	9.1	13.6	*0.204*
Agree	559	65.3	68.3	62.2	

don't know	137	16.0	15.1	17.0	
Disagree	55	6.4	6.4	6.5	
strongly disagree	8	0.9	1.1	0.7	
MMR vaccination is effective in preventing measles, mumps and rubella diseases					
strongly agree	89	10.4	8.7	12.3	*0.016*
agree	578	67.7	72.1	63.0	
don't know	167	19.6	18.0	21.2	
disagree	19	2.2	1.1	3.4	
strongly disagree	1	0.1	0.0	0.2	
I can get measles or rubella if I am not vaccinated					
strongly agree	55	6.5	4.3	8.7	*0.022*
Agree	516	60.6	64.2	56.8	
don't know	180	21.1	21.5	20.8	
Disagree	94	11.0	9.6	12.6	
strongly disagree	7	0.8	0.5	1.2	
It is important to vaccinate against measles and rubella in order to prevent the spread of these diseases in my community					
strongly agree	104	12.2	12.4	12.0	*0.047*
agree	565	66.3	69.8	62.7	
don't know	147	17.3	15.1	19.5	
disagree	34	4.0	2.7	5.3	
strongly disagree	2	0.2	0.0	0.5	
I think that rubella might become an issue for me in the future					
strongly agree	43	5.0	3.9	6.2	*0.217*
agree	394	46.1	47.0	45.1	

don't know	274	32.0	32.2	31.9	
disagree	141	16.5	16.9	16.1	
strongly disagree	3	0.4	0.0	0.7	
Rubella infection is dangerous for pregnant women and their future baby					
strongly agree	86	10.1	10.3	9.8	*0.588*
agree	413	48.3	50.0	46.5	
don't know	345	40.4	38.4	42.4	
disagree	10	1.2	1.4	1.0	
strongly disagree	1	0.1	0.0	0.2	
I may be infected with measles and rubella more easily than others					
strongly agree	3	0.4	0.5	0.2	*0.510*
agree	48	5.6	4.3	7.0	
don't know	294	34.5	35.7	33.2	
disagree	444	52.1	51.9	52.2	
strongly disagree	64	7.5	7.6	7.5	
Which disease is more dangerous for your health in your opinion?					
measles	103	12.1	11.3	13.1	*0.013*
rubella	70	8.3	9.9	6.5	
mumps	148	17.5	14.3	20.8	
none	291	34.3	33.3	35.4	
don’t know/not sure	236	27.8	33.3	35.4	
Getting vaccinated with MMR will make easier traveling / receiving education in foreign countries					
strongly agree	22	2.6	3.5	1.7	*0.008*
agree	150	18.0	22.0	13.8	

don't know	488	58.5	53.7	63.5	
disagree	141	16.9	16.6	17.2	
strongly disagree	33	4.0	4.2	3.7	
Benefit of MMR vaccination exceeds the risks					
strongly agree	89	10.5	9.9	11.1	*0.486*
agree	503	59.4	61.4	57.2	
don't know	214	25.3	24.9	25.6	
disagree	39	4.6	3.5	5.8	
strongly disagree	2	0.2	0.2	0.2	
I am concerned about MMR vaccine side effects					
strongly agree	13	1.5	1.6	1.5	*0.741*
agree	112	13.3	14.5	12.0	
don't know	199	23.6	24.4	22.7	
disagree	478	56.6	54.9	58.4	
strongly disagree	42	5.0	4.6	5.4	
Places I can get vaccines are far for me					
strongly agree	4	0.5	0.2	0.7	*0.000*
agree	31	3.7	2.5	4.8	
don't know	94	11.1	15.4	6.5	
disagree	640	75.4	74.3	76.5	
strongly disagree	80	9.4	7.6	11.4	
I am too busy to get vaccinated					
strongly agree	3	0.4	0.5	0.2	*0.139*
agree	102	12.0	14.0	9.8	
don't know	22	2.6	2.5	2.6	

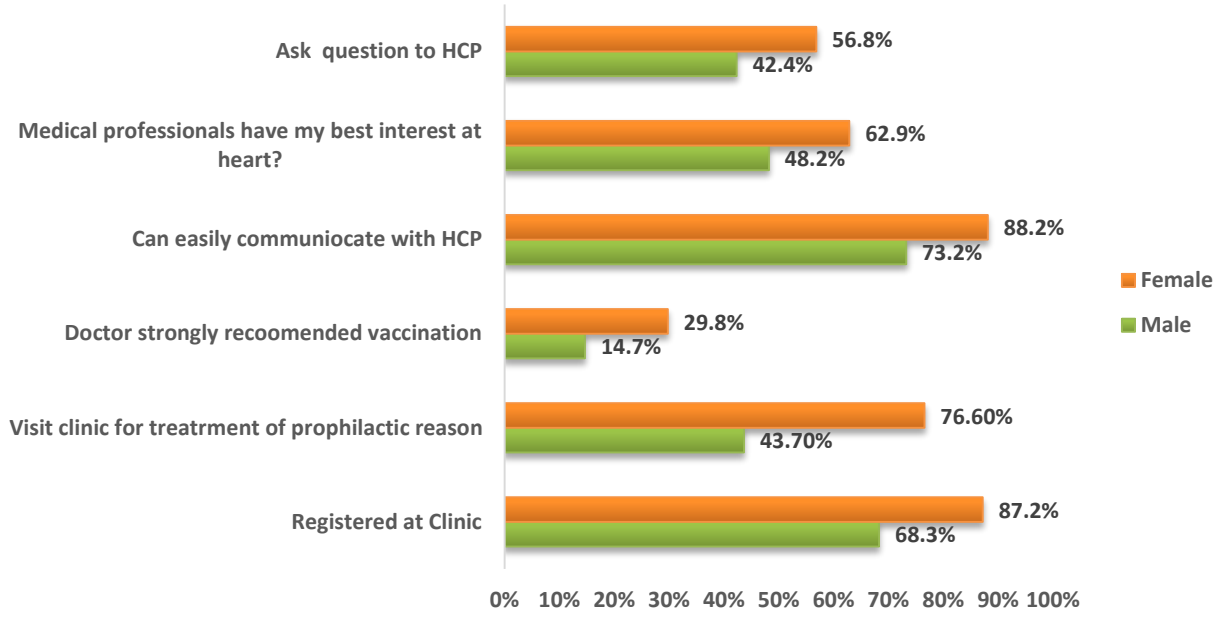
disagree	621	72.8	72.9	72.7	
strongly disagree	105	12.3	10.1	14.6	
MMR vaccination is painful					
strongly agree	10	1.2	1.1	1.2	*0.003*
agree	106	12.5	15.2	9.6	
don't know	308	36.2	38.2	34.2	
disagree	374	44.0	41.8	46.3	
strongly disagree	52	6.1	3.7	8.7	
I am not confident in the safety of routine MMR vaccines					
strongly agree	8	0.9	0.9	1.0	*0.736*
agree	37	4.4	3.4	5.3	
don't know	165	19.4	19.8	19.0	
disagree	507	59.6	59.5	59.8	
strongly disagree	133	15.6	16.3	14.9	

6. Trust toward Health Care Personnel

Majority of survey respondents (80%) reported that they were registered with a medical facility, only 15% were not, and 5 were not sure. Among those who reported to be registered with a medical facility (either private or with state health insurance program), 46% reported to visit clinic only when they are sick, 18% visited the provider for prophylactic purposes too, and the rest (36%) reported that they do not go to the clinic at all.

