

## ORIGINAL ARTICLE

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## Cervical cancer risk levels among women aged 30-65 and factors affecting compliance with the national cervical cancer screening standards

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### Abstract

Screening programs for early detection of cervical cancer are extremely important for better prognosis and long-term survival. This study was conducted to determine cervical cancer (CC) risk levels among women aged between 30-65 and the factors affecting having an HPV/Pap smear test that complies with national CC screening standards. A total of 1407 women in the 30-65 age group participated in this cross-sectional study. No sample selection procedure was conducted, and 1407 women who voluntarily agreed to participate in the study were included in the study group. Data were collected between January 2019 and March 2020. The questionnaire used in the study consisted of questions about women's sociodemographic characteristics, lifestyles, CC early diagnosis and screening behaviors, and the CC risk calculation model. Pearson chi-square test, chi-square test for trend, and logistic regression analysis were used in the study. The statistical significance level was accepted as  $p < 0.05$ . In the study, 58.9% of the women reported that they had a test within one to three years, 67.5% of those who did not have the test stated they did not know that it was necessary, and 46.2% stated that they neglected it. The CC risk level of 83.6% of women was "below average". The rate of having an HPV/PS test following the national CC screening standards was significantly higher in women who were in the 50-59 age group, smoked, had a childbirth experience, or did not regularly use a condom during sexual intercourse ( $p < 0.05$ ). As the calculated CC risk level increased, testing behaviors decreased statistically significantly ( $p < 0.01$ ). The time of the last screening test was more than five years in those with a calculated CC risk level of  $\geq$  average ( $p < 0.01$ ). The CC risk level of the women in the study was below average. There was a significant relationship between HPV/PS testing behavior and age, smoking, having a childbirth experience, and condom use.

**Keywords:** Cervical cancer, risk factors, pap smear test

### Introduction

Cervical cancer (CC) is an important public health problem that ranks fourth place in women worldwide, can be detected at an early stage through screening tests, and has a potential for recovery [1]. In 2020, cervical cancer accounted for 3.1% of all cancers globally, and 8.2% of cancer-related deaths were due to

CC [2]. Women who are in the 40-49 age group, live in developing countries where there is inadequate screening and treatment, and has Human immunodeficiency virus (HIV) infection are most affected by cervical cancer [3,4]. CC ranks ninth among cancer types seen in women in Turkey. Its incidence is 7.6 per 100,000 after the age of 40 and 11.7 per 100,000 between the ages of 50-55 in Turkey [5]. Risk factors for cervical cancer are listed as

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follows: Human Papilloma Virus (HPV) infection, other sexually transmitted infections, first sexual intercourse at an early age (before the age of 16), multiple sexual partners, smoking, dietary habits (low consumption of fruits and vegetables), high fertility rate, low socioeconomic level, poor hygiene conditions, especially the use of birth control pills for more than 5 years, suppression of the immune system, not having regular pap smear (PS) tests, not treating those with abnormal pap smear test results [5,6]. High-risk HPV infection causes cervical cancer. There are two high-risk HPV types associated with cervical cancer in many countries and in Turkey. These are HPV types 16 and 18. Especially HPV-16 alone accounts for 60% of cervical cancers [7]. CC, which can be diagnosed and prevented at an early stage with screening tests, is the most important genital cancer type. The 5-year survival of women with cervical cancer diagnosed at an early stage is 92% [8]. PS test is an appropriate screening method for early diagnosis of cervical cancer and reduction of mortality [9]. The incidence of CC in women who have regular PS tests or HPV tests is very low [10]. CC screening programs are 60% or higher in developed countries [11,12] and below 20% in developing and underdeveloped countries [13,14]. The rate of those who have never had a CC screening in Turkey is 72.6% among women aged over 15 and 66.1% among married women aged over 40 [15,16]. Women who are aged 30-65 have been screened for cervical cancer with HPV or smear test every 5 years since 2014. Women who have had a PS test in the last five years are considered to have complied with the national cervical cancer screening standards [17]. The incidence of cervical cancer has been significantly reduced in developed countries thanks to the use of PS testing [18]. However, the incidence of cancer is gradually increasing in developing countries such as Turkey. This increase reveals the need for the effective implementation of cancer screening programs [19]. For this reason, it is extremely important to increase social awareness, identify CC-related risks, and develop appropriate strategies for prevention and treatment [20].

