

DOI: 10.38173/RST.2022.24.2.10:133-151

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| <b>Title:</b>   | <i>URDU VERSION OF THE TELEMEDICINE SATISFACTION QUESTIONNAIRE AND TELEHEALTH USABILITY QUESTIONNAIRE: AN INTRODUCTORY INVESTIGATION AMONG PAKISTANI TRANSGENDER INDIVIDUALS</i> |
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**Section:** Economics

**Issue:** 2(24)/2022

|                                  |   |
|----------------------------------|---|
| <b>Received:</b> 25 August 2022  | <b>Revised:</b> 9 October 2022            |
| <b>Accepted:</b> 28 October 2022 | <b>Available Online:</b> 15 November 2022 |

Paper available online [HERE](#)

## URDU VERSION OF THE TELEMEDICINE SATISFACTION QUESTIONNAIRE AND TELEHEALTH USABILITY QUESTIONNAIRE: AN INTRODUCTORY INVESTIGATION AMONG PAKISTANI TRANSGENDER INDIVIDUALS

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### ABSTRACT:

THE HEALTH OF TRANSGENDER INDIVIDUALS ARE AT HIGH RISK IN DEVELOPING COUNTRIES. THE TRANSGENDER INDIVIDUALS ARE DESTITUTE OF BASIC HEALTH REQUIREMENTS IN THESE COUNTRIES. EVEN THOUGH TELEMEDICINE SATISFACTION QUESTIONNAIRE (TSQ) AND TELEHEALTH USABILITY QUESTIONNAIRE (TUQ) ARE CONSIDERED VALID AND RELIABLE INSTRUMENT IN DEVELOPED ECONOMIES. BUT IT CANNOT BE INVESTIGATED YET FOR TRANSGENDER INDIVIDUALS IN DEVELOPING ECONOMIES ESPECIALLY IN PAKISTAN. THE PURPOSE OF THIS STUDY IS TO INVESTIGATE THE RELIABILITY AND VALIDITY OF THE URDU VERSION OF TSQ AND TUQ. DATA WAS COLLECTED USING CONVENIENCE SAMPLING TECHNIQUE. A TOTAL OF 350 TRANSGENDER INDIVIDUALS FROM FOUR (LAHORE, FAISALABAD, RAWALPINDI AND GUJRANWALA) MAJOR CITIES OF PUNJAB WERE PARTICIPATED IN THIS STUDY. THE RESULT SHOWED THAT URDU VERSION OF TSQ AND TUQ ARE CONSIDERED VALID AND RELIABLE. THEREFORE, THIS URDU VERSION CAN BE USED OF FUTURE STUDIES.

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**KEYWORDS:** TRANSGENDER; URDU; TELEMEDICINE; TELEHEALTH; PUNJAB; PAKISTAN; SOCIAL SUSTAINABILITY; DEVELOPING ECONOMY; SOCIAL EXCLUSION;

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## INTRODUCTION

In modern era the increasing usage of technology has significantly improved the treatment and rehabilitation style. Remote health services also known as “Telemedicine” and “Telehealth” can be used with numerous software and hardware technologies<sup>5</sup>. Video and audio calls, messages, virtual platforms and online applications give necessary help for the people who could not get access to the physical (face-to-face) health services because of social, demographic and financial hurdles<sup>6</sup>. Telehealth services are extremely important for transgender. Due to gender identity transgender individuals are vulnerable to their basic health rights<sup>7</sup>. According to United States 2015 survey, 29% of transgender individuals are poor, 42% not afford to see a doctor and 21% faced difficulties with insurance related issues because they are transgender<sup>8</sup>. Financial problems, gender discrimination, insurance burdens and health anxiety are the problems faced by transgender community. The situation of transgender people’s health in developing country like Pakistan is alarming<sup>9</sup>. As concerned to the sexual health transgender individuals are at the high risk of sexually transmitted diseases like HIV. The HIV prevalence among Pakistani transgender individuals are up to 17.50% of the whole HIV population<sup>10</sup>. Moreover, transgender people in Pakistan have limited access to higher education which leads to poor health literacy. Therefore, there is a need to bring a revolutionary change in health care facilities for transgender individuals. The current demand of telehealth could improve the health care needs of patients, particularly transgender<sup>11</sup>. Telehealth services could provide the long term health care facilities to the transgender population. In addition, telemedicine applications accelerate the patient’s satisfaction level and standard of healthcare facilities<sup>12</sup>. Therefore, there is need for an improvised version of remote healthcare services for transgender community in Pakistan. Transgender individuals have distinctive healthcare needs and previous studies have reported that transgender who experience gender affirming care have superior quality of life<sup>13</sup>.

