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# Evaluation of Occupational Health Literacy of Health Workers in Adana, Turkey*

## Occupational Health And Safety Literacy In Healthcare Workers

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**Abstract:**

**Objective**: The importance of occupational health and safety (OHS) and related health literacy is increasing. The aim of this study was to evaluate the occupational health literacy status of healthcare workers in Adana (Turkey).

**Method:** The population of the study consists of health workers in Adana province (N=18,660). Between April 29 and June 13, four researchers visited the workplaces of health workers and asked them to answer online survey questions through the WhatsApp application in face-to-face meetings. The study was completed with 179 individuals determined using non-probability sampling method. The analyses were performed using the SPSS 22 software. The Kolmogorov-Smirnov, t test in independent groups Mann-Whitney U test, ANOVA, and Kruskal-Wallis test were used in the analyses. A significance level of $p < 0.05$ was considered statistically significant.

Results: The study included 179 healthcare workers with an average age of 32.36±7.97 years. Pre-employment medical examinations and periodic examinations were reported to have been performed in 65.9% and 50.3%, respectively. The "Occupational Health Literacy Scale" that was administered to the participants with a resulting avarage score was 80.30±11.68. Participants who underwent workplace periodic examinations had higher scores in Factor 1 and Factor 4 compared to those who did not undergo any periodic examination.

**Conclusion:** Participants who underwent periodic examinations and those who were informed about health risks had higher occupational health literacy. It is recommended that health workers be informed about health risks in the institutions they work, periodic examinations are carried out regularly, OHS trainings are planned, and these trainings are repeated periodically.

**Keywords:** Occupational Health, Occupational Safety, Healthcare Worker

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## INTRODUCTION

According to the World Health Organization (WHO), health is defined as not merely the absence of disease or disability but a state of complete physical, mental, and social well-being (1). Occupational Health and Safety (OHS) involves systematic and scientific efforts to protect against conditions in the workplace that could be harmful to health due to various reasons and to improve existing health and safety conditions (2). In our country, activities related to ensuring health and safety in the workplace gained momentum with the enactment of Law No. 6331 on Occupational Health and Safety in 2012. The purpose of this law is to regulate the duties, authorities, responsibilities, rights, and obligations of employers and employees to ensure occupational health and safety and to improve the existing health and safety conditions in workplaces (3).

Healthcare workers, including doctors, nurses, midwives, laboratory technicians, health technicians, public health workers, and traditional medicine practitioners, are individuals engaged in occupational activities primarily aimed at improving health (4). The term also encompasses healthcare management and support workers, such as cleaners, drivers, hospital administrators, regional health managers, and social workers, as well as other professional groups involved in health-related activities as defined by the International Standard Classification of Occupations. Healthcare workers face a range of occupational risks related to infections, unsafe patient handling, hazardous chemicals, radiation, heat, noise, psychosocial hazards, violence, harassment, injuries, and inadequate provision of safe water, sanitation, and hygiene (4). Due to the increased level of risk associated with all these factors in healthcare service delivery, hospitals are classified as highly hazardous under Law No. 6331

OHS (5). Ensuring a healthy and safe working environment in healthcare services is crucial for preventing occupational accidents and diseases, positively impacting the health and safety of employees, and enhancing their work efficiency and well-being from their social life to the service they provide (6).

Occupational health literacy refers to the degree to which individuals have the capacity to obtain, process, and understand essential Occupational Health and Safety (OHS) information and services in order to make appropriate decisions regarding health and safety in the workplace (7).The development of occupational health literacy is crucial for preserving the health of employees and preventing negative outcomes such as workplace accidents, near-miss incidents, occupational diseases, and work-related illnesses that may arise from workplace conditions. Studies have shown that employees with weak occupational health literacy have higher rates of work-related injuries, illnesses, and fatalities (8). There is no study evaluating occupational health literacy among healthcare workers in our country.

This study aims to assess the occupational health literacy of healthcare workers in Adana.