Women's knowledge, attitudes, and behaviors about cancer are very important in the prevention of cervical cancer [21]. It has been found that the incidence of cervical cancer has decreased in most societies where screening is known and adopted [22]. Although cervical cancer is well-known and inexpensive screening methods are available, it is among the causes of death from cancer in most low- and middle-income countries [23]. This study was conducted to determine the CC risk levels of women aged between 30 and 65 and the factors affecting having an HPV/Pap smear test that complies with the national CC screening standards.

## Materials and Methods

### Participants

This is a cross-sectional study. The population of the research consisted of the 30-65 age group mothers and relatives of students from Dokuz Eylul University Health Services Vocational Higher

School (student health technicians). Before the study data were collected, students were informed about the purpose and method of the research. The students who volunteered to collect data were given education by the researchers on the implementation of the questionnaire, cancer disease, CC risk factors, prevention from cervical cancer, early diagnosis of CC, and screening. The data of the study were collected by the students who received education through the face-to-face method. Data were collected through a one-time face-to-face interview. The students applied the questionnaire to their mothers, family members, and relatives. No sample selection procedure was implemented for the research. Of the family members and relatives of the students who volunteered to collect data in the project following the research method and participated in the education provided, those who agreed to participate voluntarily were included in the study. Women who did not agree to respond to the questionnaire and those with any cancer diagnosis were excluded from the study. We provided the participants with information that "the Cancer Early Diagnosis and Education Centers (KETEM) in our country work as separate units within state hospitals and conduct screening programs in cervical cancer, without charge, at the community level." The CC early diagnosis and screening brochures of the KETEM were distributed to the women taking the questionnaire by student health technicians. The student health technicians came from various regions of Turkey and families with different socioeconomic and cultural characteristics. Therefore, we think that the mothers and relatives of the students forming the sample are an important group in terms of having the general characteristics of the female population in Turkey.

The written permission of the Dokuz Eylul University Non-Interventional Research Ethics Committee was obtained for this study (September 27, 2018, 2018/23-02). Before the study data were collected, the purpose of the study was explained to the participants by the interviewer students, and the participants were informed that they were free to participate in the research and that the data would be kept confidential within the scope of the research, and their informed consent was obtained. The data of the study were collected between January 2019 and March 2020. The study was conducted following the Declaration of Helsinki.

### Measurements and Definitions

The data were collected with a questionnaire created by the researchers following a review of the literature. The questionnaire included questions about women's sociodemographic characteristics, lifestyles, CC early diagnosis and screening behaviors, and CC risk levels. The CC risk calculation model developed by the Siteman Cancer Center of Washington University School of Medicine was used to determine the CC risk levels (<https://siteman.wustl.edu/prevention/ydr/>). The model questioned women's age, cancer history, history of hysterectomy, HPV vaccination, smoking history (age of starting smoking, the number of cigarettes smoked per day, how long ago did they stop smoking if they already stopped it), the number of male sexual partners, the age of first sexual intercourse, the status of using a

condom in each sexual intercourse, history of childbirth, history of sexually transmitted infections, history of HPV infection, and the status of having PS test or PS + HPV test in the last 3-5 years (Have you had a PS test or PS + HPV test within the last 3 - 5 years?). According to the information given, the CC risk level of women was evaluated as Low, Below Average, Average, Above Average, and High. The questions asked in the risk calculation model were added to the questionnaire form of the research.

### Variables of the study

The dependent variable of the study is the status of having an HPV or HPV+ PS test every 5 years by every woman in the 30-65 age group according to the National Cervical Cancer Screening Program Standards. The independent variables are women's age, level of education, marital and employment status, chronic diseases, family history of cancer, history of sexually transmitted diseases, condom use, smoking, fertility characteristics, and calculated CC risk level.

