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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.

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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 patients 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 (forms.google.com/) 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=agree/very frequent) (Appendix). Attitude and behavior scores were calculated by adding the scores of each item and dividing by the total number of items, revealing minimum and maximum possible scores of 1 and 5. Higher scores indicated more sensitive attitudes and behaviors. A descriptive presentation of the responses to the three domains is provided as appendix to this manuscript.

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.

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).

TABLE I: Participant characteristics

		Mean (min-max)	SD
Age		42.0 (21-63)	11.6
Total years of schooling		15.0 (5-18)	3.1
		n	%
Sex	Female	9	45
	Male	11	55
Had been infected with COVID-19	Yes	5	25
	No	15	75
Place of birth	Turkey	15	75
	Germany	5	25

SD: Standard deviation.

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

(Table II).

TABLE II: COMPARISON OF THE KNOWLEDGE, ATTITUDE, AND BEHAVIOR SCORES BEFORE AND AFTER THE INTERVENTION

	Before		After		t*	p
	Mean	SD	Mean	SD		
Knowledge score	22.8	1.5	23.1	1.5	1.241	0.230
Attitude score	3.9	0.5	4.2	0.5	2.919	**0.009**
Behavior score	4.1	0.4	4.2	0.3	1.252	0.226

SD: Standard deviation, *Paired samples t-test.

TABLE III: COMPARISON OF THE INTENTIONS TO BE VACCINATED BEFORE AND AFTER THE INTERVENTION

Will you get vaccinated against COVID-19?		After		Total
		No	Yes	
Before	No	5 (71.4%)	2 (28.6%)	7 (35.0%)
	Yes	1 (7.7%)	12 (92.3%)	13 (75.0%)
	Total	6 (100%)	14 (100%)	20 (100%)

McNemar p=1.000.

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.

TABLE IV: RESPONSES OF THE PARTICIPANTS TO THE OPEN-ENDED EVALUATION QUESTIONS AFTER THE ZOOM SESSION

What I liked best from this session	What I learned from this session	I suggest the following changes in this session next time
Being interactive	I learned more concrete experiences about the corona.	More information about content and objectives could have been given in advance.
Supported with a presentation. Giving the participants the opportunity to speak.	It does not matter, whichever route the virus emerged. The important thing is how do I protect and get rid of this problem.	You answered all questions sincerely.
I have seen the application of the idea that we can use online meetings in social awareness projects.	Protection rates of vaccines.	Informing prospective participants about using the Zoom program in advance may increase the attendance rate.
Having doctors among the participants. The presenter was enthusiastic and excited. The session was short and to the point.	I learned the explanation of “Reproduktionszahl”.	At the beginning, it may be more beneficial for the participants to be muted. Moderator should be someone else who takes the questions in order and allows to speak in an order.
There was a sincere atmosphere in explanatory discussions.	The importance and necessity of getting vaccinated.	Thank you.
The explanations were persuasive.	I learned better how Covid 19 affects our lives.	You can inform us about such presentations from time to time.
It was informative and revealing.	Covid is a disease that should be taken seriously.	It is beneficial to have different speakers in a session.
Sharing information and having a brief content.	Blood groups play no role in the disease.	Pay attention to the private data protection law.
I felt in a relaxed family atmosphere. It wasn't boring. I found it fun and informative. I wish it would be repeated	I definitely didn't want to be vaccinated. Now I'm starting to think that maybe I could be.	I liked it in every aspect. I don't have any additional suggestions for now. Thanks.
Questions of the participants were answered sincerely.	It helped us to resolve our hesitations about the Covid_19 vaccine	The more people can be reached, the more people will benefit from this valuable information.
Questions found answers.	It was clear.	I wish the continuation of your success. Hope we can benefit more.
I wish this field wouldn't be mandatory :)	I wish this field wouldn't be mandatory :)	The session can be repeated with a different content.
The presentation.	Covid -19	Slides and references can be shared.
That the subject was not dispersed, but informed guests.	The coronavirus will remain in our lives for a while.	No suggestion.
Many people got their say, I could hear different opinions.	The corona virus should not be underestimated.	In order for many people to be informed, there must be more participants and speakers.
It was a very friendly atmosphere. It was a presentation that everyone could understand.	I guess I found a little bit more courage to get vaccinated.	Everything was fine. I would like to meet more frequently on new programs that cater to much larger groups, including other health issues.
The session was in the form of questions and answers and curious questions were answered.	The corona vaccine is safe.	Participants' time use can be reduced by preventing unnecessary speeches other than asking questions.
Everyone was allowed to speak, and every question was tried to be answered.	-	-
Satisfactory answers were given to the participants.	I learned that the vaccine developed for Covid-19 is protective.	In order to be useful for a wider audience, the program needs to be announced to more people.
The presentation was well prepared.	We must prepare ourselves to live with this virus for a longer time.	Participants should be allowed to join without using a code. The code is not practical.
The answers to the questions were sufficient.	The importance of vaccination.	No idea.

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.

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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.

Subscale 1: COVID-19 Knowledge	Before [n (%)]	After [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	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 (94.3)	20 (100)
18. Avoiding crowds	382 (91.0)	18 (90.0)
19. Drinking holy water	394 (94.3)	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**		
5-Agree, 4-Partially agree, 3-Not sure, 2-Partially disagree, 1-Disagree	Mean±SD	Mean±SD
1. COVID-19 is dangerous	4.47±1.04	5.90±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±0.0
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**		
1-Never, 2-Very rare, 3-Off and on, 4-Frequent, 5-Very frequent	Mean±SD	Mean±SD
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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