Sensing, ArtiFicial intelligence, and Edge networking towards Rural Health monitoring (SAFE-RH)

D4.1

Diffusion and Dissemination Plan

SAFE-RH Project no. 619483-EPP-1-2020-1-UK-EPPKA2-CBHE-JP

Contents

1. Introduction

The diffusion and dissemination plan is a strategy to define the aims and objectives, methods of conducting activities, and results, and to showcase the visibility and communication infrastructure of the project, so that all activities that will be carried out during the project lifetime will be widely known. This document presents a diffusion and dissemination plan that is designed to ensure the effective visibility of the **S**ensing, **A**rti**F**icial intelligence, and **E**dge networking towards **R**ural **H**ealth monitoring (SAFE-RH) project which will enable the participating organizations and beyond to benefit from the Erasmus Plus funded project.

More specifically, this document provides an overview of the activities that will be carried out during the lifetime of the SAFE-RH project. Starting from presenting the detailed description, essence and expected outcomes along with the aims and objectives of the project, this document explains the rationale behind chosen strategies, actions and tools, such as website and social media platforms, used to ensure the increased visibility of the project. The target groups of audiences that include both the audience benefitted directly and indirectly from this project are highlighted to increases awareness about the objectives and training activities of SAFE-RH project.

Diffusion and dissemination plan is an important and crucial factor for the success and effective outcome of the project.

The purposes of the SAFE-RH diffusion and dissemination plan include:

- To find ways that will help increase the visibility of the ongoing activities and the outcomes of the project
- To attract the attention of the target as well as general audience toward the theme of the project
- To get input from the community, especially the affected community of rural areas in Pakistan, related to the lack of health facilities
- To design strategic plan of how this information can be used to design effective solutions
- To ensure the reach of outcome of the project to the target groups
- To ensure the long-term sustainability of the project outcomes after the project timeline
- To form association of community health workers and patients
- To act and develop systems that ensure broad dissemination of the project
- To raise awareness and understanding about scientific developments of the project

This diffusion and dissemination plan is designed with the input from each partner institution of the project to cover the following aspects of the SAFE-RH project

- Project description
- Partner institutions along with contributions
- Detailed diffusion and dissemination strategy

2. Project Description

The total population of Pakistan at the beginning of the year 2020 was approximately 216M and more than 50% of the population residing in rural areas. Besides other basic needs of life, medical facilities are also deficient in these areas. A major part of the health budget is used in urban areas and the rural areas are neglected. The health conditions of women and children are even worse in such areas. Furthermore, the non-communicable diseases such as Diabetes are estimated to account for 58% of all deaths in Pakistan. According to National Diabetes Survey of Pakistan (2016-17), 26% of the population is diagnosed to have diabetes, in which, 14% were overweight, 44% were obese and 46% were hypertensive. In addition, the 44% of children under the age of 5 were reported to be stunted. Nevertheless, the malnutrition status in rural areas are reported to be worse as compared to urban areas, i.e. Stunt growth (46%), Wasted children (16%) and Underweight children (33%)[*].

The availability of doctors is scarce in rural areas. A study shows that physician to population ratio is 0.74 per 1000 people. The mortality rate is almost double in rural areas as compared to urban areas. The average infant mortality rate in Pakistan is about 60 deaths/1,000 live births[†] and is even higher in rural areas. Similarly, maternal mortality rate is estimated to be above 200 deaths per 10000 patients. These statistics indicate the lack of timely medical advice and assistance to the patients in rural areas. It is essential to provide a facility to the people in rural areas to reduce the mortality rate and improve the quality of health.

2.1. Problems and needs identified at the level of the Partner Country: [Pakistan]:

- **Lack of expert medical advice in remote and rural areas:** Due to the deficiency of expert medical doctors and their availability in rural areas, the patients face trouble in getting expert opinion. From the doctors' point of view, the main reasons include the lack of medical facilities and the low salaries due to which they are unwilling to relocate to remote urban areas for work. There is a critical need to provide services that facilitates rural patients to seek help and expert advice on time.
- **Patients with chronic diseases need to do frequent visits:** Patients having chronic diseases such as heart diseases, diabetes, respiratory problems, sleep disorders etc., are among the patients that visit doctors on a regular basis to monitor their health conditions. Sometimes, such patients need to be admitted in hospitals. The need is to provide a health monitoring mechanism that can be sent to remote experts to analyse the health condition of patients. Remote monitoring might include monitoring the active heart beats, blood pressure, blood sugar, weight, etc.
- **High mortality rates of women and infants due to delay in medical assistance:** Lack of trained midwives and their awareness to avoid infections, complications, lack of proper medical equipment such as incubators are the underlying reasons of the considerably high mortality rate of women and infants. The need is to provide prenatal and postnatal advice from experts online. Patients need to be trained to utilize tools of online facilities that will also enable the doctors to direct them to the nearest hospital well in time for a safe delivery.
- **High consultation charges and travelling long distances to visit experts:** Patients have to travel far cities to reach specialists for consultation, which is a time as well as money consuming task. Often patients of rural areas are not able to pay such high travelling and consulting costs. The need is to provide a cost-effective alternate solution that can help patients acquire quality medical assistance in rural areas.

