The Effects of an Educational Intervention on COVID-19 Knowledge, Attitudes, and Behaviors in People with Migratory Background: A Before-after Study

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ABSTRACT

Background: This study investigated the feasibility to conduct an educational webinar for improving COVID-19-related knowledge, attitudes, and behaviors in Munich.

Methods: A before-after experiment was conducted in Turkish-speaking family physician offices. Turkish-speaking participants (n=245) of a cross-sectional study evaluating COVID-19 knowledge, attitudes, and behaviors were invited to an educational webinar. COVID-19 vaccination intention and knowledge (25 true/false items) were the primary outcomes. Also, attitudes and behaviors to COVID-19 vaccination were asked using Likert scales (min. 1, max. 5).

Results: Knowledge (22.8±1.5 vs. 23.1±1.5) and behavior (4.1±0.4 vs. 4.2±0.3) scores did not change after the intervention, nor changed the intention to be vaccinated (p>0.05). However, there was a significant increase in the attitude scores from mean 3.9±0.5 to 4.2±0.5 (p=0.009). The webinar received high scores (mean 4.7±0.2).

Conclusion: We suggest educational interventions involving key persons from the Turkish-speaking community as peer trainers to change the negative attitudes towards vaccination.

Keywords: SARS-CoV, Immigrants, Inequalities, Vaccination Refusal, Vulnerable Populations.

I. INTRODUCTION

People coming from Turkey constitute the highest proportion of citizens with foreign origin in Germany [1]. More than three million people with a migration background in Germany have their roots in Turkey [2]. There are around 40 thousand people of Turkish origin in Munich [3]. On the other side, there are growing concerns about the vaccine rejection proportions in Turkey [4], and there is growing influence of Turkey on people in Germany with Turkish roots [5].

In a cross-sectional study conducted among Turkish- and German-speaking patients in Munich, we found that in contrast to 57.7% of the participants with a migratory background, 33.5% of the non-immigrant Germans were hesitating to be vaccinated against the COVID-19. The most common reasons for vaccine refusal were safety or mistrust in vaccines, the perception that vaccines were not sufficiently studied, and conspiracy theories. A multivariable analysis showed that non-migratory background (OR=3.1) and attitude scores (OR=2.9) were significant factors affecting the decision to be vaccinated [6].

It has been shown that citizens with Turkish backgrounds experience difficulties with the integration to the German community [7]. We hypothesized that an educational intervention using distant learning facilities could contribute...
to the knowledge, attitudes, and behaviors of Turkish-speaking citizens in Germany.

II. OBJECTIVES

This study aimed to investigate the feasibility to conduct an educational Zoom event for improving COVID-19-related knowledge levels, attitudes, and behaviors in Turkish speaking people in Munich.

III. METHODS

A. Study Design and Setting

A single-arm before-after experimental study was conducted. The study was approved by the ethics committee of the Medical Faculty of the Technical University of Munich (Date: 20th of January 2021, Number: 37/21 S-EB). Using a one-page information leaflet, all participants were informed about the study. The participants expressed their written consent to participate by sending an e-mail to the primary investigator. The study was conducted within March 2021 in Munich city.

B. Participants

Turkish-speaking participants of a cross-sectional study evaluating COVID-19 knowledge, attitudes, and behaviors [6] were invited to take part in an educational Zoom conference. The participants were consequent applicants to Turkish-speaking family physicians in Munich. All 245 participants of the cross-sectional study were offered to register to an online educational event by sending an e-mail to the primary researcher. In total, 57 indicated their interest in the educational activity, and 29 attended the Zoom conference. From the attendants, 23 responded to the cross-sectional survey questions a second time using the Google Forms platform and 25 provided their opinions about the intervention. After excluding questionnaires with conflicting or missing data, 20 valid responses were analyzed for the study questionnaire. Additionally, 21 participants submitted evaluations for the Zoom conference.