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<sup>5</sup> Kruse, C. S., Krowski, N., Rodriguez, B., Tran, L., Vela, J., & Brooks, M. (2017). Telehealth and patient satisfaction: a systematic review and narrative analysis. *BMJ open*, 7(8), e016242

<sup>6</sup> Hatcher-Martin, J. M., Adams, J. L., Anderson, E. R., Bove, R., Burrus, T. M., Chehrena, M., ... & Govindarajan, R. (2020). Telemedicine in neurology: telemedicine work group of the American Academy of Neurology update. *Neurology*, 94(1), 30-38

<sup>7</sup> Ming, L. C., Hadi, M. A., & Khan, T. M. (2016). Transgender health in India and Pakistan. *The Lancet*, 388(10060), 2601-2602

<sup>8</sup> Baldino, J. N., Lodge, E. K., & Lahlou, R. M. (2021). Assessment of a Student-Run Free Gender-Affirming Care Clinic's Transition to Telehealth. *Transgender Health*

<sup>9</sup> Awais-E-Yazdan, M., Hassan, Z., Ejaz, A., Spulbar, C., Birau, R., & Mitu, N. E. (2022). Investigating the nexus between safety training, safety rules and procedures, safety performance and protection against hazards in Pakistani construction companies considering its impact on textile industry. *Industria Textila*, 73(1), 48-53

<sup>10</sup> Ming, L. C., Hadi, M. A., & Khan, T. M. (2016). Transgender health in India and Pakistan. *The Lancet*, 388(10060), 2601-2602

<sup>11</sup> Apple, D. E., Lett, E., Wood, S., Freeman Baber, K., Chuo, J., Schwartz, L. A., ... & Dowshen, N. (2021). Acceptability of telehealth for gender-affirming care in transgender and gender diverse youth and their caregivers. *Transgender Health*

<sup>12</sup> Özkeskin, M., Özden, F., Ekmekçi, Ö., & Yüceyar, N. (2022). The reliability and validity of the Turkish version of the Telemedicine Satisfaction and Usefulness Questionnaire (TSUQ) and Telemedicine Patient Questionnaire (TPQ) in individuals with multiple sclerosis. *Neurological Sciences*, 43(3), 1921-1927

<sup>13</sup> Apple, D. E., Lett, E., Wood, S., Freeman Baber, K., Chuo, J., Schwartz, L. A., ... & Dowshen, N. (2021). Acceptability of telehealth for gender-affirming care in transgender and gender diverse youth and their caregivers. *Transgender Health*

The result of telemedicine research provide a positive impact on transgender health<sup>14,15</sup>. Treatment, exercise engagement, and patient satisfaction have all been proven to benefit via telehealth. Telehealth services helps in improving quality of live, fatigue and functional activities among patients<sup>16</sup>. Thus, the aim of the present study is to examine the factorial validity of the urdu version of the telemedicine satisfaction questionnaire (TSQ) and telehealth usability questionnaire (TUQ). The validation of TSQ and TUQ are important with respect to Pakistani transgender individuals as it is a first piece of research in this regard and it was not tested in Pakistani context.

## METHODOLOGY AND ANALYSIS

### Pre-Test and Pilot Test

Before data collection or formally questionnaire distribution pre-test and pilot study was conducted. The main reason behind conducting pre-test and pilot study is to ensure that there are no ambiguities and troubling statements left for respondents. For pre testing the valuable suggestions were taken from three experts from School of Business Management Universiti Utara Malaysia. All corrections and suggestions after pre testing was incorporated for further improvements before conducting formally data collection. Accordingly, pilot study was conducted by distributing 75 questionnaires to the targeted respondents. The questionnaires was distributed personally by researcher. Only 60 questionnaires were returned representing 80% of response rate. After collecting the questionnaires the Cronbach's alpha was obtained to check the reliability of data. The reliability coefficients of the construct were; TSQ (0.866) and TUQ (0.825). The Cronbach's alpha of each construct were in acceptable range so the questionnaire were distributed for genuine study.

### Study Participants

Data was collected with the help of convenience sampling technique from four major cities in Punjab, Pakistan namely, Lahore, Faisalabad, Rawalpindi and Gujranwala. The cities were included for data collection because these are most populous cities of Punjab as per latest population census. 350 transgender individuals were included in the study. 15 responses were deleted due to missing data and not fulfilling the study requirements. Consent was taken from each individual to participate in the study.

Table 1

Demographic features of the respondents

| Characteristics    | Frequency | Percentage |
|--------------------|-----------|------------|
| <b>Gender</b>      |           |            |
| Male Transgender   | 105       | 30%        |
| Female Transgender | 245       | 70%        |
| <b>Age</b>         |           |            |
| 18-27              | 99        | 28.28%     |
| 28-37              | 130       | 37.14%     |
| 38-47              | 77        | 22%        |
| 48-57              | 33        | 9.42%      |

<sup>14</sup> Apple, D. E., Lett, E., Wood, S., Freeman Baber, K., Chuo, J., Schwartz, L. A., ... & Dowshen, N. (2021). Acceptability of telehealth for gender-affirming care in transgender and gender diverse youth and their caregivers. *Transgender Health*