- **Difficulties in reaching doctors due to health conditions or age factor:** Mostly, the patients are in fragile health condition or they are too old to reach doctors frequently. The need is to provide telehealth services at doorstep to the patients' localities.

In European countries also, the smart Health is a challenge. The smart strategies of eHealth increasingly assist European health workers. Several projects supported by European Union in smart health (eHealth/mHealth/digital health) has made it possible to show the need for health workers' skills and adaptative learning methods that can be developed. Given the above mentioned challenges, opportunities and policy reforms, the consortium has thoroughly discussed and agreed to propose a Sensing, ArtiFicial intelligence, and Edge networking towards Rural Health monitoring (SAFE-RH), to develop higher education institutions (HEIs) in partner country, Pakistan, to do academic services at a large scale with local healthcare communities through Internet and mobile technologies. The academic services including remote health monitoring, and bioinformatics, etc., can be delivered to society more effectively and sustainably to modernize the Health sector. Higher education and society will learn together to localize the technology and International standards. The partner country universities will be internationalized with technical assistance from the European program country universities. The new requirements from stakeholders could be found in this project that would create significant research and development opportunities for both program and partner universities as a research network in long-term particularly knowledge discovery from Big Data of the implemented smart health systems. The identified challenges will be addressed through a series of activities with understanding (WP1: Adaptive Learning Model), develop teaching materials and program to support the learning of remote health monitoring and assess the framework through pilots (WP2: Framework assessment through pilots). This research is dedicated to scientific knowledge transfer to improve smart health by providing knowledge base and learning framework for life-long learning of health workers and students in the partner countries. This aims to increase welfare of the health workers and patients in remote areas by enhancing the remote monitoring of rural areas.

3. Partner Institutions

The following are the partner institutions that will work in collaboration toward the objective and outcome of the SAFE-RH project.

- University of the West of Scotland, UK
- Université de Lorraine, France
- Capital University of Science and Technology, Pakistan
- COMSATS University Islamabad, Wah Campus, Pakistan
- The Islamia University of Bahawalpur, Pakistan

3.1. List of Participants

The detailed list of participants from each partner institute is given in Table 1.

Table 1. SAFE-RH List of Participants

S. No	Institution	Participants	Email
1	University of the West of Scotland, UK	Prof. Naeem Ramzan	Naeem.Ramzan@uws.ac.uk
		Dr. Sana Ullah Jan	SanaUllah.Jan@uws.ac.uk
2	University of Lorraine, France	Prof. Hassan Rabah	hassan.rabah@univ-lorraine.fr
		Dr. Slavisa Jovanovic	slavisa.jovanovic@univ-lorraine.fr
		Dr. Yves Berviller	Yves.berviller@univ-lorraine.fr
3	COMSATS University Islamabad Wah Campus, Pakistan	Dr. Ehsan Ullah Munir	ehsanmunnir@gmail.com
		Dr. Tassawar Iqbal	tassawwar@gmail.com
		Dr. Saima Gulzar Ahmed	saimag57@gmail.com
		Ms. Anam Javaid	anamjavaid1992@gmail.com
4	Capital University of Science and Technology, Pakistan	Dr. Nayyer Masood	nayyer@cust.edu.pk
		Dr. Nadeem Anjum	nadeem.anjum@cust.edu.pk
		Mr. Salman Ahmad	salman.ahmed@cust.edu.pk
		Ms. Faiza Qayyum	faizaqayyum@cust.edu.pk
		Dr. Sahar Fazal	Sahar@cust.edu.pk
		Sharon ali	Shoaib.ali@cust.edu.pk
5	The Islamia University of the Bahawalpur, Pakistan	Dr. Dost Muhammad Khan	khan.dostkhan@iub.edu.pk
		Dr. Najia Saher	najiasaher@gmail.com
		Dr. Arif Mehmood	arifnhmp@gmail.com

4. Project Communication Team

To ease the exchange of dissemination related information, members from each partner institute are assigned in project communication team (PCT) given in Table 2.