C. Variables and Data Collection

The primary outcomes of the study were changes in the COVID-19 knowledge scores and vaccination intention. Other study variables were related to attitudes and behaviors regarding COVID-19.

The study questionnaire was developed by the researchers after a literature review and guideline suggestions related to COVID-19. The knowledge domain contained 25 true/false items. Knowledge scores were calculated by summing up the correct answers giving a minimum possible score of 0 and a maximum score of 25. The attitude and behavior domains included each 7 items arranged in a 5-point Likert scale (1=disagree/never, thru 5=very good) [8]. This form too was made available online using Google Forms.

D. The Intervention

The educational intervention was composed of a 40-minute interactive Zoom conference. During the Zoom event, the content of a patient education leaflet about COVID-19 was presented to the participants using audio-visual methods (15 minutes), followed by a discussion, questions, and answers (25 minutes). The presentation comprised facts and figures about the COVID-19 pandemic as well as its ways of spread, treatment options, preventive precautions, and vaccination. The seminar was prepared in accordance with patient leaflet of the German College of General Practitioners and Family Physicians (available at https://www.degam.de/patienteninformationen.html) and translated into Turkish by the principal investigator. The presentation and discussion were conducted through video conferencing with Zoom (www.zoom.com) in Turkish. Two Turkish-speaking authors (ZA and RK) attended the meeting to answer the questions of the participants. Additionally, one family medicine professor from Turkey attended the discussion section.

E. Statistical Methods

The data were entered into the IBM SPSS v25.0 Statistics (IBM Corp, Armonk, NY) software. The data distribution was described within and across the study groups by frequencies, percentages, means, and standard deviations (SD), as appropriate. Corresponding hypothesis testing of univariable group differences was performed by the McNemar’s test, and the paired samples t-test. Hypothesis testing was performed at exploratory two-sided 5% significance levels.

IV. RESULTS

Participants of the repeated assessment aged in average 42.0±11.6 years (min. 21, max. 63) and had relatively high educational levels. Most were born in Turkey (Table I).

The questionnaire was made available in German and Turkish. There was a 2-3-weeks time-gap between the first attempts of taking the survey questionnaire and the second application of the online version. At the end of the Zoom conference, the participants were asked to evaluate the educational activity using a 13-item educational session evaluation form on a 5-point Likert scale (1=very bad, thru 5=very good) [8]. This form too was made available online using Google Forms.

The knowledge and behavior scores of the participants did not change after the intervention. However, there was a significant increase in the attitude scores from mean 3.8 to 4.2

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**TABLE I: PARTICIPANT CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (min-max)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>42.0 (21-63)</td>
<td>11.6</td>
</tr>
<tr>
<td>Total years of schooling</td>
<td>15.0 (5-18)</td>
<td>3.1</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Had been infected with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COVID-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Place of birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Germany</td>
<td>5</td>
<td>25</td>
</tr>
</tbody>
</table>

SD: Standard deviation.
In the session evaluation, the Zoom session received generally high scores from the participants (mean 4.7, standard deviation 0.2). Also, the free-text evaluations were positive and encouraging (Table IV).

V. DISCUSSION

A. Key Findings

In this study, one session of interactive online Zoom intervention in the form of a short presentation followed by a discussion was feasible and evaluated positively by the participants. There was no sufficient time gap to observe modifications in the behaviors. Also, the already high knowledge scores showed a small non-significant increase. However, the attitude scores significantly improved from a mean of 3.87 to 4.20.
B. Limitations
This study was conducted with a relatively small sample size. Besides, the participants had a mean educational attainment of 15 years, corresponding to some higher education. Therefore, caution is warranted when generalizing the findings. Furthermore, this is a before-after comparison without a control group.

C. Interpretation
Our previous findings indicating that the number of patients not intending to get vaccinated is higher in those with a migration background [6] makes this educational intervention more important. The number of participants in the intervention (29 from 245 invited) shows a low interest in the proposed educational activity. Ideas should be developed to encourage involvement. Methods such as providing economic or other incentives and accessing the persons via influential keypersons from their own community could increase the participation rate.

