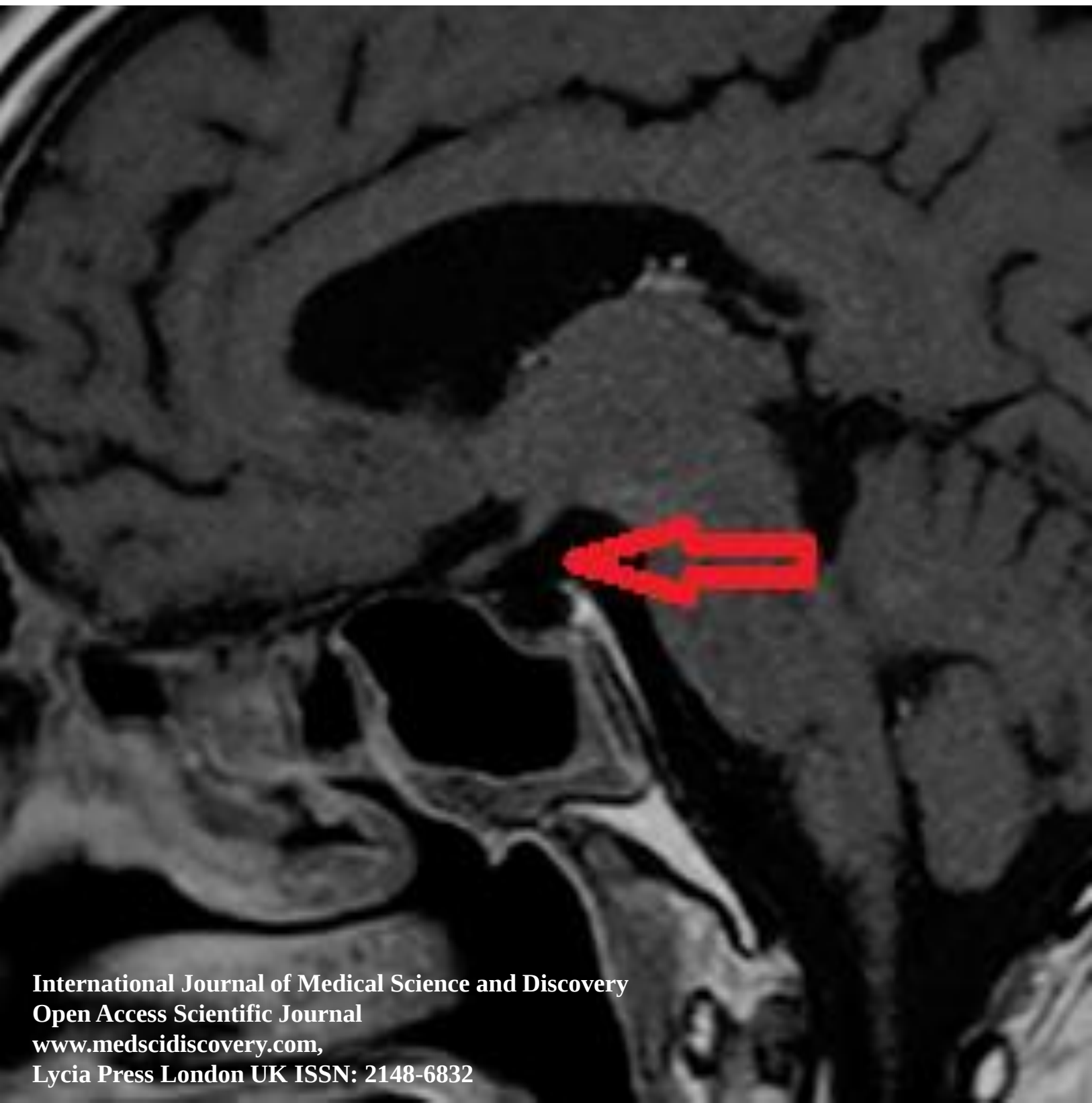


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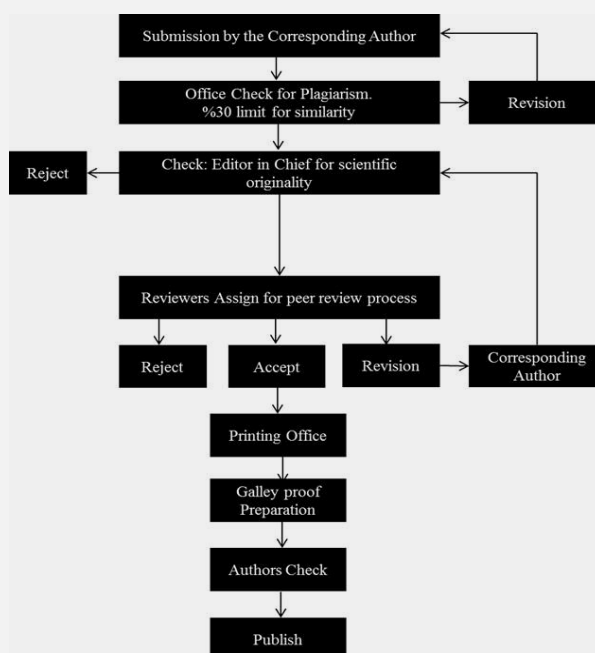
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Analysis of suicidal patients admitted to the emergency rooms and their intensive care requirements: A double-center study in Turkey

Betul Kocamer Şimşek^{1*}, Şengül Kocamer Şahin²

Abstract

Objective: In the present study, the clinical and socio-demographic data of the patients who admitted to the emergency department due to suicide attempt, the duration at the emergency department, and hospitalizations are examined. Requirement of intensive care and duration of hospitalization are investigated in the patients with suicide attempt.

Materials and Methods: Patients who were admitted to the emergency department of the hospitals after suicide attempts between 2015 and 2017 and per 2018 were included in the retrospective study. Reason for suicide, suicide modality, duration between the suicide attempt and arrival to the emergency department, suicide time, first treatment at the emergency department, hospitalization, mortality, and the levels at the intensive care unit (ICU) were retrospectively reviewed and analyzed. Data obtained from the archives of the hospitals. SPSS 25.0 (IBM Corporation, Armonk, New York, United States) program was used to analyze the variables.

Results: In the present study, 428 patients were included. Ratio of the female to male patients was 319/109. The mean age of the patients was 29.18±10.48. 205 patients were single. 136 patients were unemployed. Ninety-four (22.87%) patients were diagnosed with a psychiatric disorder. Four hundred twenty-two (98.59%) of the patients were attempted suicide with drugs/toxics. One hundred ninety-seven patients (49.75%) reported domestic violence and family issues reasons for suicide. Mean duration between the time of suicide and the time to arrive to the emergency department was 100.53±91.82 minutes. One hundred thirty (30.5%) patients were transferred to ICU, and 45 (10.5%) patients were followed in clinical departments. One hundred twenty (92.3%) patients hospitalized in the first-level ICU, 4 (3%) in the second-level ICU, and 6 (4.6%) in the third-level ICU. The mean ICU stay was 2.37±1.48 days.

Conclusion: The suicide attempts were prominent in acute poisoning cases. Majority of the patients stated domestic violence and family issues as a reason of suicide. They were discharged mostly from the emergency department and 10.5% of the patients were kept under surveillance in the departments. When the suicide attempts were evaluated in terms of their time, they were observed during day time at a higher rate.