<sup>15</sup> Baldino, J. N., Lodge, E. K., & Lahlou, R. M. (2021). Assessment of a Student-Run Free Gender-Affirming Care Clinic's Transition to Telehealth. *Transgender Health*

<sup>16</sup> Yeroushalmi, S., Maloni, H., Costello, K., & Wallin, M. T. (2020). Telemedicine and multiple sclerosis: a comprehensive literature review. *Journal of telemedicine and telecare*, 26(7-8), 400-413

|                                 |     |        |
|---------------------------------|-----|--------|
| 58-67                           | 11  | 3.14%  |
| <b>Education</b>                |     |        |
| Primary School                  | 180 | 51.42% |
| Secondary School                | 93  | 26.57% |
| Matriculation                   | 55  | 15.71% |
| Intermediate                    | 17  | 4.85%  |
| Bachelors                       | 5   | 1.42%  |
| <b>Job Status</b>               |     |        |
| Employed                        | 53  | 15.14% |
| Unemployed                      | 297 | 84.85% |
| <b>Monthly Income (PKR)</b>     |     |        |
| Less than 10000                 | 76  | 21.71% |
| 10000-15000                     | 98  | 28%    |
| 16000-20000                     | 89  | 25.42% |
| 21000-25000                     | 49  | 14%    |
| Above 25000                     | 38  | 10.85% |
| <b>Smoking Cigarettes</b>       |     |        |
| Smokers                         | 210 | 60%    |
| Non-Smokers                     | 140 | 40%    |
| <b>Needle Sharing Practices</b> |     |        |
| Yes                             | 36  | 10.28% |
| No                              | 314 | 89.71% |
| <b>Intravenous drug users</b>   |     |        |
| Yes                             | 80  | 22.85% |
| No                              | 270 | 77.14% |

### **TSQ and TUQ Scales (Urdu Version)**

Each of original questionnaire (TSQ & TUQ) was in English language. Although, not all respondents are able to read and understand English language. Similarly, the English language is not popularly used in Pakistan, therefore the questionnaire was translated into Urdu language. The study's questionnaire was translated following internationally recognized methods<sup>17,18</sup>. In the first phase the English version of both questionnaires (TSQ & TUQ) were translated into Urdu language by three native Urdu language experts. In the second phase, the Urdu version was translated again by three experts into English language to maintain the content validity of both questionnaires. In the third phase, the original version of both questionnaires were compared to the translated version and found that Urdu version was linguistically and theoretically correct. Finally, all differences were managed by translators and Urdu version was used (See appendix).

### **STUDY DESIGN**

A cross-sectional study design was used as the data was collected once. A total of 350 transgender individuals were participated in the study. The data was collected from the four cities in Pakistan. The study adopted personal administrated questionnaire for data collection. This method is considered most suitable to develop a rapport among respondents while briefing the survey, provide explanations to the respondents on the spot and immediately collect the completed questionnaires. Telemedicine satisfaction questionnaire (TSQ) was adopted from the study of Yip et al (2003) whereas, telehealth usability questionnaire (TUQ) was adopted from the study of Parmanto et al (2016). TSQ comprised of 14 items similarly,

<sup>17</sup> Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *Journal of clinical epidemiology*, 46(12), 1417-1432

<sup>18</sup> Institute, M. A. P. I. (2012). Linguistic validation manual for health outcome assessments

TUQ consist of 21 items. All items were measured using 5 item likert scale from (1) strongly disagree to (5) strongly agree.

### RELIABILITY TEST

Measurements that produce similar results are known as reliable<sup>19</sup>. Hammersley<sup>20</sup>, argued that by attaining homogenous findings incorporating the similar techniques are termed as reliability. It measure the same attributes of measurement items with respect to similar technique<sup>21</sup>. According to Denscombe<sup>22</sup> a reliable estimation is mandatory while evaluating the measurement items consistency. Reliability test explains regarding the variables consistency and what is the purpose of the measurement<sup>23</sup>. Reliability test also illustrates that the measure does not carry any random error<sup>24</sup>. Churchill<sup>25</sup> argued that the most familiar method among scholars relating to reliability is coefficient computation<sup>26,27</sup>. Normally, 0.70 is the acceptable value of cronbach's alpha<sup>28,29,30</sup>. Therefore, reliability of every construct of the present study was in admissible range.

