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TUBERCULOSIS PREVENTION PROJECT

Training Program
"Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicine Resistance"
REPORT

BACKGROUND

Earlier and improved tuberculosis (TB) case detection - including smear-negative disease often associated with HIV - as well as expanded capacity to diagnose multidrug-resistant tuberculosis (MDR-TB) are global priorities for TB control. MDR-TB poses formidable challenges due to its complex diagnostic and treatment requirements, while HIV-associated TB largely goes undetected due to the limitations of current diagnostic techniques. Alarming increases in MDR-TB, the global emergence of extensively drug-resistant TB (XDR-TB), documented institutional transmission, and rapid mortality in MDR-TB and XDR-TB patients with HIV co-infection have highlighted the urgency for rapid diagnostic methods. [1]

No single diagnostic test currently satisfies all the demands of 'quick', 'cheap', and 'easy'. Commercially available liquid culture systems and molecular line probe assays for rapid detection of MDR-TB have been endorsed by the World Health Organization (WHO); however, due to their complexity and cost, as well as the need for sophisticated laboratory infrastructure, uptake has been limited in many resource-constrained settings.[1]

The new rapid TB test – known as Xpert MTB/RIF- is a fully-automated diagnostic molecular test with the potential to revolutionize and transform TB care and control. The test is simultaneously detects TB and rifampicin drug resistance and provides accurate results in less than two hours so that patients can be offered proper treatment on the same day. Xpert MTB/RIF has minimal bio-safety requirements and can be housed in non-conventional laboratories.[2]

Based on WHO's recommendations Xpert MTB/RIF rapid test should be used as the initial diagnostic test in individuals suspected of MDR-TB or HIV/TB (strong recommendation) and may be used as a follow-on test to microscopy in settings where MDR-TB and or HIV is of lesser concern, especially in smear-negative specimens (recognizing major resource implications) (conditional recommendation).[2]

DESINING of the TRAININGS

Usage of Xpert MTB/RIF in Georgia is still limited. Currently this new technology is available only at central level in National Reference Laboratory and can be used for incomplete number of MDR-TB suspect and TB/HIV co-infected patients. For roll-out and countrywide implementation of Xpert MTB/RIF the consecutive activities are urgently needed. As the first step it is planned to pilot new technology. In July-August 2013, with support of FIND project (23/06/2010), 4 Gene Xpert systems will be implemented. Two sets will be installed at the central level in Tbilisi at National Center for Tuberculosis and Lung Diseases, other two in Batumi (Adjara region) and Kutaisi (Imereti region) in regional laboratories of National Center for Disease Control and Public Health. From 2014 usage of Xpert MTB/RIF will be enhanced and with

support of Global Fund project in all TB laboratories of Georgia 12 Gene Xpert systems will be established. But only infrastructural development is not enough for effective utilization of the new technology. There is a need to train all TB physicians, especially from regional levels, in adequate use of recommended algorithms and correct interpretation of Xpert MTB/RIF test findings.

Considering the importance of rapid TB diagnosis, especially in smear negative forms with DR-TB risk, USIAD Georgia Tuberculosis Prevention Project supported educational activities and based on newly designed program conducted trainings for countrywide implementation and utilization of Xpert MTB/RIF test.

For implementation of the high quality educational program the following activities were provided:

- Protocol for standard use of algorithms for diagnosis of TB by Xpert MTB/RIF test at country level were prepared and based on them the full training package was designed;
- Trainers for trainings were selected;
- Orientation session for selected trainers was conducted;
- Interactive Training courses for small groups in Tbilisi, Kutaisi, Zugdidi and Batumi were provided;
- Monitoring and evaluation of the trainings was ensured.

Goal and Objectives

The aim of the training course was to improve knowledge and skills of TB physicians necessary for adequate use of Xpert MTB/RIF algorithms, correct interpretation of test results and standard management of TB cases diagnosed by Xpert MTB/RIF.

The training course was intended for all TB physicians who are responsible in selection of appropriate diagnostic tests for rapid TB detection and adequate treatment at different type of heath facilities.