Update of health care services and communication with HCP differed among two gender groups. Compared to females significantly less man were registered at health care facility, visited clinic for treatment or prophylactic reasons, agreed that their HCP strongly recommended vaccination, can easily communicate with HCPs about their immunization related concerns, believes that medical professionals have patents' best interest at heart and ask any question during the visit at clinic (Figure XX).

Fig. XX. Reasons for Changing Mind on MMR Vaccination, Tbilisi vs. Gurjaani Municipality Data, 2 Measles and Rubella KAP Survey, 2017



According to the majority of respondents (72%) their health care providers had not recommended strongly to get vaccinated (Do not agree –58% and strongly do not agree – 14%).

Importantly, the vast majority of respondents agreed on the statement that they usually follow the advice of their health care provider (92%), and that they trust the information they are provided regarding the vaccination (80%). On the scale from 0 to 10 (0 - do not trust at all to 10 completely trust) respondents gave on average 8.5 points out of 10 when evaluating their trust toward health care personnel. Majority also agreed (70%) or strongly agreed (14%) that they can openly discuss concerns about shots with their doctor. However, majority found it difficult to communicate with ther health care provider (47% do not ask any question) and some respondents doubt that medical professionals have patients' best interest at heart (25% were not sure and 17% did not agree with the statement).

Interestingly, less respondents from Tbilisi survey site agreed or stronlgy agreed that trusted information provided (HCP) by health care provider and that HCP strongly recommended them to get vaccinated compared to Gurjaani municipality survey respondents.

Fig. 7. Trust toward Health Care Providers and vaccine recommendation practice, Tbilisi vs. Gurjaani Municipality Data, Measles and Rubella KAP Survey, 2017

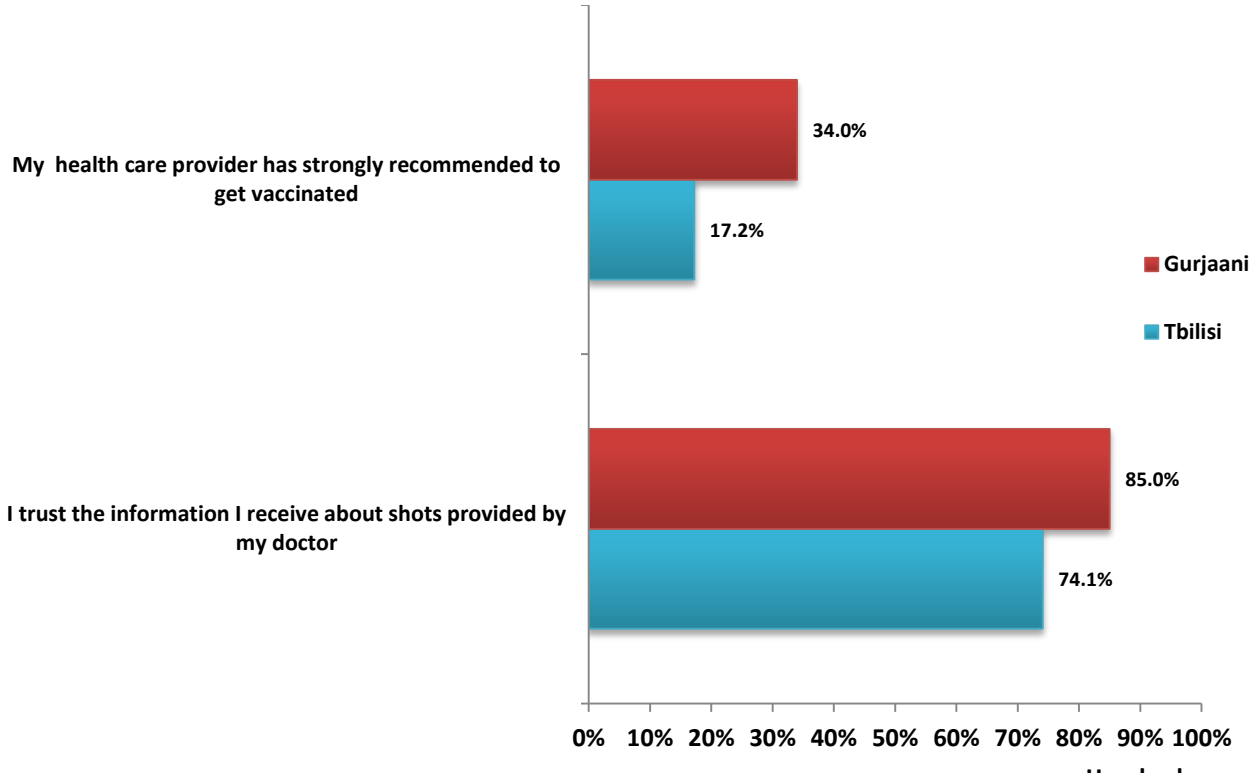


Table 8. Trust and Communication with Health Care Professionals, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%			*P*
Are you registered with a health /medical facility?					
Yes	683	79.7	80.1	79.2	*0.271*
No	131	15.3	13.9	16.7	
DNK/remember	43	5.0	5.9	4.1	
When do you visit health/medical facility?*					
Only when I am sick or need medical certificate	376	45.6	42.2	49.1	*0.138*
Even when I am not sick (e.g. for shots or tests)	149	18.1	19.3	16.8	
Do not go at all	299	36.3	38.4	34.1	

My health care provider has strongly recommended to get vaccinated					
strongly agree	29	5.5	5.1	6.0	*0.000*
agree	106	20.2	12.1	28.0	
don't know	11	2.1	2.3	1.9	
disagree	306	58.3	61.5	55.2	
strongly disagree	73	13.9	19.1	9.0	
I usually follow my health care provider's advices					
strongly agree	72	13.7	14.5	13.0	*0.126*
agree	411	78.1	74.6	81.5	
don't know	19	3.6	4.7	2.6	
disagree	24	4.6	6.3	3.0	
I can openly discuss my concerns about shots with my doctor					
strongly agree	74	14.2	14.5	13.9	*0.383*
agree	365	69.9	67.5	72.3	
don't know	25	4.8	6.7	3.0	
disagree	56	10.7	11.0	10.5	
strongly disagree	2	0.4	0.4	0.4	
Medical professionals have my best interest at heart?					
strongly agree	39	7.5	7.1	7.9	*0.888*
agree	268	51.4	51.8	51.1	
don't know	129	24.8	24.7	24.8	
disagree	81	15.5	16.1	15.0	
strongly disagree	4	0.8	0.4	1.1	
I trust the information I receive about shots provided by my doctor					
strongly agree	59	11.3	10.6	12.0	*0.014*
agree	357	68.4	63.5	73.0	
don't know	82	15.7	21.2	10.5	

disagree	23	4.4	4.3	4.5	
strongly disagree	1	0.2	0.4	0.0	
How much do you trust your doctor? 0 (Do not trust at all) to 10 (Completely trust)	526	8.6 (SD1.67)	8.4 (SD1.7)	8.7 (SD1.6)	*0.044*
Basically how many questions do you ask your doctor?					
None	247	47.1	50.4	44.0	*0.299*
1-3	159	30.3	26.7	33.8	
4-6	77	14.7	15.5	13.9	
7 and more	41	7.8	7.4	8.3	