Table 2. Members of Project Communication Team

Partner No	Institute	PCT Member	Contact
1	The University of the West of Scotland	Sana Ullah Jan	SanaUllah.Jan@uws.ac.uk
2	University of Lorraine	Slavisa Jovanovic	slavisa.jovanovic@univ-lorraine.fr
3	Capital University of Science & Technology	Sharon Ali	Shoaib.ali@cust.edu.pk
4	COMSATS University Islamabad Wah Campus	Tassawar Iqbal	tassawwar@gmail.com
5	The Islamia University of Bahawalpur	Najia Saher	najiasaher@gmail.com

5. Quality Control Committee

A quality control committee is developed to ensure the quality of the deliverables, outputs and results of the project. A member from each institute is included in this committee whose lists is given in Table 3.

Table 3. Quality Control Committee for SAFE-RH Project

Partner No	Institute	PCT Member	Contact
1	The University of the West of Scotland	Naeem Ramzan	Naeem.ramzan@uws.ac.uk
2	University of Lorraine	Yves Berviller	yves.berviller@univ-lorraine.fr
3	Capital University of Science & Technology	Nadeem Anjum	nadeem.anjum@cust.edu.pk
4	COMSATS University Islamabad Wah Campus	Ehsan Ullah Munir	ehsanmunnir@gmail.com
5	The Islamia University of Bahawalpur	Dost Muhammad Khan	khan.dostkhan@iub.edu.pk

6. Dissemination Strategy

The diffusion and dissemination strategy is designed to ensure an efficient and coherent approach for disseminating the project to the widest possible Pakistani audience and beyond. This strategy details all the actions to be conducted along the project including description and type of the action, responsible partner, target audience, tentative plan of execution and, if applicable, relevant quantitative indicators.

6.1. Objectives

The objective of the dissemination strategy is to define which and how the activities are held throughout the project life. A defined timeline of activities with proper templates and responsible partner institutions is provided here. This will further clarify the aims and objectives of the SAFE-RH project and assist on the ways of conducting each work plan. To this end, the social media platforms and website are launched that will increase the visibility, reach to the target groups, and sustainability of the SAFE-RH project in long term.

6.2. Strategic Approach

To provide an equal opportunity of disseminating and highlighting institutional contributions to the project, the responsibility of disseminating project activities, posting news and events, and promoting project over social media platforms is circulated through all the partner institutes. Each institute is given a time span of 2 months to supervise these activities, however, the input is taken from all the members of PCT. The Table 4 shows the schedule of responsibilities of each institute over the project lifetime.

Table 4. Schedule of Social Media Supervision Responsibilities for each Institution

Month		Year	Responsible Institution	Member	Email
From	To				
April	May	2021	UWS	Sana Ullah Jan	SanaUllah.Jan@uws.ac.uk
June	July	2021	UL	Slavisa Jovanovic	slavisa.jovanovic@univ-lorraine.fr
August	September	2021	CUST	Sharon Ali	Shoaib.ali@cust.edu.pk
October	November	2021	COMSATS	Tassawar Iqbal	tassawwar@gmail.com
December	January	2021, 2022	IUB	Arif Mehmood	arifnhmp@gmail.com
February	March	2022	UWS	Sana Ullah Jan	SanaUllah.Jan@uws.ac.uk
April	May	2022	UL	Slavisa Jovanovic	slavisa.jovanovic@univ-lorraine.fr
June	July	2022	CUST	Sharon Ali	Shoaib.ali@cust.edu.pk
August	September	2022	COMSATS	Tassawar Iqbal	tassawwar@gmail.com
October	November	2022	IUB	Arif Mehmood	arifnhmp@gmail.com
December	January	2022, 2023	UWS	Sana Ullah Jan	SanaUllah.Jan@uws.ac.uk
February	March	2023	UL	Slavisa Jovanovic	slavisa.jovanovic@univ-lorraine.fr
April	May	2023	CUST	Sharon Ali	Shoaib.ali@cust.edu.pk
June	July	2023	COMSATS	Tassawar Iqbal	tassawwar@gmail.com
August	September	2023	IUB	Arif Mehmood	arifnhmp@gmail.com
October	November	2023	UWS	Sana Ullah Jan	SanaUllah.Jan@uws.ac.uk

6.3. Target Groups

The following target groups (mainly in rural areas) are identified in Pakistan that needs early attention and regular monitoring by healthcare professionals:

- Infants/ new-born babies
- Children under age 5
- Maternal/ pregnant women
- Elderly people above 65 years
- Patients with chronic diseases

The main agenda of this project is to revolutionize the healthcare system by remote monitoring of the target group mentioned above. There is an acute need to modernise the health system by enabling sensing, AI and better communication. For this we need to train health workers (Doctors, Nurses and support staff) and students and to understand their needs.

6.3.1. Needs of Students:

Implementation of Remote Health Monitoring system may require expertise in many fields. To design such system students should require proficiencies in:

6.3.1.1. Digital Health

Student should study the basic structure of each component of digital health which include software and hardware design.

6.3.1.2. Health Data Standards

Students shall need to learn the worldwide standard to collect and use health data. Randomly collecting data without any standard have no benefit.