Participants of the trainings improved their knowledge and skills in rapid detection of TB cases, including smear negative and Rifampicin resistant forms, and are be able to:

- Introduce Gene Xpert MTB/RIF technology, understand methodology of real time PCR assay using of Molecular Beacon;
- Understand differences between Line Probe Assays, culture and Xpert MTB/RIF;
- Understand and operate in line with WHO's recommendations;
- Select individuals to test with Xpert MTB/RIF based on HIV status and DR-TB risk assessment;
- Choose and use an appropriate algorithm for Management of patients in accordance of theirs HIV status, DR-TB risk and type of health facility;
- Correctly interpret Xpert MTB/RIF results;
- Refer patients for further investigations and clinical management if TB is not detected;
- Register TB cases diagnosed by Xpert MTB/RIF;
- Ensure monitoring of TB cases diagnosed by Xpert MTB/RIF in line with current WHO guidelines.

Improvement of the knowledge and necessary practical skill was aimed within sessions listed below:

1. TB Epidemiology in the World and in Georgia;

2. Actuality of Xpert MTB/RIF test implementation;
3. Strengthening of TB Rapid Diagnosis by Using of Xpert MTB/RIF system;
4. Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance;
5. Case Definitions and Treatment Outcomes;
6. Selection of patients for XpertMTB/RIF testing and appropriate Algorithms;
7. Key actions necessary at country level for implementation of Xpert MTB/RIF assay.

One days training course, with duration of 8 hours, was delivered in 10 small groups for 10-12 trainees in each group. The sessions of the course included lectures presented as slide shows and followed by specially prepared practical session. After trainings all trainees received specially designed protocols as hand-out for standard use of Xpert MTB/RIF system.

The detailed agenda of the training course see in Table N 1,

Selection of the Trainers

In order to implement the training course "Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance" USAID Georgia TB Prevention Project University Research Co LLC made vacancy announcements to hire TB expert and a TB laboratory diagnostic expert as trainers for this training course. Vacancy announcement was made on www.jobs.ge, which is considered as the most popular website among job seekers in Georgia.

The trainer should accomplish the following activities:

- Develop training module and materials based on WHO standards;
- Conduct interactive training sessions in a small group setting;
- Monitor and record daily attendance of trainees;
- Prepare the report on implementation of the training program.

Applicants were evaluated against the following criteria:

1. At least 10 years of experience in organizing and delivering modular training courses for health care workers in TB (for TB expert) and in TB laboratory diagnostics (for TB laboratory expert);
2. Familiarity with the organizational setup of the National TB Program;
3. Strong capacity to ensure quality of training courses and measure results;
4. Excellent communication skills;
5. Ability to create an effective learning environment

Two candidates applied for the position of a trainer for training course "Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance". On the basis of CVs both candidates have a strong capacity to ensure quality of training courses are responsible to share received knowledge and practical skills countrywide.

The selection committee members decided to offer trainers post to both candidates. Considering applicants professional experience and background Dr. M. Janjgava will be responsible for training as TB Expert and R. Aspindzelashvili as TB Laboratory Expert (the list of selected trainers see in Table N2).

IMPLEMENTATION of the TRAININGS

For implementation of the high quality trainings the following activities were accomplished:

- The list of training's participants was prepared in collaboration with managers of TB network;
- Potential trainees were informed about forthcoming trainings and invited for participation;
- By URC regional coordinators an adequate training environment and training equipment for class-room trainings in Tbilisi, Kutaisi, Zugdidi and Batumi was identified;
- Training materials and protocols were printed and disseminated among trainees;
- Before and after trainings by pre- and post-tests improvement of trainees knowledge during the training was measured and analyzed;
- At the end of each training satisfaction of trainees was evaluated by specially prepared questionnaire;
- Daily attendance of trainees was monitored and recorded by regional coordinators of TPP;
- Lunch for trainers and trainees was ensured;
- All of the trainees received a specially designed Certificate;
- Transportation and logging expenses of trainers were covered;
- Travel and daily costs of trainees were covered.