7. Source of Information on Immunization

Respondents were asked regarding perceptions on existing information sources about immunization and their information obtaining practices. Respondents' opinion regarding the statement that "immunization-related information provided by the government is difficult to understand" varied: 46% of respondents did not agree with the statement, 32% were not sure and 22% agreed that they find information about immunization rather confusing. Majority also were not sure (61%) or did not agree (14%) that information provided by international organizations is trustworthy. Most respondents (95%) reported that they search for information on immunization in Georgian language (Table 10).

Additionally, respondents were asked separately regarding utilization of different information sources in the past and in the future. The most popular sources of information according to majority of respondents included: health care providers, internet websites, TV shows, social media and TV reporting. Also social media and websites were named as the most prefered sources of the informaion in the future (Table 9).

Table 9. Immunization Related Information Sources, Measles and Rubella KAP Survey, 2017

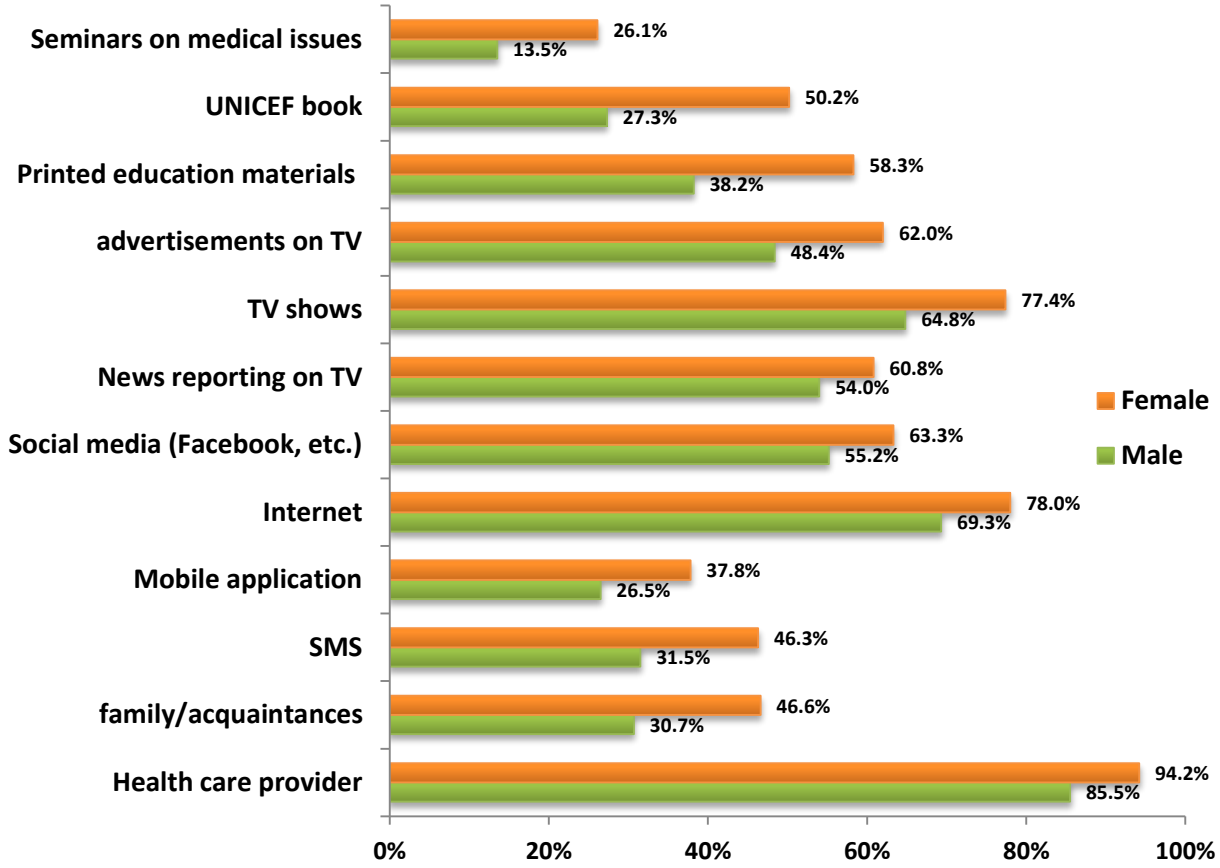
Characteristics	Total	In the past	In the future	Both	None of them
	N	%	%	%	%
Please indicate the information sources from which you got information about vaccination during last year and which you prefer to receive information on vaccination in the future:					

Health care provider	790	1.4	43.3	46.3	9.0
My family/friends/acquaintances	772	8.5	12.0	20.2	59.2
SMS	778	1.5	33.0	6.3	59.1
Mobile application	779	0.1	29.9	3.6	66.4
Websites	805	0.4	50.3	24.1	25.2
Social media (Facebook, etc.)	786	1.5	40.7	18.1	39.7
Printed media (i.e. journals, newspapers, etc.)	781	0.6	6.9	4.0	88.5
News reporting on TV	787	2.8	28.1	27.4	41.7
TV shows	791	2.3	30.5	40.1	27.2
advertisements on TV	791	3.0	25.0	29.0	43.0
Radio	785	0.4	7.5	5.4	86.8
External advertising	783	0.6	12.6	3.1	83.7
Printed education materials (i.e. posters, booklets etc.)	789	1.6	34.7	14.7	48.9
UNICEF booklet on child development	784	1.1	35.6	5.1	58.2
Seminars on medical issues	782	----	18.8	2.7	78.5
Discussions with religion leaders	777	---	6.6	2.3	91.1
Other	424	---	0.9	0.5	98.6

Comparison of preferred information sources on immunization among gender groups revealed difference among males and females. Specifically, compared to man, women were more actively using different information sources to obtain information on immunization and appeared to be more prone to give preference to such informational sources as health care providers (males 86%

vs. females 94 %), websites (males 69% vs. females 78%), TV shows (males 65% vs. females 77%) and social media (males 55% vs. females 63%) (Figure 9).