### Data analysis

The statistical analysis of the data was performed on the SPSS 24.0 statistical software package. Continuous variables were presented as mean scores and standard deviations, and grouped data were presented as numbers and percentage distributions. The conformity of the variables with normal distribution was tested with the Kolmogorov-Smirnov test, and it was determined that the data showed a normal distribution. Pearson chi-square test, chi-square test for trend, and logistic regression analysis were used in the analysis of the data. The logistic regression analysis was established with age, employment status, the status of smoking, history of childbirth, regular use of a condom during sexual intercourse, and calculated CC risk level variables to examine the factors affecting the behavior of women who complied with the National Cervical Cancer Screening Program Standards for having HPV or HPV+ PS tests. The statistical significance level was accepted as  $p < 0.05$ . The risk of women who had below average and low calculated CC risk levels in the regression analysis was grouped as "low", and those with average or high risk were grouped as "≥average".

### Results

A total of 1407 women participated in this study. The mean age of the women was  $49.4 \pm 8.3$  (Min=33, Max=65). Of the participants in our study, 56.9% stated that they had an HPV/PS smear test, 19.9% of those who had the test stated that they had it in the past year, and 58.9% within one to three years. Of those who did not have the test, 67.5% stated that they did not know that it was necessary, and 46.2% stated that they neglected it (Table 1).

Table 2 shows women's characteristics associated with CC risk factors. Accordingly, 22.3% of the women were smokers, 95.1% had a single sexual partner throughout their life, 96.3% had their first sexual intercourse experience at 16 and over, 45.2% had three or more births, and 21.7% stated that they had a family history of cancer (Table 2).

**Table 1.** The behavior of participants to have cervical cancer screening test and reasons for not having it

| HPV/PAP smear test                       | n   | %    |
|------------------------------------------|-----|------|
| Yes                                      | 801 | 56.9 |
| No                                       | 606 | 43.1 |
| <b>Recent Pap smear status (801)</b>     |     |      |
| In the past year                         | 159 | 19.9 |
| Between 1-3 years                        | 472 | 58.9 |
| Between 4-5 years                        | 82  | 10.2 |
| More than 5 years                        | 88  | 11.0 |
| <b>Reasons for not having the test *</b> |     |      |
| Who do not know that it is necessary     | 395 | 67.5 |
| Negligent                                | 270 | 46.2 |
| Afraid of smearing                       | 41  | 7.0  |
| Ashamed of having a smear                | 53  | 9.1  |
| Fear of cervical cancer                  | 13  | 2.2  |
| Not knowing where to test                | 11  | 1.9  |

\*Participants marked more than one option

**Table 2.** Characteristics of the participants associated with cervical cancer risk factors (n=1407)

| Features                                                            | n    | %    |
|---------------------------------------------------------------------|------|------|
| <b>Smoking status</b>                                               |      |      |
| Smoker                                                              | 314  | 22.3 |
| Quit smoking                                                        | 97   | 6.9  |
| Nonsmoker                                                           | 996  | 70.8 |
| <b>History of hysterectomy</b>                                      |      |      |
| Yes                                                                 | 89   | 6.3  |
| No                                                                  | 1318 | 93.7 |
| <b>How many male sexual partners have you had in your lifetime?</b> |      |      |
| 1                                                                   | 1338 | 95.1 |
| 2                                                                   | 64   | 4.5  |
| 3                                                                   | 5    | 0.4  |
| <b>Age at first sexual intercourse</b>                              |      |      |
| <16                                                                 | 51   | 3.7  |
| ≥16                                                                 | 1356 | 96.3 |
| <b>Birth</b>                                                        |      |      |
| Giving Birth                                                        | 1317 | 93.6 |
| Not giving birth                                                    | 90   | 6.4  |
| <b>Number of live births (n=1317)</b>                               |      |      |
| 1 Birth                                                             | 191  | 13.6 |
| 2 Birth                                                             | 490  | 34.8 |
| ≥3 Birth                                                            | 636  | 45.2 |
| <b>Chronic disease history</b>                                      |      |      |
| Yes                                                                 | 447  | 31.8 |
| No                                                                  | 960  | 68.2 |
| <b>Family history of cancer</b>                                     |      |      |
| Yes                                                                 | 306  | 21.7 |
| No                                                                  | 1101 | 78.3 |

When the CC risk level of the women participating in our study was calculated, it was found that the risk level of 7.4% was "low", 83.6% was "below average", 6.1% was "average", and 2.9% was "above average". Table 3 shows women's compliance

behavior with the national CC screening standards according to their sociodemographic and individual characteristics and the calculated CC risk levels. The rate of HPV/PS testing behavior following the national CC screening standards was significantly higher in women who were in the 50-59 age group, smoked, and did not regularly use a condom during sexual intercourse ( $p<0.05$ ). As the calculated CC risk level increased, testing behavior decreased statistically significantly ( $p<0.01$ ) (Table 3).