## METHOD

This study is a cross-sectional research conducted in May 2023 in Adana. The study population consists of healthcare workers in Adana province (N=18,660). The required sample size was calculated using G power 3.1 program with P=0.5, effect size=0.1, power=80%, and CI=95%, resulting in a sample size of 199. As it was not possible to access a list of registered healthcare workers in Adana, a non-randomized sampling method (non-probability sampling - convenience sampling) was chosen. Interviews were conducted with 200 healthcare workers to administer the survey, but 21 individuals refused to participate for various reasons. Therefore, we were able to reach 90% of the selected sample (179 individuals) through convenience sampling. From April 29th to June 13th, the study was conducted

with four researchers visiting healthcare workers at their workplaces and explaining the purpose face-to-face. Due to the workload of healthcare workers, an online survey was prepared using Google Forms and sent through WhatsApp to collect their responses. Due to the short duration of the project, we couldn't reach the entire sample size.

The first part of the questionnaire includes sociodemographic questions such as age, gender, marital status, education level, and profession-related information. It also includes questions related to the workplace, such as the institution where the respondent works, the work area, years of experience, the use of personal protective equipment in the workplace, history of workplace accidents, occupational diseases, near-miss incidents, work-related infections, and any work-related health issues experienced.

Furthermore, it contains questions about the participants' engagement with occupational health and safety aspects, including whether they have received training on occupational health and safety, if they hold any position related to occupational health and safety, if they have been informed about health risks related to their work area, and whether they undergo pre-employment and periodic health examinations.The second part of the questionnaire is the Occupational Health Literacy Scale (OHLS) (9). OHLS was developed by Suthakorn et al. and its Turkish validity and reliability study were conducted by Uskun et al. in 2022 (9). The internal consistency coefficient, Cronbach's Alpha, was calculated to determine the reliability of the scale and found to be 0.93.

OHLS is a Likert-type scale consisting of 38 items, divided into 4 subscales, designed to measure employees' ability to access, understand, evaluate, use, and communicate information related to OHS based on their self-reported responses.

The four subscales are as follows: Factor 1 evaluates the ability to access OHS information and consists of questions 1 to 7; factor 2 assesses the ability to understand OHS information and includes questions 8 to 22; factor 3 encompasses the evaluation of OHS information and consists of questions 23 to 27; factor 4 evaluates the use and communication of OHS information and includes questions 28 to 38.

Participants are required to rate their responses on a scale from 1 (least appropriate) to 3 (most appropriate). The total score is then used for evaluation. The lowest possible score on the scale is 38, while the highest is 114. A higher score indicates a higher level of occupational health literacy (9).

**Statistical analysis:** The data analysis was performed using SPSS 22 program. For qualitative data, the results are presented in numbers and percentages, while for quantitative data, they are reported as arithmetic mean, standard deviation, and median. The normal distribution test used was the Kolmogorov-Smirnov Test.

Various statistical tests were used in the analyses, including t-test in independent groups, Mann-Whitney U test, ANOVA (Analysis of Variance), and Kruskal-Wallis test. For post-hoc tests, the Bonferroni and Tamhane tests were utilized. The significance level chosen for statistical analysis was $p < 0.05$, which means that results with p-values less than 0.05 were considered statistically significant.

**Ethics Approval:** Approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Cukurova University Faculty of Medicine, with protocol number 133, on May 5, 2023.

## RESULTS

The mean age of the 179 healthcare workers included in our study is 32.36 ± 7.97 years. Among the participants, 67% are female, and 65.4% have a work experience of 10 years or less. Table 1 presents the sociodemographic characteristics and some other information of the individuals.

| Table 1. Sociodemographic characteristics | |
|---|---|
| **Characteristics** | **n (%)** |
| **Gender** | |
| Female | 120(67) |
| Male | 59(33) |
| **Age** | 32,36±7,97 |
| **Marital Status** | |
| Married | 109(60,9) |
| Single | 65(36,3) |
| Other | 5(2,8) |
| **Education Level** | |
| High school | 11(6,1) |
| Assosiate's degree | 5(2,8) |
| Bachelor's degree | 61(34,1) |
| Masters-Ph.D | 102(57) |
| **Occupation** | |
| Doctor | 106(59,2) |
| Nurse | 48(26,8) |
| Other | 25(14) |
| **Institution of employment** | |
| PHC | 12(6,7) |
| GH | 48(26,8) |
| UH | 101(56,4) |
| HD | 18(10,1) |
| **Years of employment** | |
| ≤10 years | 117(65,4) |
| 11-20 years | 37(20,7) |
| ≥21 years | 25(13,9) |
| **Total** | 179(100) |