Table 2

*Reliability test of Telemedicine Satisfaction Questionnaire (TSQ) & Telehealth Usability Questionnaire (TUQ)*

| TSQ Items | A     |
|-----------|-------|
| Item1     | 0.882 |
| Item2     | 0.891 |
| Item3     | 0.901 |
| Item4     | 0.841 |
| Item5     | 0.825 |
| Item6     | 0.813 |
| Item7     | 0.837 |
| Item8     | 0.912 |
| Item9     | 0.889 |
| Item10    | 0.895 |
| Item11    | 0.893 |
| Item12    | 0.923 |
| Item13    | 0.808 |
| Item14    | 0.899 |
| TUQ Items | A     |
| Item1     | 0.893 |
| Item2     | 0.851 |

<sup>19</sup> Creswell, J. W. (2009). Editorial: Mapping the field of mixed methods research

<sup>20</sup> Hammersley, M. (1987). Some notes on the terms 'validity' and 'reliability'. *British Educational Research Journal*, 13(1), 73-82

<sup>21</sup> Hammersley, M. (1987). Some notes on the terms 'validity' and 'reliability'. *British Educational Research Journal*, 13(1), 73-82

<sup>22</sup> Denscombe, M. (2003). *The good research guide* Maidenhead

<sup>23</sup> Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados*. Bookman Editora

<sup>24</sup> Singleton, R. A., Straits, B. C., & Straits, M. M. (2005). *Approaches to Social Sciences*

<sup>25</sup> Churchill Jr, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 64-73

<sup>26</sup> Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, 16(3), 297-334

<sup>27</sup> Nunnally, J. (1978). *Psychometric methods*

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<sup>29</sup> Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). Criteria for scale selection and evaluation. *Measures of personality and social psychological attitudes*, 1, 1-16

<sup>30</sup> Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons

|        |       |
|--------|-------|
| Item3  | 0.923 |
| Item4  | 0.881 |
| Item5  | 0.843 |
| Item7  | 0.893 |
| Item8  | 0.905 |
| Item9  | 0.912 |
| Item10 | 0.932 |
| Item11 | 0.805 |
| Item12 | 0.896 |
| Item13 | 0.867 |
| Item14 | 0.899 |
| Item15 | 0.856 |
| Item16 | 0.841 |
| Item17 | 0.878 |
| Item18 | 0.906 |
| Item19 | 0.912 |
| Item20 | 0.932 |
| Item21 | 0.876 |

Note:  $\alpha$  = Cronbach's alpha

### VALIDITY TEST

The acceptability and credibility of constructs are known as validity<sup>31</sup>. Borden and Abbot<sup>32</sup> argued that validity of constructs shows relating to what extent and length, it calculates what is required to calculate. Similarly, it is defined as the particular constructs which express the idea of the research. Moreover, it removes systematic and as well as non-random errors. According to Hair, et al.<sup>33</sup> validity of a research is defined as how a phenomenon is explained by a particular items. Therefore, in the present study the validity tests conducted to certify and ensure that the measures/items what it is desired for. According to (Campbell & Stanley<sup>34</sup>; Zikmund, Babin, Carr & Griffin<sup>35</sup>) stated the two types of validity, internal and external validity. Based on the study of Zikmund et al.<sup>36</sup>, if the independent variable merely influences on dependent variable and cause solely changes, the internal validity is implemented. However, in order to determine that what measure the results of the study application in the real world then the external validity is executed<sup>37</sup>. Therefore, in the context of current study research validity was confirmed by factor analysis by using SPSS.

### MULTICOLLINEARITY TEST

It defines the degree to which one construct can be explained by another construct and it disclose that each item of the construct is overlapping or mutually exclusive<sup>38</sup>. The high

<sup>31</sup> Kitchin, R., & Tate, N. (2013). *Conducting research in human geography: theory, methodology and practice*. Routledge

<sup>32</sup> Borden, K. S., & Abbott, B. A. (2011). *A process approach: Research design and methods*. New York: McGraw-Hill Education

<sup>33</sup> Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall

<sup>34</sup> Campbell, D. T., & Stanley, J. C. (2015). *Experimental and quasi-experimental designs for research*. Ravenio books

<sup>35</sup> Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business research methods*. Cengage learning

<sup>36</sup> Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business research methods*. Cengage learning

<sup>37</sup> Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business research methods*. Cengage learning

<sup>38</sup> Pallant, J. (2011). *SPSS Survival Manual: A step by step guide to data analysis using SPSS*. 4th Edition. Berkshire: McGraw-Hill Education

correlations among the variables shows the existence of multicollinearity<sup>39</sup>. Similarly, in other words when two or more variables are highly correlated it presents the multicollinearity and it could be a significant issue in structural equation modeling<sup>40</sup>. According to Tabachnick and Fidell<sup>41</sup>, the standard error of the coefficient increases due to multicollinearity and it turns the coefficient non-significant. The present study used two methods to evaluate multicollinearity<sup>42,43</sup>, namely, (1) the correlation matrix and (2) tolerance value and variance inflated factor.