Of the people with roots in Turkey, 22.5% of men and 19.9% of women had some higher education, which is lower compared to the native Germans [9]. Our subjects had comparatively higher educational levels. We believe that this difference is due to volunteer bias [10]. Therefore, is should be taken into consideration that an intervention study in the general population with Turkish roots might have challenges related to the educational level of the participants.

The proportion of the public already infected with COVID-19 is steadily increasing. As of January 15, 2021, almost 15% of adults in metropolitan France had this ailment [11]. Therefore, 25% infection rate in our study as of March 2021 seems to be a comparative figure.

Interactive educational interventions have been shown to have a positive effect on perceptions and attitudes towards immunization [12]. The educational intervention implemented in this study was a short online presentation followed by an interactive discussion. However, it is well known that any intervention will have some degree of benefits [13]. Therefore, the effectiveness of the intervention relative to a control group and its long-term outcomes need to be shown in other study designs. Furthermore, the intervention could achieve a change in the attitudes but not in knowledge or behaviors. Since the second data collection was done right after the intervention, there was no time gap for any behavioral change. On the other side, the knowledge scores were already high at the first measurement. Thus, there was not much area to improve with the seminar. However, the small increase in the knowledge scores could become significant after another seminar attempt or increasing the duration of the intervention.

Most importantly, the 40-minutes interactive seminar has achieved significant improvements in the attitudes of the audiences. It is not easy to modify the attitudes of adults [14]. Not many people easily accept or adapt to modification [15]. People will often behave in ways that their community believe is right. Therefore, a certain level of trust must be achieved between the learners as well as the learners and the facilitator in order to accomplish change [16]. Besides, adults must be given enough opportunity to think, reflect, conceptualize, and discuss [17]. From this perspective, face-to-face educational activities can be more efficient in helping a person transforming his/her mind. Thus, we suggest performing presence courses whenever possible.

Effectively motivating patients to change their health behavior is crucial for family physicians. Approximately 40% of deaths are attributed to modifiable health behaviors [18]. Changing attitudes is the most essential step in achieving behavioral change. Interventions that modify attitudes and norms are useful in endorsing health behavior change [19]. Several methods have been suggested to succeed in this difficult task. Repeated boosters of the educational activity, rewarding good behaviors, and aiming specific small steps each time are some common characteristics of the different methods [20].

Although this study showed the benefit of the online seminar discussion on modifying the attitudes, this was not reflected on the intention to get vaccinated. While two participants changed their opinion for vaccination, one person decided on the opposite. Still, we may expect that the change will become significant when working with larger number of subjects. In light of these information, we suggest multiple educational sessions with the same participants to increase the amount of transformation.

Finally, the Zoom session was highly welcomed and positively rated by the participants (mean 4.7 points out of possible 5). The enormous growth in the virtual conferencing market has probably changed the perceptions of people, making online events as the default [21]. Although face-to-face sessions could possibly show a better performance in modifying attitudes, recent trends due to COVID-19 have probably increased the familiarity and acceptance of people for distant education. The individual remarks indicated that having a friendly environment, where participants were allowed to express their opinions were valued.

VI. CONCLUSION
Although the educational intervention caused a significant change in the attitude of participants, the single educational session was not sufficient to achieve a transformation in the behaviors or intention to be vaccinated. We suggest conducting educational interventions in larger scales involving key persons from the Turkish-speaking community as peer trainers in order to change the negative attitudes towards vaccination.

ACKNOWLEDGMENT
We thank Prof. Memet Isik for attending and contributing to the Zoom discussion.