PHC: Primary Health Care Center GH: Goverment Hospital UH: University Hospital HD: Health Directorates

According to Table 2, among the healthcare workers who participated in our study, 16.2% experienced a workplace accident, 13% experienced a near-miss incident, 23.5% had a work-related infectious disease, and 8.9% had a work-related health problem. None of the participants were diagnosed with an occupational disease (Table 2). Among those who experienced a workplace accident and near-miss incident, the most common type of accident was needlestick injuries (n: 22, 73.3%) and the most common near-miss incident was also needlestick injuries (n: 7, 50%). Among the participants who reported work-related health problems, the most frequently mentioned issue was related to the musculoskeletal system. Among those who had a work-related infectious disease, the most commonly reported infection was Covid-19.

| Table 2. Occupational Health and Safety Issues Experienced by Participants Characteristics | |
|---|---|
| **Characteristics** | **n (%)** |
| **History of work accidents** | |
| Yes | 29(16,2) |
| No | 150(83,8) |
| **Diagnosis of occupational disease** | |
| Yes | 0(0) |
| No | 179(100) |
| **Occurrence of near miss** | |
| Yes | 13(7,3) |
| No | 126(70,4) |
| Unknown | 40(22,3) |
| **History of work-related infections** | |
| Yes | 42(23,5) |
| No | 137(76,5) |
| **Experience of work-related health problems** | |
| Yes | 16(8,9) |
| No | 163(91,1) |
| **Total** | 179(100) |

According to Table 3, 68.7% of the healthcare workers who participated in our study have received occupational health and safety training at their workplace. 66.5% of the participants have been informed about health risks related to their work unit. Regarding health examinations, 65.9% of the participants underwent pre-employment health examinations, and 50.3% had periodic health examinations.

| Table 3.Occupational Health and Safety Practices in the Workplace Features | |
|---|---|
| **Characteristics** | **n (%)** |
| **Status of receiving OHS training** | |
| Yes | 123(68,7) |
| No | 56(31,3) |
| **Informing about health risks** | |
| Yes | 119(66,5) |
| No | 60(33,5) |
| **Status of pre-employment medical examination** | |
| Yes | 118(65,9) |
| No | 61(34,1) |
| **Status of periodic medical examination** | |
| Yes | 90(50,3) |
| No | 89(49,7) |
| **Involvement in OHS activities** | |
| Yes | 10(5,6) |
| No | 169(94,4) |
| **Total** | 179(100) |

The participants' scores on the OHLS ranged from a minimum of 42 to a maximum of 109. The mean score was 80.3 ± 11.68.

There were no statistically significant differences among education levels for Factor 1, Factor 2, Factor 3, and Factor 4, as well as for the total OHLS score

(p=0.230, p=0.214, p=0.674, p=0.703, p=0.907). However, there was a significant difference in Factor 4 scores between doctors and other healthcare workers, with doctors scoring lower (p=0.014).

When examining the work experience of participants, there were significant differences in Factor 2, Factor 4, and the total OHLS score among groups with different work experience durations (≤5 years, 6-20 years, and ≥21 years) (p=0.01, p=0.007, p=0.008). However, no significant differences were observed for the other factor scores (Factor 1 and Factor 3) (p=0.664, p=0.051). Post-hoc analysis revealed that the scores for Factor 2, Factor 4, and the total OHLS score were higher among participants with work experience of ≥21 years compared to those with work experience of ≤5 years and 6-20 years. This suggests that participants with longer work experience have higher occupational health literacy scores in terms of Factor 2 and Factor 4, as well as the overall OHLS score.

Among the different working institutions (PHC, GH, UH, HD), there was a significant difference in Factor 1 scores (p=0.037). The post-hoc analysis has shown that GH and HD employees have significantly higher Factor 1 scores compared to PHC employees.

This indicates that workers in the PHC institution have lower occupational health literacy scores in terms of Factor 1 compared to workers in GH and HD institutions.