Firstly, using SPSS correlation matrix of latent constructs were calculated. Hair et al.<sup>44</sup> indicated that correlation coefficient of 0.90 or above specified that there is multicollinearity in latent constructs. The detail of correlation matrix among latent constructs are given below in table 3. Satisfaction & Future Use (SFU)

Table 3  
*Correlation Matrix of the Latent Constructs (Telemedicine Satisfaction Questionnaire & Telehealth Usability Questionnaire)*

| CONSTRUCTS                       | TSQ     | UF      | EUL     | IFQ     | ITQ     | RB      | SFU |
|----------------------------------|---------|---------|---------|---------|---------|---------|-----|
| TSQ                              | 1       |         |         |         |         |         |     |
| Usefulness (UF)                  | 0.626** | 1       |         |         |         |         |     |
| Ease of Use & Learnability (EUL) | 0.590** | 0.574** | 1       |         |         |         |     |
| Interface Quality (IFQ)          | 0.480** | 0.425** | 0.572** | 1       |         |         |     |
| Interaction Quality (ITQ)        | 0.514** | 0.435** | 0.520** | 0.554** | 1       |         |     |
| Reliability (RB)                 | 0.543** | 0.567** | 0.528** | 0.368** | 0.444** | 1       |     |
| SATISFACTION & FUTURE USE (SFU)  | 0.423** | 0.495** | 0.581** | 0.540** | 0.413** | 0.518** | 1   |

Table 3 indicated that no value is above the given threshold value which is 0.90 (Hair et al.2010) and the correlation coefficient of the latent construct of the present study were below 0.90 (range 0.368-0.626). Therefore, suggesting that there was no multicollinearity issue among the latent constructs. Secondly, tolerance and variance inflated factor (VIF) were assessed to investigate the issue of multicollinearity. If the tolerance value is less than 0.20 and VIF is greater than 5 then there is an issue of multicollinearity<sup>45</sup>. Table 4 displays the statistics of tolerance and VIF of the present study.

<sup>39</sup> Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152

<sup>40</sup> Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall

<sup>41</sup> Tabachnick, B. G., & Fidell, L. S. (2007). Multivariate analysis of variance and covariance. *Using Multivariate Statistics*, 3, 402-407

<sup>42</sup> Chatterjee, S., & Yilmaz, M. (1992). A review of regression diagnostics for behavioral research. *Applied Psychological Measurement*, 16(3), 209-227

<sup>43</sup> Peng, D. X., & Lai, F. (2012). Using partial least squares in operations management research: A practical guideline and summary of past research. *Journal of Operations Management*, 30(6), 467-480

<sup>44</sup> Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall

<sup>45</sup> Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152



Table 4  
*Tolerance and Variance Inflated Factor (VIF)*

| Constructs                       | Collinearity Statistics |       |
|----------------------------------|-------------------------|-------|
|                                  | Tolerance               | VIF   |
| TSQ                              | 0.477                   | 2.094 |
| USEFULNESS (UF)                  | 0.501                   | 1.995 |
| EASE OF USE & LEARNABILITY (EUL) | 0.473                   | 2.113 |
| INTERFACE QUALITY (IFQ)          | 0.573                   | 1.746 |
| INTERACTION QUALITY (ITQ)        | 0.581                   | 1.721 |
| RELIABILITY (RB)                 | 0.580                   | 1.726 |
| SATISFACTION & FUTURE USE (SFU)  | 0.468                   | 1.938 |

Table 5  
*Factor loading of the constructs (Telemedicine Satisfaction Questionnaire & Telehealth Usability Questionnaire)*

| TSQ Items | Loadings |
|-----------|----------|
| Item1     | 0.836    |
| Item2     | 0.903    |
| Item3     | 0.859    |
| Item4     | 0.870    |
| Item5     | 0.901    |
| Item6     | 0.923    |
| Item7     | 0.912    |
| Item8     | 0.928    |
| Item9     | 0.877    |
| Item10    | 0.868    |
| Item11    | 0.888    |
| Item12    | 0.905    |
| Item13    | 0.931    |
| Item14    | 0.860    |
| TUQ Items | Loadings |
| Item1     | 0.899    |
| Item2     | 0.902    |
| Item3     | 0.905    |
| Item4     | 0.884    |
| Item5     | 0.904    |
| Item6     | 0.921    |
| Item7     | 0.924    |
| Item8     | 0.890    |
| Item9     | 0.865    |
| Item10    | 0.878    |
| Item11    | 0.923    |
| Item12    | 0.915    |
| Item13    | 0.921    |
| Item14    | 0.860    |
| Item15    | 0.861    |
| Item16    | 0.878    |
| Item17    | 0.891    |
| Item18    | 0.822    |
| Item19    | 0.866    |
| Item20    | 0.835    |
| Item21    | 0.891    |

Note: factor loadings of each construct is above the recommended threshold

## DISCUSSIONS AND CONCLUSIONS

The purpose of this study is to check the reliability and validity of the TSQ and TUQ in Urdu Language. TSQ and TUQ are considered valid for the developed countries but it is never investigated in developing countries. This study is first in this regard. This Urdu version is a distinctive tool to examine telehealth related matters. It is also significant for thousands of transgender individuals in Pakistan. Telehealth and telemedicine services must be up to date in order to its usage among transgender. The original questionnaires are in English. These questionnaires were already translated in Spanish and Turkish languages due to increase in their usability<sup>4647</sup>.