6.3.1.3. Wearable sensors and wireless devices

Students shall need to learn about the wearable and wireless technologies available in the market for remote monitoring.

6.3.1.4. Internet of Things (IoT)

The System requires continuous monitoring of patients and share their data with doctors. Our system will consist of many devices that are connected together to collect the meaningful data and give alarm to doctor in case of emergency.

6.3.1.5. Big Data in HealthCare system

Healthcare big data include collecting and analysing patient physical and clinical data. It helps doctors in their prescription and improves their diagnosis. With the help of big data, personalized monitoring system can be designed for user. Students should learn machine learning and artificial intelligence algorithms which can be used to design big data analytics for such system

6.3.2. Needs of Health workers:

When Health workers remotely monitoring their patients, some requirement should be met by Remote Monitoring Health system to facilitate the health workers like:

6.3.2.1. Digital Training

Health workers can communicate with patients online and prescribe medicine. Health workers should be provided with proper training to use this system.

6.3.2.2. Communication between Health worker and patient

System should be designed in such a way that health worker and patient can communicate easily in form of video or audio. Details of video should be clear and internet speed should be good enough to continue with video. If doctor does not know the language of patients, a system should automatically translate the message in the desired language.

6.3.2.3. E-Prescription System

e-Prescription are expected to enhance the health services. All labs, pharmacies and doctors are connected to a central system. Doctor will prescribe the medicine and lab test through E-prescription. It will became easily accessible to pharmacies and labs. All previous data of patients will be saved and maintained. Patient history plays an important role in diagnosis. System should record the patient history and all previous patient history should be available to doctor on one click. In European countries, e-prescription system is already available and very successful.

6.3.2.4. Billing

Billing module should be integrated in our system and should be a part of our system. So that elder people can easily pay their bills through our system.

6.3.2.5. Secondary use of personalized data

Large scale data available can be used in data analytics and can help doctors in diagnosis. It will completely transform the health sector. It has potential to revolutionize the health industry by improving the accuracy of diagnosis.

6.3.2.6. Use of Artificial Intelligence

By using this large amount of data, not only mortality can be decreased but also quality of life can be improved. Data of patient will be recorded on daily basis by using Artificial Intelligence system. System should automatically alert doctor in case of change in any health parameter of patient. On the basis of this data, if emergency condition occur, automatically ambulance service should be informed by our system.

6.3.2.7. Patients Test Reports

Patients test report should be automatically available to doctor one click. All labs should be synchronized in such a way that all reports are saved in one centralized database. Doctor can easily access the reports.

6.3.2.8. Automatic feedback system

Doctor can automatically give their feedback regarding patients according to their availability. Doctor can view their daily health progress and give their valuable feedback.

6.3.2.9. Medicine Availability

Doctor can track the availability of medicine. If they prescribe any medicine to patient, they can check whether that medicine is available in their area or not. So they can change the medicine with alternative or can inform concerned authorities regarding the medicine.

6.3.2.10. Viral Disease

System should be designed in such a way that doctor can get update regarding the viral diseases in specific area. In case, doctor observe that specific disease is getting viral in specific area, they can give alarm to other doctors, patients and health management system associated with other rural areas.

7. Dissemination Levels

The dissemination levels for different tools and activities are presented in Table 5.