Fig. 9 Immunization Related Information Sources, Males vs. Females, Measles and Rubella KAP Survey, 2017



When assessing association of preference of information sources with willingness of getting MMR vaccine there were identified some differences among representatives of different gender groups. Specifically, if the fact that person uses websites, printed education materials (such as booklets and posters) and UNICEF developed special book for parents no matter of gender were more likely to agree on immunization compared to those who did not use the mentioned sources. However it appeared that only among males was significantly ($p \leq 0.05$) high the possibility of accepting vaccines in the group who used social media, SMS and street advertisement and only among females – printed media and medical seminars.

While comparing responses of respondents from two study region more Tbilisi site representatives appeared to agree or strongly agree with the statements "International organizations provide reliable information on vaccines" compared to Gurjaani municipality

representatives. Statistically significant difference was identified in the responses of the given two region representatives on the choice of language for searching health related information. Specifically more Gurjaani municipality representatives reported to use Georgian language to search a health related information than Tbilisi representatives (Table 10).

There was also identified differences in the sources of information used by two research site representatives. Specifically, compared to Tbilisi more Gurjaani municipality survey representatives reported to obtain information about immunization from health care providers (93% vs. 89%, Tbilisi vs. Gurjaani municipality respectively) and TV shows (77% vs. 69%). However compared to Gurjaani municipality more Tbilisi survey representatives appeared to use websites, social and printed media and medical seminars to receive information on immunization (Figure 10).

Fig. 10. Information Sources on Immunization, Tbilisi vs. Gurjaani Municipality Data, Measles and Rubella KAP Survey, 2017

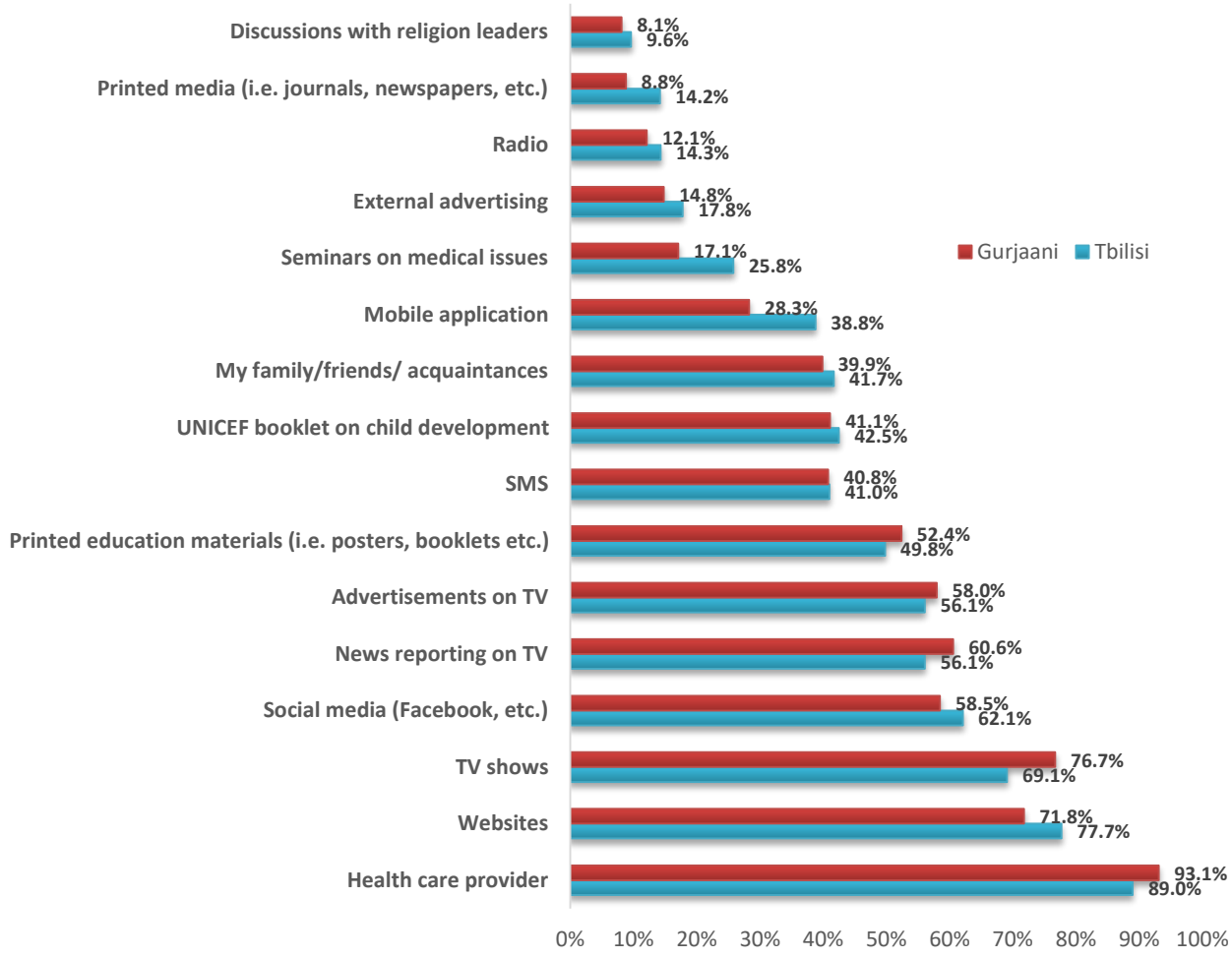


Table 10. Immunization Related Information Sources, Measles and Rubella KAP Survey, 2017

Characteristics	Total		Tbilisi	Gurjaani Municipality	
	N	%	%	%	*P*
News about vaccination is complicated and confusing					
strongly agree	9	1.1	0.5	1.7	*0.116*
agree	178	20.9	18.9	22.9	
don't know	270	31.7	34.6	28.6	
disagree	367	43.0	43.1	43.0	
strongly disagree	29	3.4	3.0	3.8	
Government provides enough information about vaccines					
strongly agree	22	2.6	3.0	2.1	*0.354*
agree	248	28.9	27.4	30.5	
don't know	262	30.6	30.1	31.0	
disagree	299	34.9	37.2	32.5	
strongly disagree	26	3.0	2.3	3.8	
International organizations provide reliable information on vaccines					
strongly agree	28	3.3	3.5	3.1	*0.000*
agree	187	22.0	29.3	14.4	
don't know	518	60.9	57.6	64.4	
disagree	111	13.1	9.0	17.3	
strongly disagree	6	0.7	0.7	0.7	
Please indicate in which language do you usually get information about vaccination					
Georgian	781	95.0	91.7	98.5	*0.000*
English	12	1.5	2.1	0.8	
Russian	22	2.7	4.5	0.8	
Other	6	0.7	1.4	0.0	
DNK/Remember	1	0.1	0.2	0.0	
Information sources on immunization					
Health care provider					