Detailed information about dates, places and numbers of participants of training program see in Table N3.

MONITORING and EVALUATION of the TRAININGS

Monitoring of the trainings in Tbilisi, Kutaisi, Zugdidi and Batumi locally was provided by TPP Regional coordinators: Davit Raminashvili; Imeda Kurtsikidze; Khatuna Chanturia; Khatuna Katamadze and Gvantsa Khizanishvili. At all training sites the selected venue was convenient, suitable equipment for presentations and adequate environment for training was ensured. All trainees were provided with the training materials, stationary, and other necessary training aids. Interactive training methods were used and the participants were fully engaged.

Expected improvement of the trainees' knowledge during trainings was evaluated by using of the pre- and post-tests. Analysis of the pre- and post-tests results showed that all trainees have improved their results since pre-testing. The knowledge of most trainees in specific issues discussed within training program has been raised from "Vary bad" and "Bad" to "Good" and "Very Good" (model of ranking trainees according to their wrong answers numbers see in Table N 4; how trainees have changed their results since pre-testing see in Table N 5 and N 6 and Figure N1).

The satisfaction of the trainees was evaluated by specially prepared Satisfaction Survey Questionnaire, evaluation of which showed, that by most of trainees from all regions all aspects of the training course were scored as top possible "5" (Very Good). None of items were scored as "1" "2" or "3" (for other results of satisfaction survey see Tables N 7 and Figure N 2).

In addition to scoring participants had the opportunity to write comments and suggestions about trainings and trainers. Majority of comments were positive. Trainees underlined that during the course they received newest information about WHOs recommendations on new rapid diagnostic test and algorithms for using of this test. Only thing that is needed now is to implement necessary number of new systems countrywide and ensure there rapid involvement in laboratory system.

TRAININGS COVERAGE

From July to september 2013, TPP provided trainings " Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance" in Tbilisi, Kutaisi, Zugdidi and Batumi. Totally, 100 participants (50 in regions and 50 in Tbilisi) were trained. The class-room trainings for small groups with size of approximately 10 trainees were conducted by specially selected trainers. Initially 125 participants were invited, but because of the vacation period only 100 TB physicians participated in trainings. Attendance was 80%. Full list of participants is attached as a separate Excel file.

CONCLUSION

As the result of the training course evaluation we can conclude that:

- This educational intervention has high potential to build capacity for correct use of algorithms for diagnosis of TB by using Xpert MTB/Rif test;
- Training course was prepared based on newest approaches of WHOs recommendations and adopted for country needs. specially designed protocols will gave opportunity to ensure standard diagnosis of TB by new, rapid molecular tests;
- Training course was very interactive, trainees had opportunity to ask questions and discuss about all presumable gaps in organizational process of diagnosis TB by Xpert system;
- Trainees received necessary skills for timely referral of samples for TB diagnosis by mostly appropriate method.

Table N1

Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance

A g e n d a

Time	Session	Trainer
10:00 – 10:30	Pre-test	
10:30 – 11:15	TB Epidemiology in the World and in Georgia;	Marina Janjgava
11:15 – 12:00	Actuality of Xpert MTB/RIF test implementation;	Marina Janjgava

12:00 – 12:45	Strengthening of TB Rapid Diagnosis by Using of Xpert MTB/RIF system;	Rusudan Aspindzelashvili
12:45 -13:15	**Lunch**	
13:15 -14:00	Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance;	Rusudan Aspindzelashvili
14:00 – 14:45	Case Definitions and Treatment Outcomes;	Marina Janjgava
14:45 – 15:30	Selection of patients for XpertMTB/RIF testing and appropriate Algorithms;	Rusudan Aspindzelashvili
15:30 – 16:45	Practical Study;	Rusudan Aspindzelashvili
16:45 – 17:30	Key actions necessary at country level for implementation of Xpert MTB/RIF assay	Marina Janjgava
17:30 – 18:00	Post-Test	

Table N2

Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance

Trainers of Training

Trainer	Position
Marina Janjgava	Head of the Office for Program Management-Coordination and Tuberculosis Control at the National Center for Tuberculosis and Lung Diseases.
Rusudan Aspindzelashvili	Head of the reference Laboratory at the National Center for Tuberculosis and Lung Diseases.