Table 5. Dissemination levels

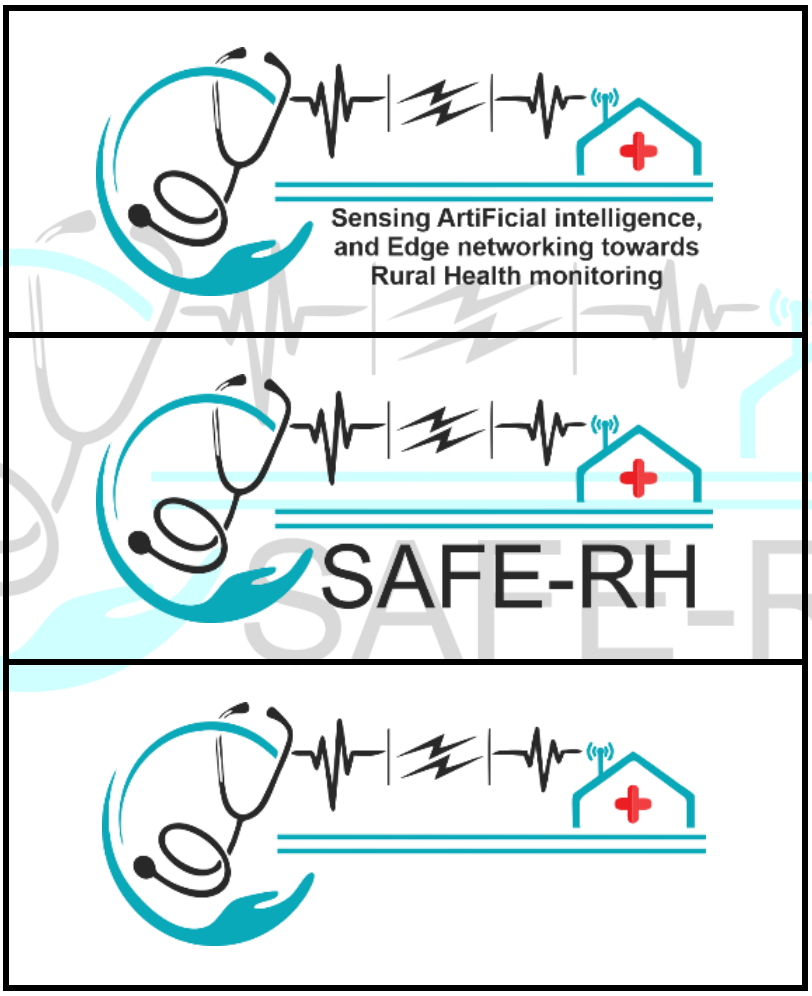
Dissemination tool or activity	Dissemination level					
	Department/ Faculty	Institution	Local	Regional	National	International
Diffusion and Dissemination Plan	x	x	x	x	x	x
Logo	x	x	x	x	x	x
Presentation Template	x			x	x	x
Website	x	x	x	x	x	x
Printed Materials	x	x	x	x	x	x
Electronic Materials	x	x	x	x	x	x
Publications in professional media			x	x	x	x
Social Media	x	x	x	x	x	x
Conferences and Workshops	x	x	x	x	x	x
Literature review and reports	x					
Publications in indexed journals	x	x	x	x	x	x
Book Publications	x	x	x	x	x	x
Participation in scientific congresses and conferences	x	x	x	x	x	x
SAFE-RH Quality Plan and Project Handbook			x	x	x	x
Project Periodic Report	x	x				
Project Final Report		x		x	x	x

8. SAFE-RH Project Presence

To increase the visibility of the presence of SAFE-RH project, a logo, a website and social media platforms are launched. The following sections provides rationale and details about features of website, logo and social media pages realized for SAFE-RH project.

8.1. Logo

Logo communicate the unique visual identity of any company, brand, or project. Following the same intent, a customized logo in-line with the theme of the SAFE-RH is designed. The logo represents the availability of medical services at doorstep in rural areas through ICT and IoT. Three variants of the logo with full name, acronyms and image only are designed.