Keywords: Suicide; Intensive care; Emergency

Introduction

Suicide is a public health problem that concerns communities, provinces and all the countries. More than 800.000 people die each year due to suicide. Suicide is the second most important cause of death between 15- and 29-years old patients worldwide (1). Methods of suicide attempt vary according to the countries. The most frequent suicide methods are over dosage, hanging themselves, asphyxiation, jumping out, pesticide poisoning, and use of firearms (2). Pesticide intake is one of the most common methods of suicide attempt globally (1). Most frequently used two methods of suicide leading to death in Turkey are hanging oneself and the use of firearms (3). The patient with suicide attempt can be discharged or hospitalized

based on the examination. The need for medical attention and interventions after a suicide attempt varies from 22% to 88% (4). Treatment settings include the department, intensive care unit, and the outpatient treatments. Severe suicide attempts, refusal of treatment, or mental state changes with metabolic, toxic, infectious situations or any other etiology generally require hospitalization (5). In Nordic countries, the rate of the patients requiring intensive care only after overdose varies between 3% and 15.7% (6).

There are limited numbers of studies in which suicidal attempts and the follow-up of the treatment at the intensive care unit are considered and there are no large-scale studies



including the interventions at the emergency department and the follow-ups at the intensive care unit in Turkey.

There is a rapidly increasing trend in suicide attempts in Turkey especially in respect of elderly suicides (7,8) and suicidal patients who are required intensive care, poses a significant cost to the health care system in Turkey (9). Current studies in this area are mostly investigated patients who were admitted ICU due to suicide (10). In other perspective, this study investigates the rate of the patients who were in need of intensive care or followed up under clinical conditions after suicide attempt. In this exploratory study, the clinical and socio-demographic data of the patients with suicide attempt who admitted to the emergency department, duration of admission to the emergency department, and hospitalizations are examined. Requirement of intensive care and duration of hospitalization are investigated in the patients with suicide attempt.

Material and Methods

Data collection: The present study was retrospectively conducted at Adana State Hospital and Sanko University Hospital of Faculty of Medical. Approval for the study was granted by the Institutional Ethics Committee of Sanko University, Gaziantep, Turkey (No: 2017/01-4 date: 25.01.2017). Patients who were admitted to emergency departments of the hospitals after suicide attempts between 2015 and 2017 and per 2018 were included in the study. The file numbers, and hospitalization process of the patients were retrospectively reviewed from central electronic file system of the two hospitals. This system includes all data of procedures applied to patients in hospital. Suicide time, arrival time, suicide pattern and reasons were reviewed from the paper charts which had been applied to patients by a nurse and a psychologist when the patient had admitted to emergency due to suicide. Age, gender, relationship status, employment status, alcohol or substance abuse, history of psychiatric disorders, history of chronic illnesses, reason for suicide, suicide modality, previous suicide attempts, history of suicide in family members, duration between the suicide attempt and arrival to the emergency department, suicide time, initial treatment at the emergency department, hospitalization, mortality, and intensive care unit (ICU) levels were retrospectively reviewed and analyzed. If the answers for the said elements were not present in the hospital registries, they were recorded as missing data. Patients' information were received as anonymized.

Statistical analysis: SPSS 25.0 (IBM Corporation, Armonk, New York, United States) program was used to analyze the variables. Chi-Square and Binominal tests are used for the homogeneity of categorical variables, Fisher-Freeman-Holton tests are used for the comparison with each other and they are tested by using the Monte Carlo Simulation technique. The ratios of the columns are compared with each other and expressed according to the Bonferroni corrected p value results. Quantitative variables were shown as mean $\pm$ SD (Standard Deviation) and median (Minimum/maximum) and categorical variables as n (%) in the tables. The variables were examined at

confidence level of 95% and p value less than 0.05 was accepted as significant.

Results

Totally 458 patients were detected in this review of inpatients records. Patients who have missing data (suicide time, reason etc.) were excluded from the study. Rest of the patients (428) were included the study. Ratio of the female to male patients was 319/109. The mean age of the patients was 29.18 ± 10.48 . Most of the patients were married (n=189) and single (n=205) and others were widow (n=20) or divorced (n=14). The patients were mostly unemployed. One hundred nine patients were housewives (n=109), 103 were working in a job, 58 were students and 3 were retired. Table 1 shows the sociodemographic data of the patients.