Table N 3: Trainings Schedule and Number of Participants

Date	Place	Groups	Participants
July 27, 2013	Kutaisi	**2**	**21**
July 28, 2013	Zugdidi	**2**	**18**
July 27, 2013	Batumi	**1**	**11**
19-20 May	Tbilisi	**5**	**50**
Total 10 days		**10 groups**	**100 participants**

Table N 4: Trainees ranking according to their wrong answers numbers

Trainees knowledge	Very bad	Bad	Satisfactory	Good	Very good

Number of wrong answers	≥7 (58%)	5 - 6 (42%-50%)	3 – 4 (25%-33%)	1 – 2 (8%-17%)	0 (0%)

Table N 5: Pre- and Post-test results of all trainings (July-September, 2013)

N	Name	Pre-tests	Standart	Post-tests	Standart	Progress
1	Tamar Janelidze	1	Good	0	Very good	Good=>Very good
2	Nino Gabunia	7	Very bad	1	Good	Very bad => Good
3	Mariam Vardanashvili	5	Bad	0	Very good	Bad => Very Good
4	Nazi Beradze	3	Satisfactory	0	Very good	Satisfectory => Very good
5	Maia Kiphiani	1	Good	1	Good	Good=>Good
6	Madona Khujadze	5	Bad	0	Very good	Bad => Very Good
7	Ioseb Kuchava	5	Bad	1	Good	Bad => Good
8	Nargiza Grigorashvili	8	Very bad	0	Very good	Very bad => Very good
9	Marina Khutsishvili	3	Satisfactory	0	Very good	Satisfectory => Very good
10	Julieta Gobronidze	5	Bad	1	Good	Bad => Good
11	Gulnara Oragvelidze	2	Good	2	Good	Good=>Good
12	Venera Tonia	6	Bad	1	Good	Bad => Good
13	Maia Kakhiani	6	Bad	0	Very good	Bad => Very Good
14	Darejan Imerlishvili	4	Satisfactory	0	Very good	Satisfectory => Very good
15	Ina Viushkina	7	Very bad	0	Very good	Very bad => Very good
16	Lia Ghachava	6	Bad	0	Very good	Bad => Very Good
17	Ketevan Abramishvili	4	Satisfactory	1	Good	Satisfectory => Good
18	Duliko Avaliani	3	Satisfactory	3	Satisfactory	Satusfactory => Satusfactory
19	Tamar Shukakidze	4	Satisfactory	1	Good	Satisfectory => Good
20	Marine Kakhniashvili	4	Satisfactory	1	Good	Satisfectory => Good
21	Naira Bogveradze	4	Satisfactory	2	Good	Satisfectory => Good
22	Nana Kankia	4	Satisfactory	1	Good	Satisfectory => Good
23	Tsiuri Kakulia	6	Bad	3	Satisfactory	Bad => Satisfectory
24	Mzia Kvaratskhelia	3	Satisfactory	1	Good	Satisfectory => Good
25	Gocha Salia	1	Good	1	Good	Good=>Good
26	Zeinab Charchkhalia	9	Very bad	0	Very good	Very bad => Very good
27	Nino Izoria	9	Very bad	0	Very good	Very bad => Very good
28	Zaira Kalandia	3	Satisfactory	0	Very good	Satisfectory => Very good
29	Zaza Dgebuadze	3	Satisfactory	1	Good	Satisfectory => Good
30	Aza Kitia	4	Satisfactory	0	Very good	Satisfectory => Very good
31	Olga Gogokhia	6	Bad	0	Very good	Bad => Very Good
32	medea jinjolia	10	Very bad	0	Very good	Very bad => Very good
33	Nana Janjalia	9	Very bad	0	Very good	Very bad => Very good
34	Nani Chakvetadze	9	Very bad	0	Very good	Very bad => Very good
35	Izabela Gvilia	6	Bad	0	Very good	Bad => Very Good
36	Tatarishvili irina	5	Bad	0	Very good	Bad => Very Good
37	darsalia Rafieli	8	Very bad	0	Very good	Very bad => Very good
38	Tamaz Zagania	6	Bad	0	Very good	Bad => Very Good
39	Donara Badzagua	4	Satisfactory	0	Very good	Satisfectory => Very good