Likewise, it is a significant approach to translate it into Urdu language due to increase its generalizability. Considering, the vulnerable health problems among transgender individuals, the Urdu version of these questionnaires would be a crucial step to solve these matters. The growing trend of telehealth and telemedicine warrants more valid and reliable tools must be developed worldwide and these tools should be translated and validated for usage across the globe. The Urdu version of TSQ and TUQ are considered as appropriate tools to evaluate the health related matters among transgender individuals in Pakistan. It is recommended to aware transgender individuals about the usage of telehealth services to avoid any health risk. The study propose that both TSQ and TUQ are considered useful and it must be incorporated among the lives of Pakistani transgender. The study have some limitations.

Firstly, the study sample was only limited to transgender individuals which limits the generalizability of the results. Future studies must investigate the Urdu version of TSQ and TUQ with more representative population of Pakistan. Secondly, the data was collected from the cities situated in Punjab. Future studies must include the other provinces of Pakistan to check the demographic and cultural differences also. The Urdu version of TSQ and TUQ are considered valid and reliable among transgender individuals in Pakistan.

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<sup>47</sup> Özkeskin, M., Özden, F., Ekmekçi, Ö., & Yüceyar, N. (2022). The reliability and validity of the Turkish version of the Telemedicine Satisfaction and Usefulness Questionnaire (TSUQ) and Telemedicine Patient Questionnaire (TPQ) in individuals with multiple sclerosis. *Neurological Sciences*, 43(3), 1921-1927

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## Appendix A in Urdu language version

### Telemedicine Satisfaction Questionnaire (TSQ) - Urdu Version

| سوالات  | انتہائی غیر متفق | غیر متفق | غیر جانبدار | متفق | انتہائی متفق |
|---|------------------|----------|-------------|------|--------------|
| (1) میں اپنے صحت کی دیکھ بھال فراہم کرنے والے سے آسانی سے بات کر سکتا ہوں۔                    | 5                | 4        | 3           | 2    | 1            |
| (2) میں اپنے صحت کی دیکھ بھال فراہم کرنے والے کو واضح طور پر سن سکتا ہوں۔                     | 5                | 4        | 3           | 2    | 1            |
| (3) میرا صحت کی دیکھ بھال فراہم کرنے والا میری صحت کی دیکھ بھال کی حالت کو سمجھنے کے قابل ہے۔ | 5                | 4        | 3           | 2    | 1            |
| (4) میں اپنے صحت کی دیکھ بھال کرنے والے کو اس طرح دیکھ سکتا ہوں جیسے ہم ذاتی طور پر ملے ہوں۔  | 5                | 4        | 3           | 2    | 1            |
| (5) سسٹم استعمال کرتے وقت مجھے مدد کی ضرورت نہیں ہے۔  | 5                | 4        | 3           | 2    | 1            |
| (6) میں اپنے صحت کی دیکھ بھال فراہم کرنے والے کے ساتھ بات چیت کرنے میں آسانی محسوس کرتا ہوں۔  | 5                | 4        | 3           | 2    | 1            |
| (7) میرے خیال میں ٹیلی میڈیسن کے ذریعے فراہم کی جانے والی صحت کی دیکھ بھال مطابقت رکھتی ہے۔   | 5                | 4        | 3           | 2    | 1            |
| (8) میں ٹیلی میڈیسن   | 5                | 4        | 3           | 2    | 1            |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
|   |   |   |   |   | کے استعمال سے صحت کی دیکھ بھال کی خدمات تک بہتر رسائی حاصل کرنا ہوں۔                        |
| 5 | 4 | 3 | 2 | 1 | (9) ٹیلی میڈیسن میرا ہسپتال یا کسی ماہر کلینک کے سفر میں وقت بچاتی ہے                       |
| 5 | 4 | 3 | 2 | 1 | (10) مجھے کافی توجہ ملتی ہے۔  |
| 5 | 4 | 3 | 2 | 1 | (11) ٹیلی میڈیسن میری صحت کی دیکھ بھال کی ضرورت کو پورا کرتی ہے۔                            |
| 5 | 4 | 3 | 2 | 1 | (12) مجھے ٹیلی میڈیسن صحت کی دیکھ بھال کی خدمات حاصل کرنے کا ایک قابل قبول طریقہ لگتا ہے    |
| 5 | 4 | 3 | 2 | 1 | (13) میں ٹیلی میڈیسن کی خدمات دوبارہ استعمال کروں گا  |
| 5 | 4 | 3 | 2 | 1 | (14) مجموعی طور پر، میں ٹیلی میڈیسن کے ذریعے فراہم کی جانے والی سروس کے معیار سے مطمئن ہوں۔ |