When examining the occupational health issues and practices experienced by the workers, no significant differences were found in the scores for each sub-factor (Factor 1, Factor 2, Factor 3, and Factor 4), as well as the total OHLS score, between those who had experienced a work accident and those who hadn't (p=0.732, p=0.993, p=0.328, p=0.898, p=0.729). Similarly, there were no significant differences in the scores between those who had experienced a near-miss incident and those who hadn't (p=0.662, p=0.314, p=0.067, p=0.502, p=0.263), those who had experienced a work-related infection and those who hadn't (p=0.400, p=0.452, p=0.989, p=0.502, p=0.873), those who had experienced a work-related health problem and those who hadn't (p=0.423, p=0.582, p=0.992, p=0.488, p=0.486), those who were involved in occupational health and safety studies and those who weren't (p=0.899, p=0.471, p=0.441, p=0.813, p=0.753), and those who had undergone a pre-employment medical examination and those who hadn't (p=0.112, p=0.308, p=0.220, p=0.652, p=0.513).

Significant differences were found in Factor 1, Factor 4, and total OHLS scores between workers who underwent workplace periodic medical examinations and those who did not (p=0.005, p=0.004, p=0.025).

Regarding the workers who were informed about the health risks in their workplace compared to those who were not informed, significant differences were observed in Factor 1, Factor 2, Factor 4, and total OHLS scores (p=0.000, p=0.019, p=0.007, p=0.002). In terms of Factor 1 scores, a significant difference was found between different work areas (p=0.037); post-hoc analysis revealed that administrative staff had significantly higher Factor 1 scores compared to those who worked in multiple areas. The results of the analyses are presented in Table 4.

## DISCUSSION

In this study conducted on healthcare workers, 68.7% of the participants stated that they received OHS training. In another study conducted on healthcare workers of a hospital in 2020, the rate of those who received OHS training was found to be 20.5% (10). The findings show a difference from our study.

The rate of participants who had an pre-employement examination was 65.9%, while the rate of participants who had a periodic examination was found to be 50.3%. In a study conducted by Özberk et al., published in 2021, it was found that 70.9% of healthcare workers had an entry examination and 42.7% had regular periodic examinations (11). The findings show similarity with our study.

| Table 4. OHLS Analysis of Total Score and Scale Subfactors According to Participant Characteristics | | | | | |
|---|---|---|---|---|---|
| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | OHLS Total |
| | X±SS /Median(IQR)[a] | | | | |
| Gender | | | | | |
| Male | 12(2) | 37(10) | 8(1) | 23(6) | 80,54±12,02 |
| Female | 13(3) | 36,5(9) | 8(2) | 24(5) | 79,81±11,06 |
| p | 0,338 | 0,621 | 0.850 | 0.860 | 0,696 |
| Education level | | | | | |
| High school | 14(2) | 34(8) | 8(0) | 24(8) | 78,91±7,51 |
| Assosiate's degree | 14(2) | 30(7) | 8(3) | 23(5) | 79,40±11,92 |
| Bachelor's degree | 13(3) | 36(10) | 8(3) | 24(8) | 81,13±13,96 |
| Master's/Ph.D | 13(3) | 37(9) | 8(1) | 23(5) | 80±10,62 |
| p | 0,230 | 0,214 | 0,674 | 0,703 | 0,907 |
| Occupation Groups | | | | | |
| Doctor | 13(3) | 36(9) | 8(2) | 23(5) | 79,06±10,5 |
| Other healthcare workers | 13(3) | 37(10) | 8(2) | 24(7) | 82,28±13,19 |
| p | 0,123 | 0,852 | 0,206 | 0,014 | 0,073 |
| Institution of employment | | | | | |
| Primary Healthcare Center | 11,5(4)[c] | 37(12) | 8(2) | 23(5) | 77,5(17) |
| Goverment Hospital | 13,5(2)[c] | 36(10) | 8(2) | 24(5) | 79(15) |
| University Hospital | 13(3) | 36(10) | 8(2) | 23(6) | 80(15) |
| Health Directorates | 13,5(4) [c] | 37,5(10) | 9(4) | 24,5(9) | 85(19) |
| p | 0,037 | 0,609 | 0,235 | 0,150 | 0,308 |
| Years of employment | | | | | |
| 5 Years and below | 13(2) | 35(9) | 8(1) | 23(4) | 79(11) |
| 6-20 Years | 13(3) | 37(10) | 8(2) | 23(6) | 79(16) |
| 21 Years and above | 12(4) | 40(6)[b] | 8(4) | 27(8)[b] | 90(20)[b] |
| p | 0,664 | 0,01 | 0,051 | 0,007 | 0,008 |
| Work accident experience | | | | | |
| Yes | 12(3) | 36(8) | 8(2) | 24(7) | 80,97±9,31 |
| No | 13(3) | 37(10) | 8(2) | 23,5(5) | 80,17±12,11 |
| p | 0,732 | 0,933 | 0,328 | 0,898 | 0,739 |
| Near-miss experience | | | | | |
| Yes | 13(4) | 39(4) | 9(4) | 25(7) | 85,31±10,46 |
| No | 13(3) | 36(10) | 8(3) | 23(5) | 80,08±15 |
| Unknown | 13(3) | 36(8) | 8(1) | 23,5(6) | 79,38±11,29 |
| p | 0,662 | 0,314 | 0,067 | 0,502 | 0,502 |
| Work-related infectious disease experience | | | | | |
| Yes | 12(4) | 37(10) | 8(2) | 23(4) | 80,05±11,83 |
| No | 13(3) | 36(10) | 8(2) | 24(6) | 80,38±11,68 |
| p | 0,400 | 0,452 | 0,989 | 0,502 | 0,873 |
| Work-related health problem experience | | | | | |
| Yes | 12,5(4) | 36,5(4) | 8(3) | 23,5(10) | 82,25±12,40 |
| No | 13(3) | 37(10) | 8(1) | 24(5) | 80,11±11,63 |