Table 1. Demographic data of the cases

	n (%)
Gender	
Female	319 (74.53)*
Male	109 (25.47)
Relationship status	
Single	205 (47.90)*
Married	189 (44.16)*
Widow	20 (4.67)
Divorced	14 (3.27)
Occupying	
Unemployed	136 (33.25)*
Working in a job	103 (25.18)
Housewife	109 (26.65)
Student	58 (14.18)
Retired	3 (0.73)
Age (n: 428)	
Mean $\pm$ SD.	29.18 ± 10.48
Median (Min./Max.)	26 (14 / 67)

Ninety-four patients were diagnosed with a psychiatric disorder, and ninety of them were receiving treatment. Sixteen patients were diagnosed with chronic illnesses as diabetes mellitus, hypertension, cardiac problems and cancer, and 3 of these patients were diagnosed with neurological disorders. Fifteen patients had substance abuse and 31 patients had alcohol abuse. Eighty-five patients had attempted suicide previously, 23 of these patients had a history of suicide attempt in the family members and 21 of them had a history of psychiatric disorders in the family members. Medical history of the patients was analyzed, and they are shown in table 2. **Other comorbidities are diabetes mellitus, hypertension, cardiac problems and cancers. Four hundred twenty-two of the patients were attempted suicide with drugs/toxic substances. Of these patients, 3 attempted suicide with cutting tools, 2 by jumping over (1=4th floor, 1=2nd floor), and 1 by gunshot (died within 12 hours).

The reasons for attempting suicide were analyzed, and 396 patients specified the reason, but 32 patients did not want to give information. In the said 396 patients, majority stated the reason as domestic violence and family issues (n=197) followed by chronic illnesses, (n=64) and others specified the reason as communication problems (n=46), sexual

problems (n=28), economic problems (n=18), loneliness (n=12), alcohol/substance abuse (n=9), parental conflicts (n=8), exams (n=8), Death/lost (n=6), juvenile problems (3), and school (n=2). Table 3 shows the suicide modality of the patients.

Table 2. Medical history of patients

History	n (%)
Alcohol abuse	
Yes	31 (7.29)
No	394 (92.71)*
Substance abuse	
No	408 (96.45)*
Yes	15 (3.55)
Comorbidities	
None	409 (96.23)*
Other **	13 (3.06)
Neurological	3 (0.71)
Psychiatric disorder	
None	317 (77.13)*
Yes	94 (22.87)
Psychiatric treatment	
None	293 (76.50)*
Yes	90 (23.50)
History of suicide attempt before	
No	335 (79.76)*
Yes	85 (20.24)
History of suicide attempt in family members	
No	353 (93.88)*
Yes	23 (6.12)
Psychiatric disorder in family members	
No	341 (94.20)*
Yes	21 (5.80)

Table 3. Suicide descriptive.

Suicide modality	Numbers (%)
Drugs/toxics	422 (98.59)*
Cutting tools	3 (0.70)
High jump	2 (0.47)
Gun	1 (0.24)
Reason for suicide attempt	
Domestic violence and family issues	197 (49.75)*
Chronic illnesses	64 (16.16)
Communication problems	46 (11.62)
Sexual problems	23 (5.81)
Economic problems	18 (4.54)
Loneliness	12 (3.03)
Alcohol/substance abuse	9 (2.27)
Parental conflict	8 (2.02)
Exams	8 (2.02)
Death/lost	6 (1.52)
Juvenile problems	3 (0.76)
School	2 (0.51)
Suicide time	
[24:00-06:00]	75 (18.9)*
[06:00-18:00]	174 (43.9)
[18:00-24:00]	147 (37.1)

The times of suicide attempts were examined in three different periods: evening period (18:00-23:59), night period (00:00-05:59), and day time period (06:00-17:59). The records of the times of suicide attempts were available in 396 patients. Most of the patients attempted suicide

during the day time period (n=174), secondly in the evening period (n=147), and finally in the night period (n=75) (table 3). Table 4 shows the descriptive characteristics of ICU and the emergency department. Four hundred twenty patients were treated with gastric lavage and activated charcoal in the emergency department, 3 patients with tracheal intubation and transferred to ICU, and 3 patients with tracheal intubation and then immediately transferred to the operating room. One hundred twenty (92.3%) patients hospitalized in first-level ICU, 4 (3%) in second-level ICU, and 6 (4.6%) in third-level ICU.