Yes	719	75.8	89.0	93.1	*0.045*
No	71	7.5	11.0	6.9	
My family/friends/ acquaintances					
Yes	315	40.8	41.7	39.9	*0.612*
No	457	59.2	58.3	60.1	
SMS					
Yes	318	40.9	41.0	40.8	*0.958*
No	460	59.1	59.0	59.2	
Mobile application					
Yes	262	33.6	38.8	28.3	*0.002*
No	517	66.4	61.2	71.7	
Websites					
Yes	602	74.8	77.7	71.8	*0.054*
No	203	25.2	22.3	28.2	
Social media (Facebook, etc.)					
Yes	474	60.3	62.1	58.5	*0.308*
No	312	39.7	37.9	41.5	
Printed media (i.e. journals, newspapers, etc.)					
Yes	90	11.5	14.2	8.8	*0.018*
No	691	88.5	85.8	91.2	
News reporting on TV					
Yes	459	58.3	56.1	60.6	*0.199*
No	328	41.7	43.9	39.4	
TV shows					
Yes	576	72.8	69.1	76.7	*0.016*
No	215	27.2	30.9	23.3	
Advertisements on TV					
Yes	451	57.0	56.1	58.0	*0.587*
No	340	43.0	43.9	42.0	

Radio					
Yes	104	13.2	14.3	12.1	*0.368*
No	681	86.8	85.7	87.9	
External advertising					
Yes	128	16.3	17.8	14.8	*0.264*
No	655	83.7	82.2	85.2	
Printed education materials (i.e. posters, booklets etc.)					
Yes	403	51.1	49.8	52.4	*0.449*
No	386	48.9	50.2	47.6	
UNICEF booklet on child development					
Yes	328	41.8	42.5	41.1	*0.701*
No	456	58.2	57.5	58.9	
Seminars on medical issues					
Yes	168	21.5	25.8	17.1	*0.003*
No	614	78.5	74.2	82.9	
Discussions with religion leaders					
Yes	69	8.9	9.6	8.1	*0.475*
No	708	91.1	90.4	91.9	

8. MMR Vaccine Refusal Related Factors, Bivariate Analysis

Bivariate analysis was conducted to assess factors associated with MMR vaccine refusal among study participants who reported not to be vaccinated and/or who reported to not to have a measles or rubella in the past (Table 10).

8.1. Demographic characteristics

Risk of MMR vaccine refusal did not differ among participants living in Tbilisi and Gurjaani municipality. There was no statistically significant ($p<0.05$) difference identified among respondents of different age, ethic or social groups (including internally displaced population and those receiving government support). However males appeared to be more likely to refuse MMR

vaccination compared to females (PR=1.69 95%CI: 1.33-2.15). Respondents with lower education status (secondary school) were also more likely to refuse MMR vaccination than those with higher education (PR=1.49 95%CI: 1.16-1.90). Also respondents with no medical background were more likely to refuse MMR vaccination compared to respondents with medical background (represented by students undergoing education at medical and related faculties) (PR=1.71 95%CI: 0.94-3.08).

There was some but not statistically significant (statistical significance defined by $p<0.05$) difference found among respondents of different ethnic groups, marital and employment status. Specifically, respondents who were ethnic Georgian, employed and currently not in marital relationship were more likely to refuse to MMR vaccine compared to others.

Table 11. Demographic Characteristics Association with MMR Vaccine Refusal, Measles and Rubella KAP Survey, 2017

Characteristics	Refused or were not sure about receiving MMR vaccination				
	N	%/Mean	PR	95%CI	*P*
Study Site					
Tbilisi	93	35.8	1.06	0.83-1.36	*0.342*
Gurjaani	79	33.6	1	---	
Respondent Sex					
Male	93	45.8	1.69	1.33-2.15	***0.000***
Female	79	27.1	1	---	
Age					
18-24	81	33.9	1	---	*0.385*
25-29	91	35.5	1.05	0.82-1.34	
Education					
Secondary school	100	41.8	1.49	1.16-1.90	***0.001***
Professional/Technical school/ University/College	72	28.1	1	---	
Ethnicity					
Georgian	160	34.0	1	---	*0.062*
Other	12	52.2	1.53	1.02-2.31	
Religion					
Orthodox Christian	162	34.4	1	---	*0.200*
Other	10	45.5	1.32	0.82-2.12	
Marital Status					
Currently married	76	31.7	1	---	*0.096*
Other	96	37.6	1.19	0.93-1.51	
Employment Status					

Employed	71	39.4	1.23	0.97-1.57	*0.060*
Student /Unemployed	101	32.1	1	---	
Professional background					
Medical/nursing	9	21.4	1	---	***0.034***
Not medical /DNK	159	36.6	1.71	0.94-3.08	
How many children do you have?	129	0.95 (1.0703)	1.705	---	*0.192*
Do you receive social assistance?					
Yes	19	31.7	1	---	*0.347*
No	153	35.3	1.11	0.75-1.65	
Have you ever been forced to move from your house because of war or civil unrest?					
Yes	10	40.0	1.17	0.71-1.93	*0.341*
No	159	34.0	1	---	

8.2. Vaccination Practices

Likelihood of MMR vaccine refusal was also assessed based on respondents' vaccination practices. Respondents who reported not to be vaccinated during their childhood were 1.6 times more likely to refuse MMR vaccination compared to those who were vaccinated in the childhood. Similarly, those who were not vaccinated in adulthood were 2.4 times more likely to refuse MMR vaccination compared to those who reported to be vaccinated during adulthood. Similarly those who refuse to get their children vaccinated were 1.8 times more likely to refuse to be vaccinated with MMR vaccine compared to others (low statistical significance p= *0.077*). Those who responded that they would not recommend MMR vaccine to friends and colleagues were 6 times more likely to refuse MMR vaccine themselves (Table 11)

Table 12. Vaccination Practices Association with MMR Vaccine Refusal, Measles and Rubella KAP Survey, 2017

Characteristics	Refused or were not sure about receiving MMR vaccination				
	N	(%/Mean)	PR/F	95%CI	*P*
Socio-Demographic					

Have you been vaccinated in childhood (before age 15)?					
Yes	155	33.5	1	---	*0.021*
No/DNK	17	53.1	1.58	1.12-2.25	
Have you or your parent ever refused your vaccination					
Yes	30	75.0	2.41	1.93-3.02	*0.000*
No/DNK	141	31.1	1	---	
Would you recommend your friend / colleague to get vaccine against Measles and Rubella?					
Yes	44	13.2	1	---	*0.000*
No/DNK	127	81.4	6.18	4.65-8.22	
Have you ever decided not to have your child get a shot?					
Yes	7	53.8	1.76	1.03-3.04	*0.077*
No/DNK	65	30.5	1	---	

8.3. Vaccination Knowledge and Perceptions

Bivariate analysis was conducted to assess association of participants' vaccine related knowledge and perceptions with MMR vaccine refusal status.

Respondents who reported not to be informed about immunization in general were more likely to refuse MMR vaccination than those who reported to be informed (36% vs. 25%). Respondents who have not heard about previous measles and rubella outbreaks in Georgia or were not aware about complications due to the given diseases such as hospitalization, death and pregnancy issue, were more likely to refuse to be vaccinated with MMR vaccine (Table 12).