| Table 4. OHLS Analysis of Total Score and Scale Subfactors According to Participant Characteristics | | | | | |
|---|---|---|---|---|---|
| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | OHLS Total |
| | X±SS /Median(IQR)[a] | | | | |
| p | 0,423 | 0,582 | 0,992 | 0,488 | 0,486 |
| OHS Training Status | | | | | |
| Yes | 13(2) | 37(9) | 8(2) | 24(6) | 80(16) |
| No | 12(4) | 36(10) | 8(2) | 23(3) | 77,5(12) |
| p | 0,007 | 0,381 | 0,845 | 0,216 | 0,753 |
| Informing about Health Risks in the Department of Work | | | | | |
| Yes | 13(2) | 37(10) | 8(2) | 24(7) | 81(16) |
| No | 12(4) | 35(8) | 8(2) | 23(5) | 76(14) |
| p | 0,000 | 0,019 | 0,169 | 0,007 | 0,002 |
| Involvement in OHS Studies | | | | | |
| Yes | 12,5(3) | 34,5(8) | 8,5(3) | 23,5(5) | 79,5(15) |
| No | 13(3) | 37(10) | 8(2) | 24(6) | 80(16) |
| p | 0,899 | 0,471 | 0,442 | 0,813 | 0,753 |
| Status of pre-employment medical examination | | | | | |
| Yes | 13(2) | 36(10) | 8(2) | 23(7) | 79(17) |
| No | 13(3) | 37(8) | 8(5) | 24(5) | 81(13) |
| p | 0,112 | 0,308 | 0,220 | 0,652 | 0,513 |
| Status of periodic medical examination | | | | | |
| Yes | 13(2) | 37(9) | 8(2) | 24(6) | 80(16) |
| No | 12(4) | 36(10) | 8(1) | 23(6) | 78(14) |
| p | 0,005 | 0,411 | 0,384 | 0,004 | 0,025 |
| Department of Work | | | | | |
| Outpatient Clinic | 12,5(2) | 36,5(11) | 8(2) | 23(7) | 79,35±10,56 |
| Inpatient Ward | 13(6) | 34(9) | 8(2) | 23(7) | 78,72±15,11 |
| Emergency Room and Intensive Care Unit | 14(2) | 37,5(9) | 8(3) | 25(5) | 78,07±11,47 |
| Administrative Area | 14(3)[c] | 37(11) | 8(3) | 24(8) | 82,75±12,43 |
| Multiple Work Areas | 12(3)[c] | 36,5(8) | 8(1) | 23(4) | 78,19±9,68 |
| p | 0,012 | 0,648 | 0,702 | 0,139 | 0,276 |

[a] If the groups conform to a normal distribution, the values are presented as X ± SS (mean ± standard deviation). If they do not follow a normal distribution, the values are presented as median value (IQR).
[b] The group that creates the difference.
[c] The groups that show significant differences in the post hoc analysis.