**Table 3.** Women's compliance behavior with the national CC screening standards according to their sociodemographic and individual characteristics and the calculated CC risk levels (n=1407)

| Features                                 | National Cervical Cancer Screening Standard |      |                |      | P      |
|------------------------------------------|---------------------------------------------|------|----------------|------|--------|
|                                          | Compliance                                  |      | Non-compliance |      |        |
|                                          | (n=713)                                     | %    | (n=694)        | %    |        |
| Age                                      |                                             |      |                |      |        |
| 30-39                                    | 80                                          | 46.2 | 93             | 53.8 | 0.001* |
| 40-49                                    | 231                                         | 50.7 | 225            | 49.3 |        |
| 50-59                                    | 355                                         | 55.0 | 290            | 45.0 |        |
| 60-65                                    | 47                                          | 35.3 | 86             | 64.7 |        |
| Educational status                       |                                             |      |                |      |        |
| Primary school and below                 | 390                                         | 49.1 | 405            | 50.9 | 0.237* |
| Middle-High School                       | 223                                         | 51.5 | 210            | 48.5 |        |
| University                               | 100                                         | 55.9 | 79             | 44.1 |        |
| Marital status                           |                                             |      |                |      |        |
| Married                                  | 585                                         | 51.4 | 554            | 48.6 | 0.289* |
| Single                                   | 128                                         | 47.8 | 140            | 52.2 |        |
| Employment status                        |                                             |      |                |      |        |
| Worker                                   | 256                                         | 54.4 | 215            | 45.6 | 0.050* |
| Not working                              | 457                                         | 48.8 | 479            | 51.2 |        |
| Cigaret                                  |                                             |      |                |      |        |
| Smoker                                   | 190                                         | 60.5 | 124            | 39.5 | 0.001* |
| Non-smoker-quit                          | 523                                         | 47.8 | 570            | 52.2 |        |
| Childbirth                               |                                             |      |                |      |        |
| Having given birth                       | 684                                         | 51.9 | 633            | 48.1 | 0.001* |
| Not having given birth                   | 29                                          | 32.2 | 61             | 67.8 |        |
| Regular condom during sexual intercourse |                                             |      |                |      |        |
| No                                       | 612                                         | 51.9 | 567            | 48.1 | 0.037* |
| Yes                                      | 101                                         | 44.3 | 127            | 55.7 |        |
| History of sexually transmitted disease  |                                             |      |                |      |        |
| Yes                                      | 21                                          | 65.6 | 11             | 34.4 | 0.087* |
| No                                       | 692                                         | 50.3 | 683            | 49.7 |        |
| Chronic disease history                  |                                             |      |                |      |        |
| Yes                                      | 230                                         | 51.5 | 217            | 48.5 | 0.690* |
| No                                       | 483                                         | 50.3 | 477            | 49.7 |        |
| Calculated risk of cervical cancer       |                                             |      |                |      |        |
| Low                                      | 74                                          | 71.2 | 30             | 28.8 | 0.001‡ |
| Below the middle                         | 615                                         | 52.3 | 561            | 47.7 |        |
| Middle                                   | 12                                          | 14.0 | 74             | 86.0 |        |
| Above the middle                         | 12                                          | 29.3 | 29             | 70.7 |        |

\* Pearson  $\chi^2$ , ‡ Slope  $\chi^2$

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A logistic regression model was set to do a multivariate examination of the factors affecting women's having a screening test following the national CC screening standards. Women's age, employment status, smoking habits, childbirth experience, regular use of condoms during sexual intercourse, and the calculated CC risk level were examined together in the model. It was determined that having had a PS test increased 1.83 times (95%CI=1.20-2.78) in the 40-49 age group and 2.10 times (95%CI=1.41-3.12) in the 50-59 age group compared to the 60-65 age group. The behavior of having a CC screening test was 7.42 times higher (95%CI=4.75-11.59) in smokers than in non-smokers, 4.01 (95%CI=2.36-6.81) times higher in those who had given birth than in those who had never given birth, 1.72 times higher (95%CI=1.25-2.37) in those who did not regularly use a condom during sexual intercourse than in those who did, and 31.49 times higher (95%CI=16.97-58.42) in those with a low calculated CC risk level than in those with  $\geq$ average CC risk level (Table 4). The time of the last screening test among those who had a calculated CC risk level of  $\geq$ average was more than five years ( $p<0.01$ , not shown in tables).