Measles and rubella disease risk perception was identified as an important predictors of MMR vaccine acceptance among the survey participants. Those who did NOT believe that vaccine preventable diseases can cause death and that measles and rubella are easily transmitted diseases were more likely to refuse MMR vaccine compared to those who believed (PR= 1.53 and PR=1.39 respectively). Correspondingly, those respondents who did not agree with the statements that if not vaccinated with MMR, they might get measles or rubella, and that given disease might be a big problem for them in the future, were more than twice likely to refuse MMR vaccination. Respondents who did not agree with the statement that rubella infection is serious risk/dangerous for pregnant women and their future babies, were also more likely to refuse (PR=1.46; 95%CI: 1.14-1.86).

The survey respondents who did not believe or were not sure regarding the fact that vaccination in general is effective method to strengthen immunity (resistance) of organism against infectious diseases or specifically MMR vaccine is effective in preventing measles, mumps and rubella diseases, were twice more likely to refuse MMR vaccination. Similarly, those who disagreed with the statement that MMR vaccine provides lifelong immunity against measles and rubella, and that is also an protective from mumps, were 1.5 times more likely to refuse MMR vaccination.

Participants' perception regarding adult vaccination were also identified to be a predictor of their willingness to get MMR vaccine. The respondents who disagreed that MMR should be provided to adults and that adults should receive all recommended vaccines, were almost four times more likely to refuse MMR vaccine (PR=3.69 and PR=3.27 respectively). Respondents who agreed that vaccines are more important for children than adults, were almost twice as likely to refuse MMR compared to those who disagreed with the given statement.

Questions on vaccine safety perceptions revealed correlation of safety concerns with MMR vaccine acceptance. Respondents that did not believe that vaccines are safe in general, and were not confident in MMR vaccination safety, were almost twice more likely to refuse MMR vaccine. Likewise, those who agreed that they are concerned about MMR vaccine side effects, were 1.4 times more likely to refuse to be vaccinated with MMR.

Perceptions on vaccination benefits in general and MMR vaccine in particular was also identified to be related to MMR vaccine acceptance among survey participants. The respondents who disagreed or were not sure that benefit of MMR vaccination exceeds the risks, were 2.6 times more likely to refuse to get MMR vaccine. Respondents who did not believe in MMR vaccine public and personal benefits (for instance benefit for community -prevention of spread of the diseases in the country, and personal benefit - making easier for them to travel or receive education in foreign countries) were about twice more likely to refuse to get MMR vaccine (PR=2.23 and PR=1.75 respectively).

Bivariate analysis also revealed additional MMR vaccine acceptance barriers such as participants busy time schedule .

Table 13. Vaccination Related Knowledge and Perceptions Association with MMR Vaccine Refusal, Measles and Rubella KAP Survey, 2017

Characteristics	Refused or were not sure about receiving MMR vaccination				
	N	(%/Mean)	PR/F	95%CI	*P*
Awareness Level					
In your opinion, Do you think that you are informed enough about immunization?					
Informed	85	26.9	1	---	*0.000*
Not informed	87	48.9	1.82	1.44-2.30	
What kind of vaccination is acceptable for you?					
Voluntary	103	44.0	1.66	1.29-2.13	*0.000*
Other	69	26.4	1	---	
Which vaccines are acceptable for you?					
Free of charge - state program vaccines	109	28.1	1	---	*0.000*
Paid for vaccines	63	59.4	2.12	1.69-2.65	
Which place is most acceptable for you to get vaccine shot?					
Medical facility	135	30.5	1	---	*0.000*
Other	37	69.8	2.66	1.96-3.62	
Have you ever heard about measles and rubella epidemic in Georgia?					
Yes	19	24.4	1	---	*0.021*
No	128	37.1	1.52	1.01-2.30	
Have you heard about cases of hospitalization from measles and rubella during recent years?					
Yes	19	22.1	1	---	*0.004*
No	144	37.5	1.69	1.12-2.58	

Have you heard about fatal cases of measles and rubella during last years?					
Yes	4	17.4	1	---	*0.053*
No	161	35.7	2.05	0.84-5.05	
Have you heard about pregnancy complication because of rubella?					
Yes	12	21.4	1	---	*0.017*
No	149	36.5	1.70	1.02-2.86	
Knowledge					
In your opinion, why is it necessary to receive vaccines?					
To prevent some infectious diseases	80	24.5	1	---	*0.000*
Other	92	55.4	2.26	1.79-2.85	
What age is appropriate for vaccination?					
Both childhood and adulthood	57	17.6	1	---	*0.000*
Incorrect answers	114	66.7	3.78	2.92-4.89	
Measles and rubella can be treated with antibiotics					
Yes	136	38.6	1.50	1.1-2.05	*0.004*
No	36	25.7	1	---	
Measles can be transmitted by Air					
Yes	83	26.8	1	---	*0.000*
No	89	48.1	1.80	1.42 -2.28	
Perceptions					
How do you think, can vaccine-preventable diseases cause death					
Agree	64	27.2	1	---	*0.001*
Don't agree	108	41.7	1.53	1.19-1.97	
Do you think that measles and rubella is easily transmitted diseases?					

Yes	84	26.4	1	---	*0.000*
No	88	50.9	1.93	1.52-2.43	
Measles and rubella vaccine provide lifelong immunity against these diseases					
Yes	68	27.4	1	---	
No	104	42.3	1.54	1.20-1.98	*0.000*
One without measles and rubella immunity should get the vaccine even if he/she is an adult.					
Yes	56	17.7	1	---	*0.000*
No	115	65.3	3.69	2.84-4.79	
MMR vaccination is effective in preventing mumps disease					
Yes	26	14.5	1	---	*0.007*
No	146	37.6	1.53	1.07-2.19	
Adults should receive all recommended vaccines					
Agree	77	21.5	1	---	*0.000*
Don't agree	95	70.4	3.27	2.61-4.10	
Vaccines are more important for children than adults					
Agree	143	41.8	2.17	1.52-3.07	*0.000*
Don't agree	29	19.3	1	---	
The vaccination is effective method to strengthen immunity (resistance) of organism against infectious diseases					
Agree	124	30.1	1	---	*0.000*
Don't agree/DNK	48	60.8	2.02	1.60-2.54	
Vaccines are safe					
Agree	103	28.3	1	---	*0.000*
Don't agree/DNK	69	53.5	1.89	1.50-2.38	
MMR vaccination is effective to prevent acute					

measles, mumps and rubella diseases					
Agree	92	26.1	1	---	
Don't agree/DNK	80	57.6	2.21	1.76-2.77	*0.000*
I can get a Measles or Rubella if I am not vaccinated					
Agree	67	23.2	1	---	
Don't agree/DNK	105	52.0	2.24	1.75-2.87	*0.000*
It is important to vaccinate against Measles and Rubella in order to prevent the spread of the diseases in my community					
Agree	90	25.9	1	---	*0.000*
Don't agree/DNK	82	57.7	2.46	1.84-3.29	
I think that measles might be a big problem for my future.					
Agree	43	21.1	1	---	*0.000*
Don't agree/DNK	128	44.4	2.11	1.57-2.83	
Rubella infection is serious risk/dangerous for pregnant women and their future baby					
Agree	74	28.7	1	---	*0.01*
Don't agree/DNK	98	41.9	1.46	1.14-1.86	
Getting vaccinated with MMR will make easier traveling/ receiving education in foreign countries					
Agree	21	21.9	1.75	1.17-2.60	*0.001*
Don't agree/DNK	150	38.3	1	---	
Benefit of MMR vaccination exceeds the risks					
Agree	70	22.2	1	---	
Don't agree/DNK	100	58.1	2.62	2.06-3.34	*0.000*