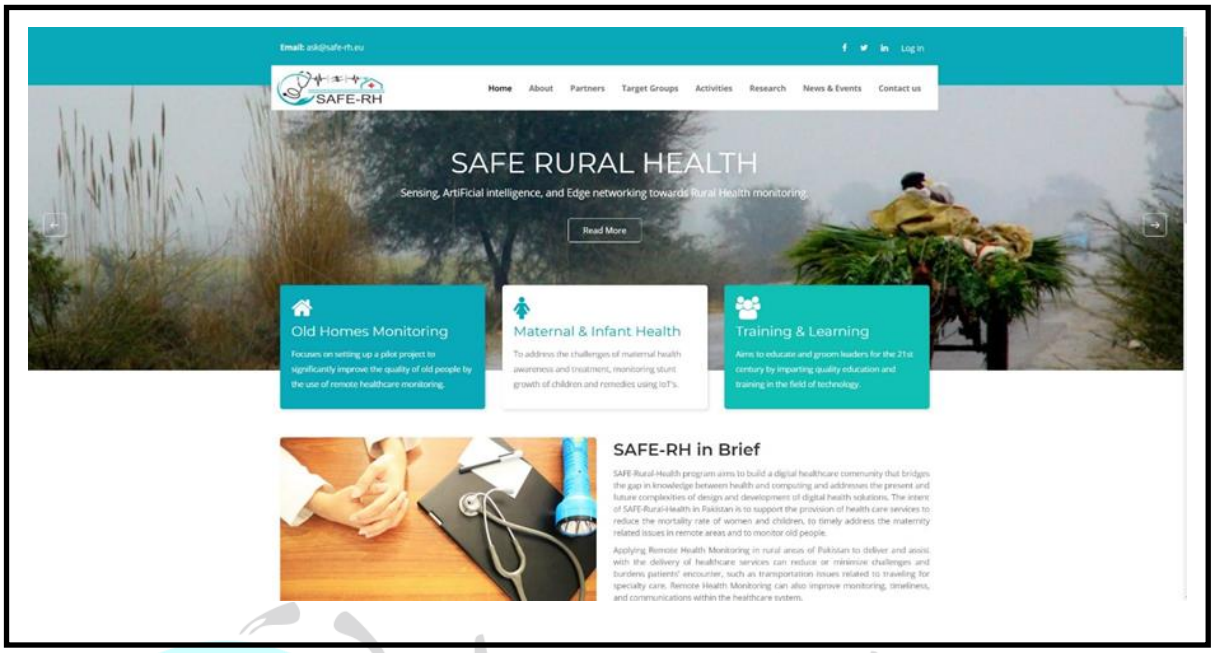


8.2. Website

https://safe-rh.eu/

The major intent of the website is to reflect SAFE-RH project and to increase its visibility among target audience that include both the audience benefitted directly and indirectly from this project. To meet the purpose in an effective way the layout, features and content of the website are designed exploiting

quality guidelines of Human Computer Interaction and Information presentation. The following image shows a full layout of the SAFE-RH website.

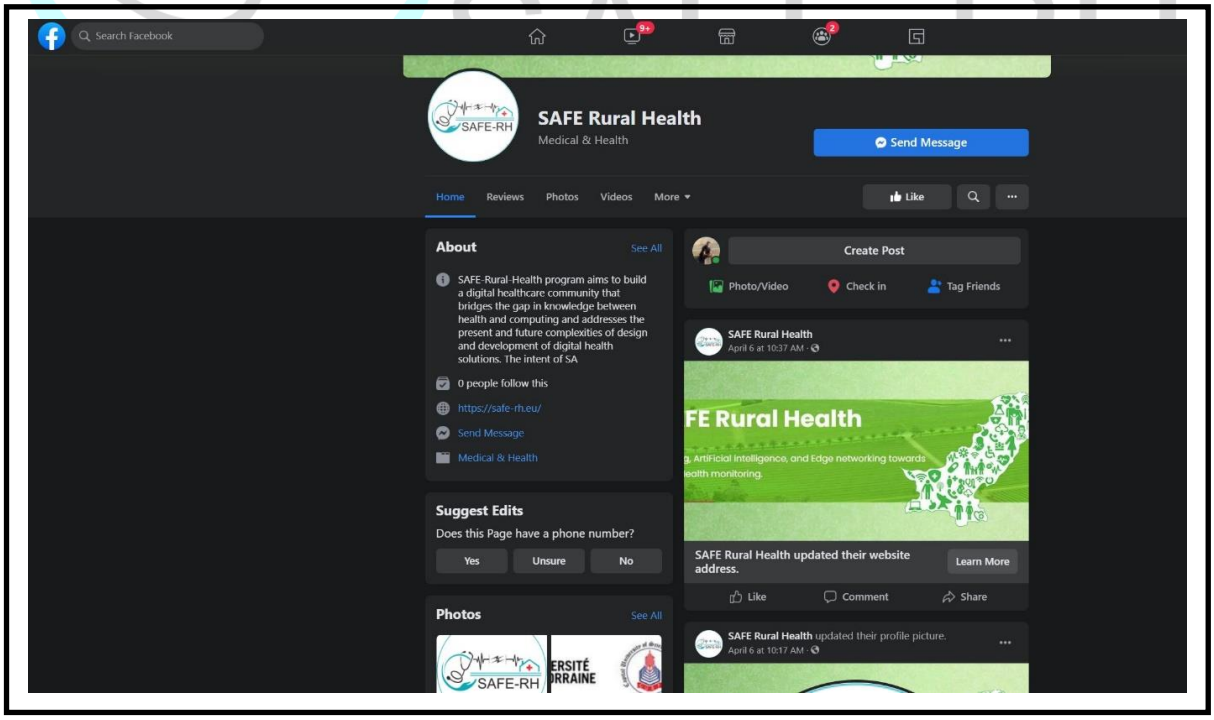


8.3. Social Media Platforms

The social media platforms have been developed to increase the reach of the project as much as possible. The name of the platforms along with the screenshots of the project page/profile is given below.