**Appendix A in English language version**

*Telemedicine Satisfaction Questionnaire (TSQ) - English Version*

| No. | Items   | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|-----|---|-------------------|----------|---------|-------|----------------|
| 1   | I can easily talk to my healthcare provider                           | 1                 | 2        | 3       | 4     | 5              |
| 2   | I can hear my healthcare provider clearly                             | 1                 | 2        | 3       | 4     | 5              |
| 3   | My health-care provider is able to understand my healthcare condition | 1                 | 2        | 3       | 4     | 5              |
| 4   | I can see my healthcare provider as if we met in person               | 1                 | 2        | 3       | 4     | 5              |
| 5   | I do not need assistance while using the system                       | 1                 | 2        | 3       | 4     | 5              |

|    |   |   |   |   |   |   |
|----|---|---|---|---|---|---|
| 6  | I feel comfortable communicating with my healthcare provider                        | 1 | 2 | 3 | 4 | 5 |
| 7  | I think the healthcare provided via telemedicine is consistent                      | 1 | 2 | 3 | 4 | 5 |
| 8  | I obtain better access to healthcare services by use of telemedicine                | 1 | 2 | 3 | 4 | 5 |
| 9  | Telemedicine saves me time travelling to hospital or a specialist clinic            | 1 | 2 | 3 | 4 | 5 |
| 10 | I do receive adequate attention   | 1 | 2 | 3 | 4 | 5 |
| 11 | Telemedicine provides for my healthcare need  | 1 | 2 | 3 | 4 | 5 |
| 12 | I find telemedicine an acceptable way to receive healthcare services                | 1 | 2 | 3 | 4 | 5 |
| 13 | I will use telemedicine services again  | 1 | 2 | 3 | 4 | 5 |
| 14 | Overall, I am satisfied with the quality of service being provided via telemedicine | 1 | 2 | 3 | 4 | 5 |

### Appendix B in Urdu language version

#### Telehealth Usability Questionnaire (TUQ) - Urdu Version

| سوالات   | انتہائی غیر متفق | غیر متفق | غیر جانبدار | متفق | انتہائی متفق |
|--|------------------|----------|-------------|------|--------------|
| افادیت   |                  |          |             |      |              |
| (1) ٹیلی ہیلتھ صحت کی دیکھ بھال کی خدمات تک میری رسائی کو بہتر بناتا ہے۔ | 5                | 4        | 3           | 2    | 1            |
| (2) ٹیلی ہیلتھ میرا ہسپتال یا کسی ماہر کے کلینک کے سفر میں وقت بچاتا ہے۔ | 5                | 4        | 3           | 2    | 1            |
| (3) ٹیلی ہیلتھ میری صحت کی دیکھ بھال کی ضروریات فراہم کرتا ہے۔           | 5                | 4        | 3           | 2    | 1            |
| استعمال میں آسانی اور  |                  |          |             |      |              |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
|   |   |   |   |   | سیکھنے کی اہلیت۔  |
| 5 | 4 | 3 | 2 | 1 | (1) اس نظام کو استعمال کرنا آسان تھا۔   |
| 5 | 4 | 3 | 2 | 1 | (2) سسٹم کو استعمال کرنا، سیکھنا آسان تھا۔  |
| 5 | 4 | 3 | 2 | 1 | (3) مجھے یقین ہے کہ میں اس سسٹم کا استعمال کرتے ہوئے تیزی سے نتیجہ خیز بن سکتا ہوں۔ |
|   |   |   |   |   | انٹرفیس کے معیار  |
| 5 | 4 | 3 | 2 | 1 | (1) جس طرح سے میں اس سسٹم کے ساتھ تعامل کرتا ہوں وہ خوشگوار ہے۔                     |
| 5 | 4 | 3 | 2 | 1 | (2) مجھے نظام کا استعمال کرنا پسند ہے۔  |
| 5 | 4 | 3 | 2 | 1 | (3) نظام سادہ اور سمجھنے میں آسان ہے۔   |
| 5 | 4 | 3 | 2 | 1 | (4) یہ نظام ہر وہ کام کرنے کے قابل ہے جو میں چاہتا ہوں کہ یہ کرنے کے قابل ہو۔       |
|   |   |   |   |   | تعامل کا معیار  |
| 5 | 4 | 3 | 2 | 1 | (1) میں ٹیلی ہیلتھ سسٹم کا استعمال کرتے ہوئے معالج سے آسانی سے بات کر سکتا ہوں۔     |
| 5 | 4 | 3 | 2 | 1 | (2) میں معالج کو ٹیلی ہیلتھ سسٹم کا استعمال کرتے ہوئے واضح طور پر سن سکتا ہوں۔      |
| 5 | 4 | 3 | 2 | 1 | (3) میں نے محسوس کیا کہ میں اپنے آپ کو مؤثر طریقے سے بیان کرنے کے قابل ہوں۔         |
| 5 | 4 | 3 | 2 | 1 | (4) ٹیلی ہیلتھ سسٹم کا استعمال کرتے ہوئے، میں معالج سے بھی مل سکتا                  |