**Table 4.** Factors associated with the behavior of women to comply with the cervical cancer screening standard \*

| Variables                                |                          | Crude OR<br>(%95 GA) | Adjusted OR<br>***<br>(%95 GA) | P        |
|------------------------------------------|--------------------------|----------------------|--------------------------------|----------|
| Age                                      | 30-39                    | 1.57<br>(0.98-2.51)  | 1.62<br>(0.97-2.69)            | 0.060    |
|                                          | 40-49                    | 1.87<br>(1.26-2.81)† | 1.83<br>(1.20-2.78)            | 0.005    |
|                                          | 50-59                    | 2.23<br>(1.52-3.31)† | 2.10<br>(1.41-3.12)            | <0.001   |
|                                          | 60-65**                  | 1.00                 | 1.00                           | -        |
| Employment status                        | Worker                   | 1.28<br>(0.99-1.55)  | 1.22<br>(0.95-1.56)            | 0.108    |
|                                          | Not working**            | 1.00                 | 1.00                           | -        |
| Cigaret                                  | Smoker                   | 1.66<br>(1.29-2.15)† | 7.42<br>(4.75-11.59)           | <0.001†† |
|                                          | Non-smoker**             | 1.00                 | 1.00                           | -        |
| Childbirth                               | Having given birth       | 2.27<br>(1.44-3.62)† | 4.01<br>(2.36-6.81)            | <0.001†† |
|                                          | Not having given birth** | 1.00                 | 1.00                           |          |
| Regular condom during sexual intercourse | No                       | 1.35<br>(1.02-1.80)† | 1.72<br>(1.25-2.37)            | 0.001††  |
|                                          | Yes**                    | 1.00                 | 1.00                           | -        |
| Estimated risk of CC                     | Low                      | 4.99<br>(3.19-8.04)† | 31.49<br>(16.97-58.42)         | <0.001†† |
|                                          | ≥Middle **               | 1.00                 | 1.00                           | -        |

\* A model was created with age, marital status, smoking, risk perception, and estimated cervical cancer risk level. †Statistically significant ( $p<0.001$ )\*\* Reference value\*\*\* It has been adjusted according to the variables included in the model

## Discussion

It is known that the successful implementation of cervical cancer screening programs is effective in reducing cervical

cancer [24]. Despite this, women still die from CC. Therefore, it is extremely important to identify the risks associated with CC, raise awareness about CC, develop appropriate strategies for prevention and treatment, and know the attitudes of women toward the diagnosis of cervical cancer and the factors affecting these attitudes [20,24]. The findings of this study, which was conducted to examine the factors affecting the CC risk levels of women and having an HPV/PS test following the national CC screening standards, were discussed in light of the literature.

In our study, more than half of the women were found to have had an HPV/PS test and they had the test within 1-3 years. Studies have shown varying rates of HPV/PS testing. In studies with results similar to ours, more than half of women had had their PS test [15,25,26]. According to the results of the studies conducted in different groups and regions in Turkey, the rate of women's participation in cervical cancer screening varies between 29% and 51.3% [11,25,26]. Contrary to these results, the rate of women who have a PS test in some studies is low [27,28]. The fact that more than half of the women in our study had a PS test is an important finding in terms of early diagnosis. Women who had a Pap smear test in the last five years were considered to have met the national cervical cancer screening standards. In our study, it was determined that more than half of the women had their PS test, but that the frequency of the tests was not right. We think that this situation should be taken into account in the education programs about PS tests planned for women.