40	Dimitri Tsetskhladze	4	Satisfectory	1	Good	Satisfectory => Good
41	Diana Beridze	5	Bad	1	Good	Bad => Good
42	Ketevan Tsereteli	7	Very bad	0	Very good	Very bad => Very good
43	Inga Davitadze	5	Bad	0	Very good	Bad=> Very good
44	Irma Tavartkiladze	7	Very bad	0	Very good	Very bad => Very good
45	Khatuna Mamasakhlisi	6	Bad	2	Good	Bad => Good
46	Izolda Mikeladze	3	Satisfectory	1	Good	Satisfectory => Good
47	Nino Tunadze	9	Very bad	1	Good	Very bad => Good
48	Pavle Mjavanadze	8	Very bad	1	Good	Very bad => Good
49	Shota Sharadze	7	Very bad	1	Good	Very bad => Good
50	Nana Sakvarelidze	7	Very bad	3	Satisfectory	Very bad => Satisfectory
51	Lalita Jalagonia	3	Satisfectory	1	Good	Satisfectory => Good
52	Manana Mikiani	5	Bad	0	Very good	Bad=> Very good
53	Gumrakh Pashaevi	3	Satisfectory	2	Good	Satisfectory => Good
54	Bejan Khozrevanidze	2	Good	0	Very good	Good=> Very good
55	Ketevan Gurashvili	3	Satisfectory	1	Good	Satisfectory => Good
56	Mzia Ivanauri	3	Satisfectory	1	Good	Satisfectory => Good
57	Nona Imerlishvili	3	Satisfectory	0	Very good	Satisfectory => Very Good
58	Nelly Lobjanidze	4	Satisfectory	3	Satisfectory	Satisfectory => Satisfectory
59	Marina Mazanashvili	3	Satisfectory	0	Very good	Satisfectory => Very Good
60	Manana Gongadze	1	Good	0	Very good	Good=> Very good
61	Ketevan Mshvenieradze	0	Very Good	0	Very good	Very Good => Very Good
62	Marina Borashvili	8	Very bad	3	Satisfectory	Very bad => Satisfactory
63	Tsira Natroshvili	7	Very bad	1	Good	Very bad => Good
64	Irma Gudumidze	3	Satisfectory	1	Good	Satisfectory => Good
65	Tasiko Nakhusrishvili	8	Very bad	1	Good	Very bad => Good
66	Tamar Khinchikashvili	7	Very bad	1	Good	Very bad => Good
67	Tamar Tatishvili	5	Bad	2	Good	Bad => Good
68	Viola zurabiani	8	Very bad	2	Good	Very bad => Good
69	Darejan Gvelesiani	8	Very bad	0	Very good	Very bad => Very good
70	Valentina Toroiani	7	Very bad	1	Good	Very bad => Good
71	Olga Grechkina	7	Very bad	4	Satisfectory	Very bad => Satisfactory
72	Tamaz Jijeishvili	7	Very bad	2	Good	Very bad => Good
73	Nana Murjikneli	4	Satisfectory	0	Very good	Satisfectory => Very Good
74	Makvala Metreveli	2	Good	0	Very good	Good=> Very good
75	Leila Javadova	7	Very bad	0	Very good	Very Good => Very Good
76	Ketino Akhalkaci	6	Bad	1	Good	Bad => Good
77	Marine Demetrashvili	5	Bad	1	Good	Bad => Good
78	Manana Tarkashvili	7	Very bad	1	Good	Very bad => Good
79	Miranda Kvavilashvili	5	Bad	0	Very good	Bad => Very Good
80	Guliko Gonashvili	4	Satisfectory	0	Very good	Satisfectory => Very Good
81	Otar Zamtaradze	11	Very bad	0	Very good	Very bad => Very good
82	Malkhaz Davitashvili	3	Satisfectory	0	Very good	Satisfectory => Very Good
83	Lia Gambashidze	3	Satisfectory	0	Very good	Satisfectory => Very Good
84	Tamar Dochviri	4	Satisfectory	0	Very good	Satisfectory => Very Good
85	Natia Lomadze (Ped)	4	Satisfectory	0	Very good	Satisfectory => Very Good