APPENDIX
Distributions of the correct knowledge answers and mean±SD values for the attitude and behavior domains compared between the first study [6] and the current repeated measurement.
1. The cause of the Corona-infection is a virus
2. How COVID-19 spreads is not known
3. COVID-19 can spread through the air in enclosed spaces
4. COVID-19 can spread through close contact (e.g. hugging)
5. COVID-19 can spread through sexual contact
6. COVID-19 is often transmitted through food surfaces
7. Vaccination against COVID-19

Subscale 1: COVID-19 Knowledge
Before
After
[ n (%)]
[ n (%)]
1. The cause of the Corona-infection is a virus 353 (87.4) 19 (95.0)
2. How COVID-19 spreads is not known 287 (69.5) 16 (80.0)
3. COVID-19 can spread through the air in enclosed spaces 388 (93.3) 17 (85.0)
4. COVID-19 can spread through close contact (e.g. hugging) 394 (93.8) 19 (95.0)
5. COVID-19 can spread through sexual contact 242 (59.9) 9 (45.0)
6. COVID-19 is often transmitted through food surfaces 333 (80.2) 20 (100)
Which measures can reduce the risk of transmitting COVID-19? 408 (96.5) 20 (100)
7. Washing hands after touching potentially infected surfaces 412 (97.4) 20 (100)
8. Wearing a face mask when entering crowds 368 (90.2) 20 (100)
9. Taking antibiotics 335 (80.5) 17 (85.0)
10. Drinking vinegar 363 (87.5) 19 (95.0)
11. Drinking carrot juice 405 (96) 20 (100)
12. Keeping a distance of 1.5 meters from people 400 (95.7) 20 (100)
13. Lubricate butter in the nostrils 311 (75.1) 17 (85.0)
14. Eating garlic 222 (54.8) 12 (60.0)
15. The use of the Corona app 401 (94.8) 20 (100)
16. Frequent ventilation when in the same room with others 374 (88.6) 20 (100)
17. Avoiding closed rooms with strangers 397 (94.5) 20 (100)
18. Avoiding crowds 382 (91.0) 18 (90)
19. Drinking holy water 394 (94.5) 18 (90)
Which of the following symptoms are common in COVID-19? 407 (96.9) 20 (100)
20. Cough 363 (89.4) 20 (100)
21. Fever 395 (96.8) 20 (100)
22. Dysuria 387 (95.3) 20 (100)
23. Increased appetite 391 (93.8) 20 (100)
24. Weight gain 287 (69.5) 20 (100)
25. Loss of taste and smell 388 (93.3) 20 (100)

Subscale 2: COVID-19 Attitude
Mean±SD Mean±SD
5-Agree, 4-Partially agree, 3-Not sure, 2-Partially disagree, 1-Disagree
1. COVID-19 is dangerous 4.47±1.04 5.00±0.30
2. In reality, COVID-19 does not exist 1.63±1.24 1.10±0.44
3. The danger of COVID-19 is exaggerated 2.42±1.52 2.10±1.29
4. I am afraid of dying if I should get COVID-19 2.50±1.45 3.05±1.50
5. Believers are protected from COVID-19 1.47±1.12 1.0±0.5
6. COVID-19 was created purposely to control the world 2.47±1.50 2.05±1.23
7. Vaccination against COVID-19 is safe 3.19±1.29 3.70±0.80

Subscale 3: COVID-19 Behavior
Mean±SD Mean±SD
1-Never, 2-Very rare, 3-Off and on, 4-Frequent, 5-Very frequent
1. How often do you wash your hands? 4.38±0.64 4.55±0.51
2. How often do you wear a mask when you are outside? 4.19±0.90 4.40±0.75
3. How much attention do you pay to keeping distance? 4.16±0.88 4.50±0.51
4. How often do you accept guests? 2.13±0.88 2.10±0.64
5. How often do you go visiting others? 1.82±0.91 2.10±0.91
6. How often do you enter crowded places? 2.05±0.91 2.05±0.60
7. How often do you use public transport? 2.27±1.23 1.85±0.74

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