I am concerned about MMR vaccine side effects					
Agree	71	41.5	1.33	1.05-1.69	*0.014*
Don't agree/DNK	99	31.1	1	---	
I am very busy to get vaccinated					
Agree	39	56.5	1.79	1.40-2.31	*0.00*
Don't agree/DNK	133	31.4	1	---	
I am not confident in the safety of routine MMR vaccines					
Agree	69	53.5	1.91	1.51-2.40	*0.000*
Don't agree/DNK	101	28.1	1	---	
Concerns about immunization					
Vaccines are more dangerous than measles or rubella					
Yes	16	84.2	2.57	2.03-3.24	*0.000*
No	156	32.8	1	---	
Experiments done on us					
Yes	14	93.3	2.83	2.35-3.41	*0.000*
No	158	32.9	1	---	
Vaccinations are no longer necessary because all of these diseases are very rare today.					
Yes	13	81.3	2.45	1.87- 3.19	*0.000*
No	159	33.2	1	---	
Vaccines contain dangerous substances					
Yes	22	68.8	2.12	1.62-2.77	*0.000*
No	150	32.4			

Pharmaceutical companies promote vaccination of children/adults for profit.					
Yes	8	72.7	2.15	1.46-3.15	*0.011*
No	164	33.9	1	---	
There is not enough evidence that immunization prevents the occurrence of infectious diseases.					
Yes	13	76.5	2.29	1.72-3.08	*0.000*
No	159	33.3	1	---	

Perceptions related to health care personnel and existing information sources were identified to be related to participant's willingness to be vaccinated against measles and rubella. Those respondents who reported not be registered with any medical facilities, those who disagreed that they follow their health care providers' advice, as well as those who did not trust the information provided by health care personnel, were almost twice as likely to refuse vaccination against measles and rubella (Table 13).

Participants' perceptions about information sources were also an important predictor for MMR vaccination. Specifically, those respondents who agreed with the statement that news about vaccination is complicated and confusing where more likely to refuse to get vaccinated with MMR vaccine compared to those who did not agree (PR= 1.39). Also, those respondents who did not agreed with statements that government provides enough information about vaccines and that international organizations provide reliable information on vaccines where more likely to refuse to get vaccinated with MMR vaccine (PR=1.39 and PR=1.66 respectively). Also, those who reported not to be using in the past or never planning to use any information source on immunization, were almost twice more likely to refuse to get MMR vaccination, than others.

Table 14. Health Care Personnel and Information Sources-related Perceptions and their Association with MMR Vaccine Refusal, Measles and Rubella KAP Survey, 2017

Characteristics	Refused or were not sure about receiving MMR vaccination				
	N	(%/Mean)	PR/F	95%CI	*P*
Are you registered in health/medical facility?					
Yes	105	28.8	1	---	*0.000*
No	67	52.8	1.83	1.45-2.30	
I usually follow my health care provider advices					
Agree	59	24.2	1	---	*0.005*
Don't agree	15	48.4	2.00	1.31-3.06	
I trust the information I receive about shots provided by my doctor					
Agree	45	22.3	1	---	*0.005*
Don't agree	28	39.4	1.78	1.20-2.61	
News about vaccination is complicated and confusing					
Agree	51	24.1	1.79	1.36-2.36	*0.000*
Don't agree	121	43.1	1	---	
Government provides enough information about vaccines					
Agree	42	27.5	1	---	*0.013*
Don't agree	130	38.2	1.39	1.04-1.86	
International organizations provide					

reliable information on vaccines					
Agree	27	23.3	1	---	*0.002*
Don't agree	145	38.6	1.66	1.16-2.36	
Please indicate the information sources from which you got information about vaccination during last year and which you prefer to receive information on vaccination in the future?					
Never used and/or do not plans to use in the future	53	56.4	1.91	1.92 -4.97	*0.000*
Used and/or is planning to use at least one	92	29.5	1	---	

Conclusions and Recommendation

The measles and rubella infection and MMR vaccination related Knowledge, Attitudes and Practices (KAP) survey was conducted in 2016 among 18-29 years-old-population living in two diverse geographical areas such as **(1)Tbilisi** a typical urban area (capital city with more than 2/3 of country population) with highest measles cases detected during 2013-2015 and lowest vaccine uptake estimates during 2008 MR immunization campaign and **(2) Gurjaani municipality** (Municipali in Kakheti Region, East Georgia) a rural area with lower measles incidence and higher vaccine coverage estimates compared to Tbilisi.

1. Socio-demographic differences among two regions

As expected socio-demographic characteristics of the study population of these two survey sites differed. Specifically, compared to Tbilisi, in the rural area, represented by Gurjaani municipality, respondents were more likely to be in older age group (25-29 years old), to have lower education status (Secondary school or lower), to have less ethnical or religious diversity, to be currently in marital relationship and to have a child, to be unemployed and not be a student.

2. Self-reported vaccine coverage and measles disease rate estimates

Self-reported data on immunization practices and history of infection with measles and rubella was in compliance with existing estimates. Specifically, childhood vaccination status did not differ significantly among representatives of the selected two regions (97% Gurjaani vs. 94% Tbilisi), though reported vaccination rate after 15 years-old-age was higher among Gurjaani municipality representatives compared to Tbilisi (22% Gurjaani vs. 12% Tbilisi), as well as MMR (8.8% Gurjaani vs. 5.4% Tbilisi) and MR (3.8% Gurjaani vs. 1.9% Tbilisi) vaccination rates. Similar to official statistics more Tbilisi survey representatives reported to be infected with measles and/or rubella in their lifetime compared to Gurjaani municipality (25% vs. 18% respectively).

3. MMR vaccine acceptance and reported reasons for refusal

Survey revealed that among participants who did not report to be vaccinated against measles or rubella (either with MR or MMR vaccine) 65% agreed to get MMR shot if provided free of charge. MMR vaccine acceptance did not defer by region (64% Tbilisi vs. 66% Gurjaani), though females appeared to agree on MMR vaccination more than males (73% Female vs. 54% Males). Moreover among males in particular high education status (more than high school education), medical background and having 1 or more children was a predictor for MMR vaccine acceptance.

The main reported reason for refusal in females was past history infection with measles and rubella (31%), while for male it was law risk perception of the given diseases (42%). The top two reasons participants would change mind and accept MMR vaccine was same for both gender and included: (1) Health care providers strongly recommendation and (2) Information about Measles or Rubella epidemic in the country. However the HCPs recommendation was much important for women than men (40% vs. 24%, respectively).