86	Zeinab Sandodze	3	Satisfectory	0	Very good	Satisfectory => Very Good
87	Nino Tsivtsivadze (Ped)	5	Bad	0	Very good	Bad=> Very good
88	Ketevan Zedashidze	4	Satisfectory	0	Very good	Satisfectory => Very Good
89	Nino Kobaladze	2	Good	0	Very good	Good => Very Good
90	Lali Chigogidze	4	Satisfectory	0	Very good	Satisfectory => Very Good
91	Tamar Khachidze (Ped)	4	Satisfectory	0	Very good	Satisfectory => Very Good
92	Marina Gachechiladze	4	Satisfectory	1	Good	Satisfectory => Good
93	Manana Rekhviashvili	4	Satisfectory	1	Good	Satisfectory => Good
94	Nestan Jorjoliani (Ped)	5	Bad	1	Good	Bad => Good
95	Keti Jincharadze	6	Bad	5	Bad	Bad => Bad
96	Nana Popova	4	Satisfectory	2	Good	Satisfectory => Good
97	Nikoloz Gogsadze	4	Satisfectory	1	Good	Satisfectory => Good
98	Mzia Seferteladze (Ped)	1	Good	1	Good	Good=>Good
99	Marina Lejava	3	Satisfectory	2	Good	Satisfectory => Good
100	Marina Goglidze	3	Satisfectory	1	Good	Satisfectory => Good

Table N5: Progress in knowledge of all participants

Progress of knowladge from pre- to post-test	N	%
Very bad => Satisfectory	3	3%
Very bad => Good	11	11%
Very bad => Very good	13	13%
Bad => Bad	1	1%
Bad => Satisfectory	1	1%
Bad => Good	9	9%
Bad => Very Good	12	12%
Satusfactory => Satusfactory	2	2%
Satisfectory => Good	20	20%
Satisfectory => Very good	18	18%
Good=>Good	4	4%
Good => Very Good	5	5%
Very Good => Very Good	1	1%