According to some studies, the low level of women's knowledge and negligence are among the barriers to having a PS test [15,27,29]. In our study, the majority of those who did not have the test stated that they did not know that it was necessary to have the test and that they neglected it. In a study, it was determined that more than half of the women had never had a PS test, they did not know that the frequency of having the test was once in five years and that they did not have the PS test mostly out of negligence and unawareness [30]. The most important determinant of the rate of women's having a PS test is the level of their knowledge and awareness of this issue. Women's unawareness of the risk factors and the PS test deprives them of the prevention, early diagnosis, and treatment methods for cervical cancer [10]. Our study results suggest that most women do not have a PS test because they do not have enough knowledge of it. Increasing the education and knowledge level of women about PS testing will increase the applicability of screening tests and help them make the right decisions about their own health.

It has been reported that cervical cancer most frequently affects young women aged between 35 and 50, with the average age at diagnosis being 49 [31]. In our study, the mean age of women was  $49.4 \pm 8.3$  years, and PS testing was more common in the 50-59 age group. Studies have shown that advancing age increases the likelihood of women engaging in health protection behavior [10,25,32]. According to these results, it was determined that the women in our study were in the risky age group for CC, and it was

thought that their knowledge, attitudes, and behaviors regarding CC were important in terms of early diagnosis and treatment.

It has been reported that the likelihood of developing cervical cancer is higher in women who smoke, and smoking is a risk factor for HPV [33]. In our study, the behavior of having a CC screening test was higher in smokers than in non-smokers. Similar to our study results, a study indicated that the rate of having a PS test among smokers was high [34]. Community health centers and family health centers in Turkey conduct education programs for smoking cessation and cancer screening (Ministry of Health). Women who smoke may have a higher awareness of the risk of CC. According to these results, it was thought that smokers took the risk into account and had a PS test.

Some studies in the literature have shown that giving birth and giving four or more births are effective in participation in cervical cancer screening [35]. In our study, the screening test was more common in women who had given birth than in those who had never given birth. Similar to the results of our study, Çankaya found the number of children affected by having a PS test [36]. In another study, a significant relationship was found between women's participation in cervical cancer screening and the number of births. In line with these results, it was thought that women with children presented to health institutions more often and that they were informed about cervical cancer screening and therefore their awareness increased.

It was determined that the CC risk level of the women participating in our study was mostly below average. The majority of the women in the study had a single sexual partner and the age of first marriage was above 16, which affected the risk level to be below average. The time of the last screening test in women with a calculated CC risk level of  $\geq$ average was more than five years. It was determined that the behavior of having a screening test was higher in women whose calculated CC risk level was low than in those with a CC risk level of  $\geq$ average. In a study, it was found that women living in areas with a high risk of CC were more prone to cancer screening tests [37]. In our study, women with a low CC risk level complied with the national cervical cancer screening standards more than those with average and high-risk levels. Compliance with the national cervical cancer screening standards increased significantly as the risk of CC decreased. This result shows that women do not have enough knowledge of CC and its risks.

### Limitations and strengths of the research

The results of the study are limited to the data obtained from the women participating in the study; therefore, they cannot be generalized. Recalling may have played a role in some quantitative data since data were collected retrospectively by using a questionnaire, but this limitation is a random error and cannot be considered a bias. It is thought that providing education after the implementation of the questionnaires contributed to the elimination of women's lack of knowledge.

## Conclusion

In our study, it was determined that PS testing was more common in the 50-59 age group, more than half of the women had a PS test, but most of the women who had the test did not have it at the right frequency. In our study, the majority of those who did not have the test stated that they did not know that it was necessary and therefore neglected it. The behavior of having an HPV/PS test following the national CC screening standards was significantly higher in women who were in the 50-59 age group, smoked, gave birth, and did not regularly use a condom during sexual intercourse. It was determined that the CC risk level of women was mostly below average, and the screening test behavior was higher in those with low CC risk levels. Awareness of the importance of Pap smear screening tests in the early diagnosis of cervical cancer is important for public health and especially women's health. Accordingly, all women, especially those in the risk group, should be made aware of CC, risk factors, prevention, and early diagnosis. Moreover, women should be provided with education on screening programs, and CC prevention programs should be increased.

## Conflict of interests

*The authors declare that there is no conflict of interest in the study.*

## Financial Disclosure

*The authors declare that they have received no financial support for the study.*

## Ethical approval

*Permissions required for conducting the study were obtained from the Clinical Research Ethics Committee of Harran University (dated 27.01.2020, session numbered 02, and decision numbered 02, 27), the relevant institution, and the individuals participating in the study.*

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