There is no study aimed to investigate OHS literacy among healthcare workers in Turkey. It is important that the Occupational Health Literacy Scale among healthcare workers.

In our study, the scores obtained from the sub-dimension of using and communicating OHS (Occupational Health and Safety) information were found to be higher in other healthcare workers compared to doctors. In a study related to

occupational accidents in the health sector, nurses (44%), doctors (28%), and technicians (15%) were the most exposed to injuries from sharp and piercing tools, due to representing the largest professional group in hospital workforce (12). In a study named "Occupational Accidents and Employee Safety in Hospitals" in 2013, it was found that 68% of nurses, 32% of doctors, and more than half of all staff had been exposed to injuries from sharp and piercing tools at least once in their working lives (13). Among healthcare workers, nurses are considered to be in the most at-risk group (14). According to these studies, the fact that other healthcare workers, most of whom are nurses, are exposed to occupational risks more than doctors may have resulted in them being more careful in terms of using and communicating OHS (Occupational Health and Safety) information. On the other hand, doctors' preference for curative health services over preventive health services may have led them to score lower in terms of using and communicating OHS information. After all, occupational health and safety is within preventive health services.

Actually, scores obtained by the employees in the PHC from the sub-dimension of accessing OHS information are lower compared to the employees of Provincial/District Health Directorates and State Hospitals; it can be interpreted as the employees thinking that PHC's are less risky in terms of OHS and do not need it, or the inadequacy of OHS trainings at the PHC level.

Participants with more years of work have higher scores in Total OHS Literacy, understanding OHS information, and using and communicating OHS information could be due to the increase in their experiences as the years of work increase. Only the scores obtained from the sub-dimension of accessing OHS information are higher in those who have received OHS training compared to those who have not, may be due to a deficiency in the content of OHS trainings or differences in the way individuals perceive the given trainings.

Participants who are informed about the health risks of the department they work in have higher scores in accessing OHS information, understanding OHS information, using and communicating OHS information, and total OHS Literacy, can be interpreted as providing specific risk information about the area they work in, leading to a clearer perception and importance of the subject in individuals.

Participants who have periodic examinations have higher scores in accessing OHS information, using and communicating OHS information, and total OHS Literacy, is an important finding in emphasizing the importance of periodic examinations. Essentiallt, participants working in the administrative field have higher scores from the sub-dimension of accessing OHS information compared to participants working in multiple fields, may be due to the personnel in administrative areas being responsible for receiving, organizing, being aware of, and following up on OHS trainings.

**Limitations:** The study utilized non-probability sampling, which resulted in a low representativeness of the sample for the population, leading to selection bias. Additionally, memory bias may have influenced participants' responses to certain questions (e.g., workplace accidents, pre-employment, and periodic medical examinations). The use of an online survey may have introduced information bias as participants could have misunderstood or misinterpreted the questions during completion.

## CONCLUSION

Participants who have periodic examinations and are informed about health risks in the institution they work in have been found to have a higher total score on the occupational health literacy scale. It is recommended that health workers have regular periodic examinations at the institution they work in, that OHS trainings are planned for health workers, and that these trainings are repeated periodically. It is also important to encourage

doctors, who score lower than other health workers in the sub-dimension of using and communicating OHS information, to use and communicate OHS information to other health personnel, considering that their responsibilities are higher.

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**Conflict of Interest**

*No conflict of interest*

**Support Resources**

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**Ethical Declaration**

Ethical permission was obtained from the Cukurova University, Medical Faculty Clinical / Human Research Ethics Committee for this study with date 05.05.2023 and number 133, and Helsinki Declaration rules were followed to conduct this study.

**Authorship Contributions**

Concept: FİD, Aİ, HMS, TM, FT, HD, Design: FİD, Aİ, HMS, TM ,Supervising: FT, HD, Financing and equipment: FİD, Aİ, HMS, TM, Data collection and entry: FİD, Aİ, HMS, TM, Analysis and interpretation: FİD, Aİ, HMS, TM, Literature search: FİD,Aİ,HMS,TM

Writing: FİD, Aİ, HMS, TM, FT, HD Critical review: FİD, Aİ, HMS, TM, FT, HD