Figure N1: Progress in knowledge of all trainees

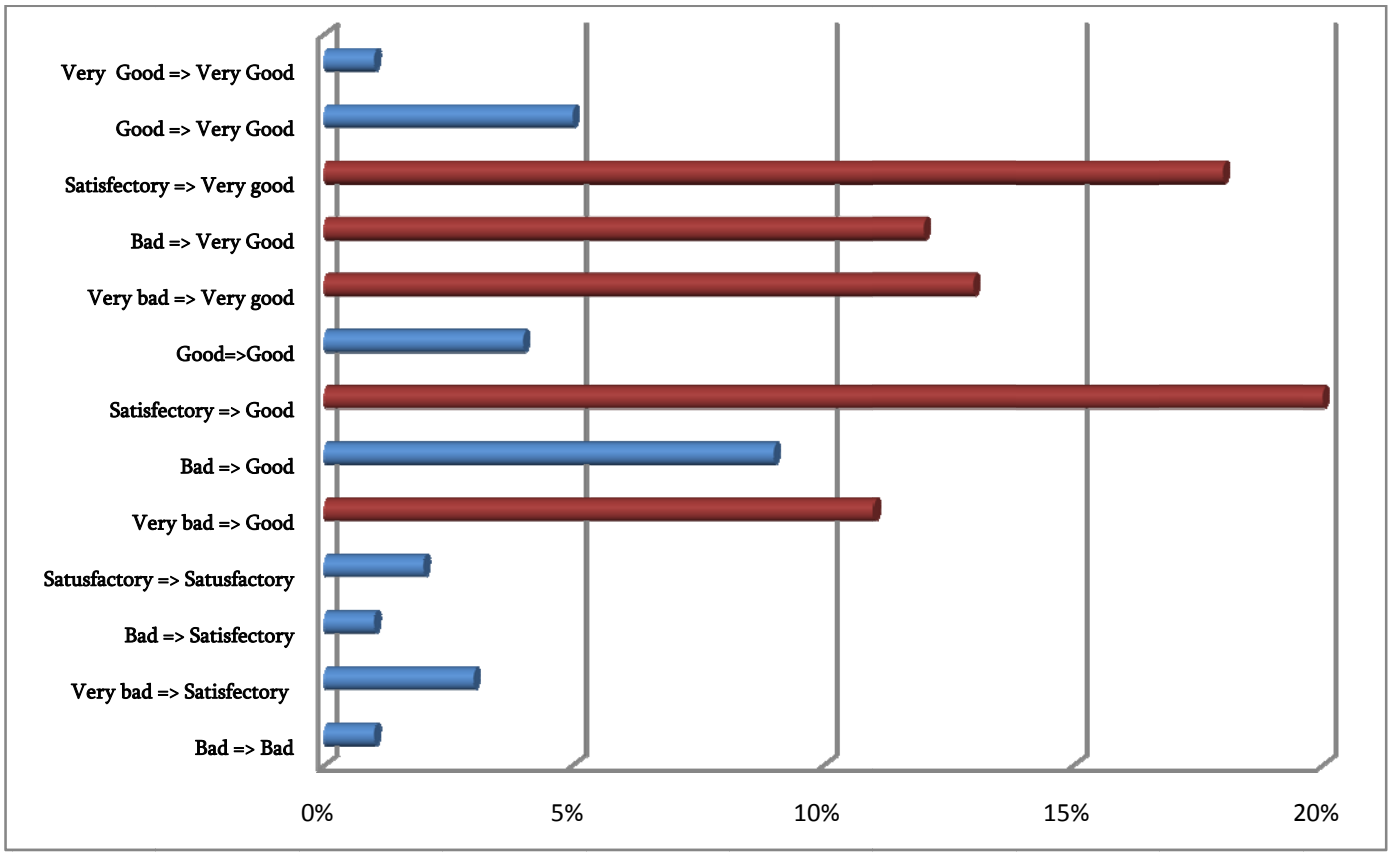
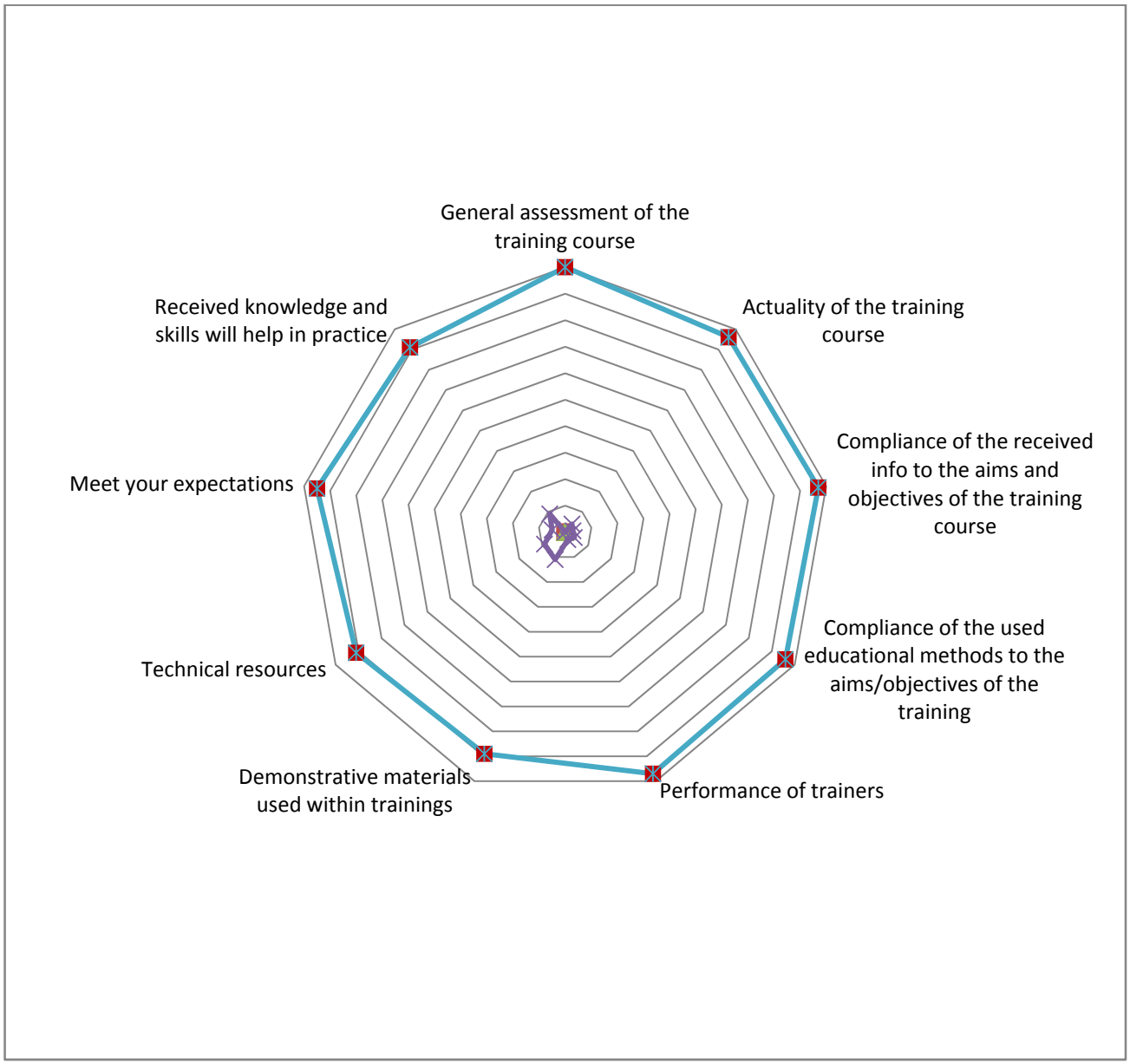