Table 4. ICU and emergency room descriptives.

Steps in ICU	n (%)
1.Step	120 (92.3) *
2. Step	4 (3)
3. Step	6 (4.6)
Stay in hospital	
Discharge from emergency room	251 (58.9)*
ICU	130 (30.5)
Clinical Services	45 (10.5)
Treatment in emergency room	
Gastric lavage and activated charcoal	420 (98.5)*
Tracheal intubation and transfer to ICU	3 (0.7)
Tracheal intubation and transfer to operating room	3 (0.7)
Treatment in ICU	
Monitored Care	120 (92.3) *
Hemodialysis	4 (3)
Mechanical ventilation and Hemodialysis	3 (2.3)
Mechanical ventilation and operation	3 (2.3)
Discharge from ICU	
Discharged	129 (99.24)*
Death	1 (0.76)

Two hundred fifty one patients were discharged from the emergency department, 130 patients were transferred to ICU, and 45 patients were followed in clinical departments. Mean duration between the time of suicide attempt and the time to arrive to the emergency department was 100.53±91.82 minutes (n=416) (table 5). Sixty-three female and 40 male patients were working in a job, and 92 female patients and 44 male patients were unemployed. The reasons for suicide attempts were mostly domestic violence and family issues (52.7%) in female patients and were mostly the economic problems (13.5%) and illnesses (13.5%) in male patients. The most common cause in all relationship status when the relationship status and the reason of suicide are compared is domestic violence and domestic problems. Similarly, the most common causes in employment conditions when the employment status and the reason of suicide are compared, are domestic violence and domestic problems. Table 6 shows the relationship status, and the occupational status.

Table 5. Time to reach to the emergency room and Stay in ICU.

	Mean±SD.	Median (Min/Max)
Time to reach to the emergency room (min)	100.5±91.8	60 (6 / 540)
Stay in ICU (day)	2.37±1.48	2 (1 / 12)

Table 6. Relationship between suicide reasons and gender, relationship status, occupying. *p<0.001

	Gender		Relationship status					Occupying				
	Female n (%)	Male n (%)	Single n (%)	Divorced n (%)	Widow n (%)	Married n (%)	Working in a job n (%)	Unemployed n (%)	Retired n (%)	Housewife n (%)	Student n (%)	
Domestic violence and family issues	158 (52.7)*	39 (40.6)	69 (37.3)*	9 (64.3)*	7 (41.2)*	112 (62.2)*	51 (52)	51 (40.8)	1 (50)	64 (61)*	20 (39.2)	
Alcohol/substance abuse	1 (0.3)	8 (8.3)	9 (4.9)	0 (0)	0 (0)	0 (0)	3 (3.1)	4 (3.2)	0 (0)	0 (0)	2 (3.9)	
Sexual problems	15 (5)	8 (8.3)	16 (8.6)	0 (0)	1 (5.9)	6 (3.3)	5 (5.1)	6 (4.8)	0 (0)	5 (4.8)	5 (9.8)	
Parental conflict	7 (2.3)	1 (1)	7 (3.8)	0 (0)	0 (0)	1 (0.6)	0 (0)	7 (5.6)	0 (0)	0 (0)	1 (2)	
Economical problems	5 (1.7)	13 (13.5)*	7 (3.8)	0 (0)	0 (0)	11 (6.1)	6 (6.1)	9 (7.2)	0 (0)	1 (1)	1 (2)	
Juvenile problems	2 (0.7)	1 (1)	3 (1.6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (5.9)	
Chronic illnesses	51 (17)	13 (13.5)*	29 (15.7)	3 (21.4)	5 (29.4)	27 (15)	22 (22.4)	19 (15.2)	1 (50)	18 (17.1)	4 (7.8)	
Communication problems	35 (11.7)	11 (11.5)	26 (14.1)	1 (7.1)	1 (5.9)	18 (10)	11 (11.2)	15 (12)	0 (0)	12 (11.4)	7 (13.7)	
School	2 (0.7)	0 (0)	1 (0.5)	0 (0)	0 (0)	1 (0.6)	0 (0)	0 (0)	0 (0)	0 (0)	2 (3.9)	
Death/lost	6 (2)	0 (0)	2 (1.1)	0 (0)	2 (11.8)	2 (1.1)	0 (0)	2 (1.6)	0 (0)	4 (3.8)	0 (0)	
Exams	6 (2)	2 (2.1)	8 (4.3)	0 (0)	0 (0)	0 (0)	0 (0)	5 (4)	0 (0)	0 (0)	3 (5.9)	
Loneliness	12 (4)	0 (0)	8 (4.3)	1 (7.1)	1 (5.9)	2 (1.1)	0 (0)	7 (5.6)	0 (0)	1 (1)	3 (5.9)	