|   |   |   |   |   |  |
|---|---|---|---|---|--|
|   |   |   |   |   | ہوں اگر ہم ذاتی طور پر ملنا چاہتے ہیں۔   |
|   |   |   |   |   | اعتبار   |
| 5 | 4 | 3 | 2 | 1 | (1) میرے خیال میں ٹیلی ہیلتھ سسٹم پر فراہم کردہ وزٹ ذاتی دوروں کی طرح ہیں۔                           |
| 5 | 4 | 3 | 2 | 1 | (2) جب بھی میں نے سسٹم کا استعمال کرتے ہوئے غلطی کی، میں آسانی سے اور جلدی سے اس کو ٹھیک کر سکتا ہوں |
| 5 | 4 | 3 | 2 | 1 | (3) جب بھی سسٹم نے خرابی کے پیغامات دیے جس نے مجھے واضح طور پر بتایا کہ مسائل کو کیسے حل کیا جائے۔   |
|   |   |   |   |   | اطمینان اور مستقبل کا استعمال  |
| 5 | 4 | 3 | 2 | 1 | (1) میں ٹیلی ہیلتھ سسٹم کا استعمال کرتے ہوئے معالج کے ساتھ بات چیت کرنے میں آرام محسوس کرتا ہوں۔     |
| 5 | 4 | 3 | 2 | 1 | (2) ٹیلی ہیلتھ صحت کی دیکھ بھال کی خدمات حاصل کرنے کا ایک قابل قبول طریقہ ہے۔                        |
| 5 | 4 | 3 | 2 | 1 | (3) میں ٹیلی ہیلتھ سروسز دوبارہ استعمال کروں گا۔   |
| 5 | 4 | 3 | 2 | 1 | (4) مجموعی طور پر، میں اس ٹیلی ہیلتھ سسٹم سے مطمئن ہوں۔  |

**Appendix B** in English language version

*Telehealth Usability Questionnaire (TUQ) - English Version*

| No. | Items   | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|-----|---|-------------------|----------|---------|-------|----------------|
|     | <b>Usefulness</b>   |                   |          |         |       |                |
| 1   | Telehealth improves my access to healthcare services                  | 1                 | 2        | 3       | 4     | 5              |
| 2   | Telehealth saves me time traveling to a hospital or specialist clinic | 1                 | 2        | 3       | 4     | 5              |
| 3   | Telehealth provides for my healthcare needs                           | 1                 | 2        | 3       | 4     | 5              |
|     | <b>Ease of Use and Learnability</b>                                   |                   |          |         |       |                |
| 1   | It was simple to use this system                                      | 1                 | 2        | 3       | 4     | 5              |
| 2   | It was easy to learn to use the system                                | 1                 | 2        | 3       | 4     | 5              |
| 3   | I believe I could become productive quickly using this system         | 1                 | 2        | 3       | 4     | 5              |
|     | <b>Interface Quality</b>  |                   |          |         |       |                |
| 1   | The way I interact with this system is pleasant                       | 1                 | 2        | 3       | 4     | 5              |
| 2   | I like using the system   | 1                 | 2        | 3       | 4     | 5              |
| 3   | The system is simple and easy to understand                           | 1                 | 2        | 3       | 4     | 5              |
| 4   | This system is able to do everything I would want it to be able to do | 1                 | 2        | 3       | 4     | 5              |
|     | <b>Interaction Quality</b>  |                   |          |         |       |                |

|                                    |   |   |   |   |   |   |
|------------------------------------|---|---|---|---|---|---|
| 1                                  | I could easily talk to the clinician using the telehealth system                        | 1 | 2 | 3 | 4 | 5 |
| 2                                  | I could hear the clinician clearly using the telehealth system                          | 1 | 2 | 3 | 4 | 5 |
| 3                                  | I felt I was able to express myself effectively   | 1 | 2 | 3 | 4 | 5 |
| 4                                  | Using the telehealth system, I could see the clinician as well as if we met in person   | 1 | 2 | 3 | 4 | 5 |
| <b>Reliability</b>                 |   |   |   |   |   |   |
| 1                                  | I think the visits provided over the telehealth system are the same as in-person visits | 1 | 2 | 3 | 4 | 5 |
| 2                                  | Whenever I made a mistake using the system, I could recover easily and quickly          | 1 | 2 | 3 | 4 | 5 |
| 3                                  | The system gave error messages that clearly told me how to fix problems                 | 1 | 2 | 3 | 4 | 5 |
| <b>Satisfaction and Future Use</b> |   |   |   |   |   |   |
| 1                                  | I feel comfortable communicating with the clinician using the telehealth system         | 1 | 2 | 3 | 4 | 5 |
| 2                                  | Telehealth is an acceptable way to receive healthcare services                          | 1 | 2 | 3 | 4 | 5 |
| 3                                  | I would use telehealth services again   | 1 | 2 | 3 | 4 | 5 |

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |
| 4 | Overall, I am satisfied with this telehealth system | 1 | 2 | 3 | 4 | 5 |