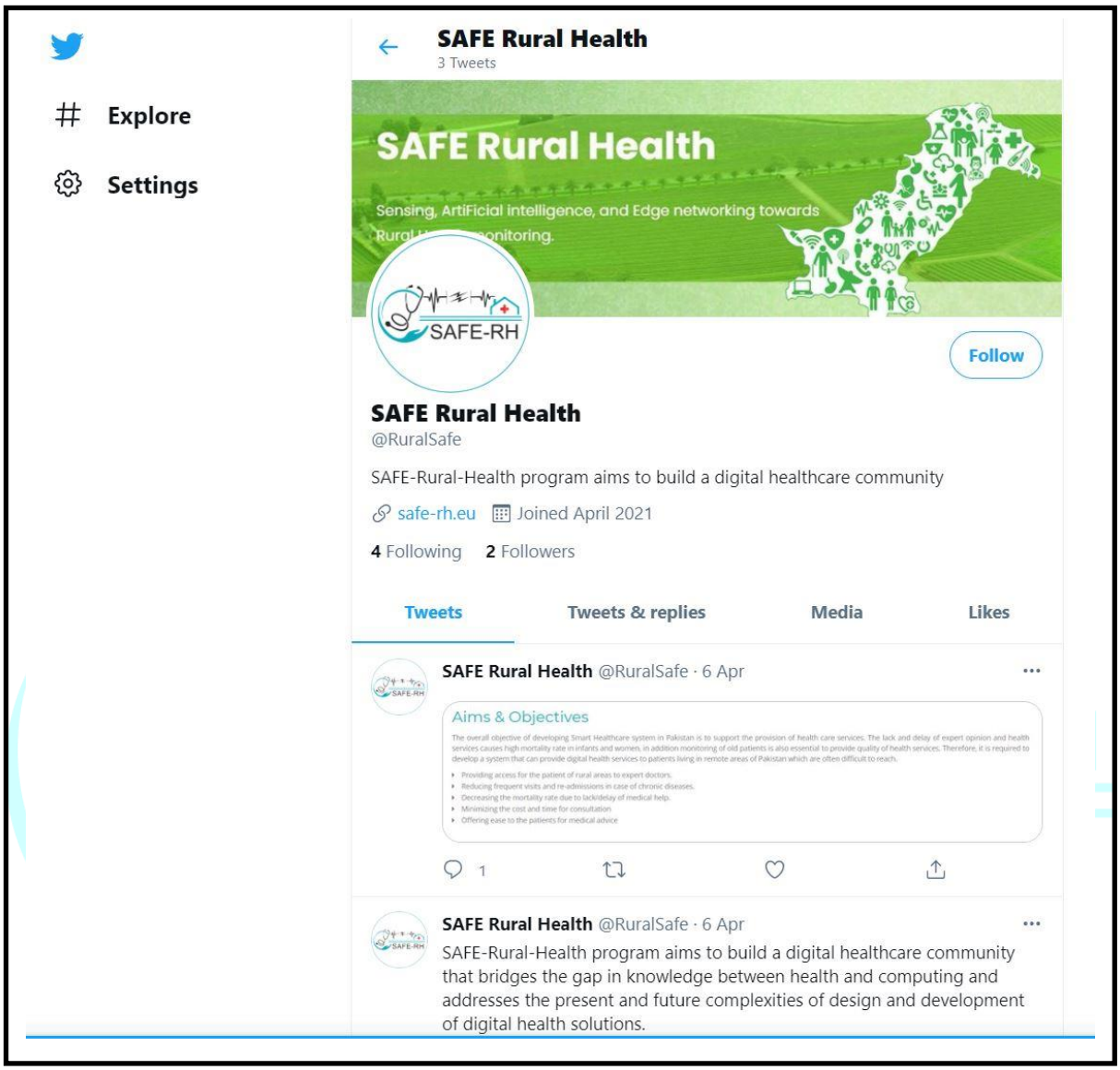
8.3.1. Facebook

https://www.facebook.com/SAFE-Rural-Health-104638741664829



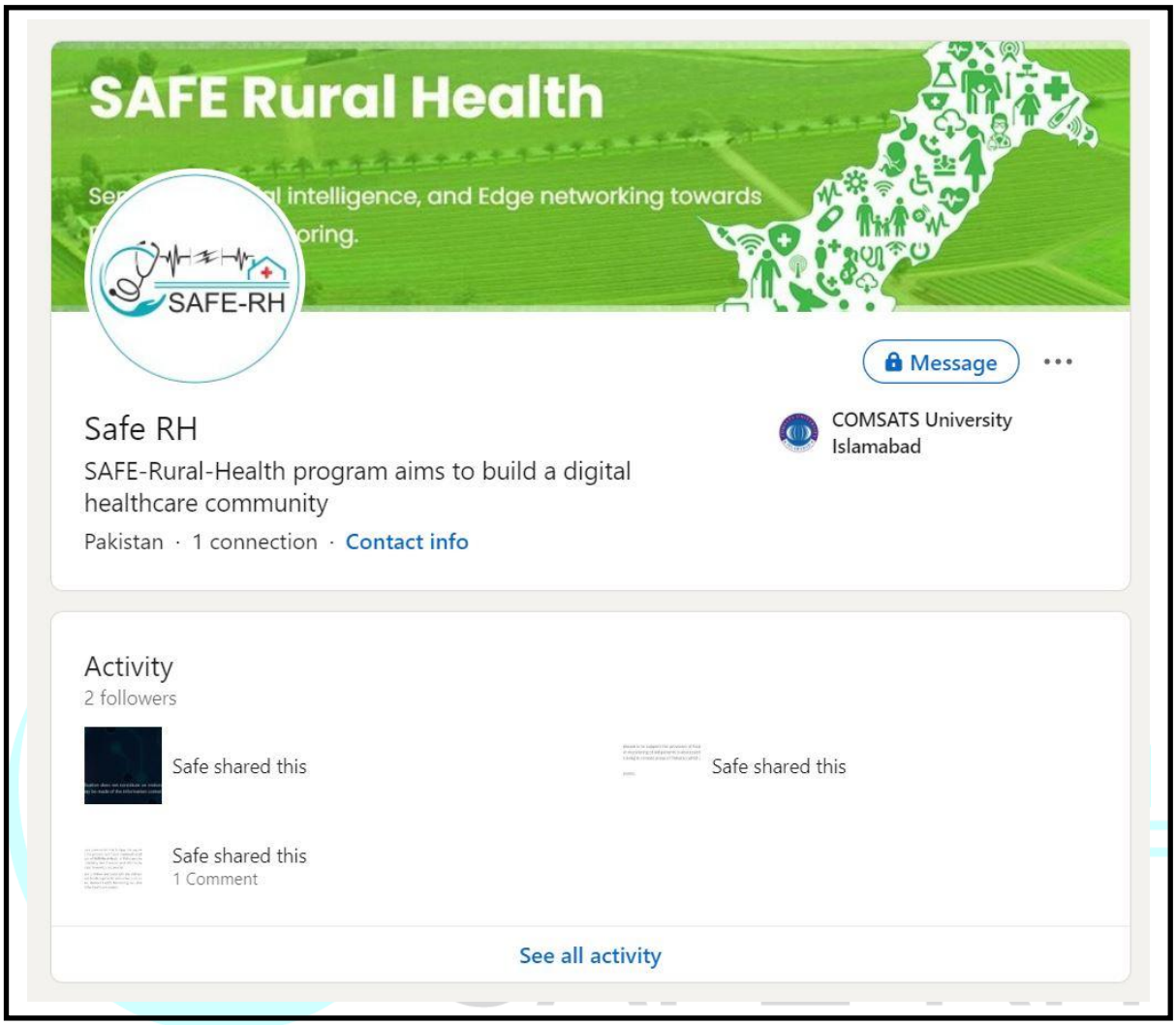
8.3.2. Twitter

https://twitter.com/RuralSafe



8.3.3. LinkedIn

https://www.linkedin.com/in/safe-rh-50424820b/



9. Dissemination Activities

The dissemination activities of the project are as follows

9.1. Symposium and Workshops

Two workshops are part of the dissemination activities of this project, one was organized in Pakistan by CUST in April 2021 and one will be organized in EU by European partners. The objectives of these workshops include the identification of the skill priorities and the requirements of the Remote Health Monitoring. A questionnaire will be set up to identify the real needs of rural patients to respond to access health provision. This questionnaire will be supplemented by workshops that will bring together patients, health workers and universities to discuss and identify needs. The associate partners will be part of these workshops both in Asia and Europe.

These workshops will be organized to achieve the short-term objectives such as identifying the target groups, following training, practices at different levels, cross pilot and regional collaboration. The aim is to sum up all the outputs of the activities in order to reach the wider and final aim of the project. Different means of communication would be used to reach different target groups that include local healthcare service providers, local health board, partner HEIs, regional research institutions and policy institutions. An indication of the effectiveness of the communication means can be reflected through one or more parameters including the number of member communities on board for the pilot, number of healthcare professionals trained, number of healthcare service providers agreed to participate in the pilots, number of HEIs, healthcare service provider signed up for the pilot, and MoU signed with number of HEIs beyond partner institutes.

These activities are expected to have long-term impacts including increase in rural population healthcare standard, national healthcare indicators and these workshops will help increase the growth in knowledge level. These long-term impacts can be accumulated through several short-term impacts of such activities which include having real expertise in the addiction of connected health, strengthening the healthcare service professional skills, increasing the awareness of connected health in the healthcare sector, be aligned with the European agenda in the healthcare field and research outputs in use of smart technology in healthcare.

9.2. Local Dissemination Activities

The partner institutes in Pakistan will arrange periodic visits to rural areas that will help identify the health-related problems in those areas. The continuous interaction with the patients and the medical doctors will help highlighting real challenges faced by both groups in these areas. People will be exposed to the novel technological solutions and they will be trained accordingly. A reliable and well-established connection of patients with healthcare providers will be developed through these activities.

9.3. Final Communication and Dissemination Report

A final report will be provided including a final publishable summary report comprising a description of the main results, potential impact and main dissemination activities.

[*] https://gallup.com.pk/short-report-on-health-statistics-in-pakistan/

[†] https://www.indexmundi.com/pakistan/demographics_profile.html