Recommendation #1

Males from 18-29 years, with low education and no children represent one of the important target group to be addressed during communication campaigns considering high resistance for MMR vaccine acceptance, low awareness information level and risk perception, law access through health care setting and bad communication with health care providers.

4. Communication Sources on immunization

Health care providers were revealed to be the main source of information on immunization and their recommendation the major reason why would resistant participants (did not agree or were not sure about MMR vaccine) change their mind agree on MMR vaccination. Respectively the fact the person obtains information from HCP was important predictor for MMR vaccine acceptance.

Internet and social media was not only the top information sources on immunization after HCPs but also the most frequently named sources participant did not use in the past and were willing to use in the future. As expected in Tbilisi more respondents named websites, social media and immunization mobile application as immunization information sources than Gurjaani municipality representatives. While more Gurjaani municipality representative preferred TV shows as the source of immunization related information. Respectively internet, social and broadcasting media usage was an important predictor of acceptance of immunization.

There were important difference among gender groups. Females were more active in general using different information sources on immunization than males. Unlike women men were less prone to obtain information from HCPs and depended on other sources. Respectively the fact how well government informs population about immunization was significant predictor of MMR vaccine acceptance only among males.

Recommendation #2

To reach MMR vaccination target audience (represented by 19-29 years old persons) the most recommended channel for communication besides health care provider represents:

- **Internet media,**
- **Social media**
- **TV shows.**

For urban areas with better access to internet like Tbilisi preference should be given to internet and social media, while for the majority of regions TV shows remain the better channel for communication.

Recommendation #3

Considering gender differences in the choice of communication channels for immunization and its correlation with MMR vaccine acaceptance, it is recommended to use the bellow mentioned channels to target specifically men:

- **Social Media**
- **SMS**
- **TV Shows**
- **Street Advertisement**

5. Communication with Health Care Providers

Health Care Providers again were named as the main trusted source of immunization related information and their strong recommendation as the main reason for accepting MMR vaccines.

However considering specificity of the survey population age (18-29 years) uptake of health services and their communication with health care workers differed. Specifically only about 20% of respondents reported to visit medical facility for other reasons than treatment (for prophylactic purposes), the rest either visit facility only in case of being sick and when they need medical certificate (document about health status of the person requested at education or other settings) (45%) and do not visit facility at all (35%). Also those who did not considered the medical setting as the most acceptable place for receiving shots and supported current voluntary vaccination policy were more likely to refuse MMR vaccination.

Importantly, despite the fact that about 80% of respondents report to have good communication with their HCP ("I can openly discuss my concerns about shots with my doctor") about half of respondents reported to ask no question to HCP during the visit to the clinic.

Compared to Tbilisi HCPs, the Gurjaani municipality HCPs had better communication and higher trust with the survey population. Unlike Tbilisi among Gurjaany survey participant's trust toward HCP provided information and compliance with HCP's recommendations was a significant predictor for MMR vaccine acceptance.

Uptake of health care services and communication with HCP significantly differed among males and females. Males compared to females not only were less likely to go to health care setting but also had bigger communication barriers with HCP (including discussions their concerns about immunization and asking any questions during regular visits). Respectively the fact that HCP strongly recommended vaccination and trust toward the information HCP provides was significant predictor of acceptance of MMR vaccine only among females.

Recommendation #4

Considering Health Care Providers' role and communication challenges with target audience it is crucial to provide training to:

- **Strengthen their interpersonal communication skills** *(i.e. obtain trust, provide more information on immunization, encourage parents/adults ask them questions and share concerns, avoid using medical terms with no explanations, etc.);*
- **Increase their knowledge and self-efficacy in overcoming immunization barriers among parents and adults;**
- **Increase competence in immunization crisis communication.**

6. Population awareness and perceptions on immunization and key messages to be utilized in the communication campaign

Population self-estimated awareness level was identified to be very low, less than 17% of respondents reported to be well or sufficiently informed about immunization. Similar to the 2012 and 2015 KAP studies on immunization conducted by NCDC, bivariate analysis of factors associated with MMR vaccine refusal revealed that those with low risk perceptions and low confidence in vaccine benefit, efficacy and safety are more likely to refuse to get MMR vaccine.

Though self-reported vaccine refusal rate during childhood was low (no more than 7%) reported reasons for refusals in the past reveals common misconceptions regarding vaccine contraindications, such as perception that if person has allergies to something or any neurologic issues should not be vaccinated.

Population knowledge about measles, rubella and mumps and immunization was important predictor for MMR acceptance. Particularly those who know why and in what age are provided vaccines and who knew that measles and rubella can be transmitted by air and that does not have specific antibiotic treatment were more likely to accept MMR vaccine.

Risk perception was one of the important factor particularly for male representatives to accept MMR vaccine. Information about epidemic, hospitalization, death and pregnancy complications due to measles and rubella and special circumstances like the diseases epidemic in the country was an important predictor for MMR vaccine acceptance among all representatives (even the information about past epidemics).

In addition to vaccine safety there are other important concerns which influenced participant's decision to accept MMR vaccine including:

- Vaccines are more dangerous than measles or rubella
- Vaccines are experiments done on us
- Vaccinations are no longer necessary because all of these diseases are very rare today.
- Vaccines contain dangerous substances
- Pharmaceutical companies promote vaccination of children/adults for profit.
- There is not enough evidence that immunization prevents the occurrence of infectious diseases.

Recommendation #5

Considering Low awareness, information and knowledge level as well as low perceptions on immunization and measles the following topics for massages must be used for immunization communication:

- **Government provides safe and effective vaccines approved by WHO (government purchased vaccines are of high quality)**
- **Measles epidemic situation in the country including hospitalization, fatal cases pregnancy complication because of rubella**
- **Vaccines are necessary to prevent some infectious diseases.**
    - **The vaccination is effective method to strengthen immunity (resistance) of organism against infectious diseases.**
    - **MMR vaccination is effective to prevent acute measles, mumps and rubella disease**
    - **MMR vaccination is effective in preventing mumps disease**
- **Vaccines are equally important for children and adults and one without measles and rubella immunity should get the vaccine even if he/she is an adult. Adults should receive all recommended vaccines**
- **Measles and rubella are not treated with antibiotics**
- **Measles is transmitted by Air and is very easily transmitted disease**
- **Vaccine-preventable diseases cause death**
- **Measles and rubella vaccine provide lifelong immunity against these diseases**
- **Vaccines are safe and does not have any side effects**
- **I can get a Measles or Rubella if I am not vaccinated**
- **It is important to vaccinate against Measles and Rubella in order to prevent the spread of the diseases in my community**
- **Measles might be a big problem for your future**
- **Rubella infection is serious risk/dangerous for pregnant women and their future baby**
- **Getting vaccinated with MMR will make easier traveling/ receiving education in foreign countries**
- **Benefit of MMR vaccination exceeds the risks**
- **One could find time to get vaccinated even being very busy**