Table N 7: Satisfaction survey results from all training courses

	Satisfaction Survey Questionnaire for all trainees N 100 (100%)	1	2	3	4	5
1	What is your overall assessment for the training course?	0	0	0	0	100 (100%)
2	How do you assess actuality of the training course?	0	0	0	4 (4%)	96 (96%)
3	How do you assess the compliance of the received information to the aims and objectives of the training course?	0	0	0	3 (3%)	97 (97%)
4	How do you assess the compliance of the used educational methods (lecture, seminar, case discussion) to the aims and objectives of the training course?	0	0	0	4 (4%)	96 (96%)
5	How do you assess performance of your trainer in TB related aspects (ability to give the information, to explain, to demonstrate the practical skills)?	0	0	0	3 (3%)	97 (97%)
6	**How do you assess demonstrative/illustrative materials used within trainings?**	0	0	0	**11 (11%)**	**89 (89%)**
7	**How do you assess technical resources (space of the training room, equipment) of trainings?**	0	0	0	**9 (9%)**	**91 (91%)**
8	How did the Course meet your expectations?	0	0	0	5 (5%)	95 (95%)

9	**How the received knowledge and skills will help you in practice?**	0	0	0	**9 (9%)**	**91 (91%)**

Figure N 2: Satisfaction survey results from all training courses



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