Discussion

As reported from Turkish Statistical Institute, the number of suicides that resulted in death was 3 thousand 169 in the revised 2014, while it increased by 1.3% in 2015 and became 3 thousand 211, also 72.7% of the suicides were men and 27.3% were women.

The time of suicide per hundred thousand population, and in 2015, it remained unchanged at 4,11 per hundred thousand. In other words, four of every hundred thousand people committed suicide in 2015 (11).

It is critical to understand the extent of suicide attempts in order to develop the protection and intervention programs. The present study contributes to the literature regarding the suicide modalities, duration between the suicide attempt and arrival to the emergency department, time of the suicide attempt, first treatment at the emergency department, hospitalization, and the intensive care unit (ICU) stages in order to monitor suicide-related treatment level.

Previous studies found that suicide attempts are higher in females and males are more likely to have completed suicide (12,13). Similarly, in the present study, the number of suicide attempts were higher in women than in men and 1 person who died due to a suicide attempt was male. Also, being single acts as a risk factor for a suicide attempt (14). Consistently, it was found that suicide attempts were higher in singles.

In the present study, the predominant method for suicide attempt was drug intoxication, and the second reason was slitting his/her wrists. Only 3 patients attempted suicide by slitting their wrists. Drug overdose was found the most common way of attempting suicide in also adolescents like adults (15). This frequency is compatible with the previous studies regarding suicide attempt (13).

Psychiatric disorders, history of suicidal behaviors, and substance abuse are important risk factors for suicide attempt (16,17). In the current study, 94 patients were diagnosed with a psychiatric disorder, 15 had substance abuse, 31 had alcohol abuse, and 85 had a previous suicide attempt. The approaches to interpersonal/relationship problems, psychiatric morbidity may be complementary for the doctors at the emergency department as well as the psychiatrists.

There is a significant correlation between domestic violence and suicide attempt tendency in developing countries (18,19). In the current study including 396 patients, most of the patient stated domestic violence and family issues (n=197) as the reason for a suicide attempt followed by chronic illnesses.

The results of the studies regarding the times of suicide attempt are not consistent. In the present study, the highest incidence rate for suicide attempt was the day time period (06:00-17:59). Times of suicide attempts are analyzed in different time intervals (ex. Most frequent time intervals according to the studies are 15.00-18.00, 06.00-16.00, 12.00-16.00, 8.30-12.30) (20-21), it may be considered that

the suicide attempts are more frequent when the patient is awake in the day time.

One of the distinctive results of the present study is how long the patients reach the emergency department after suicide attempt. In a study conducted in Turkey, the median time from the exposure to substance intake to the ED was 2 hours (22,23). It took 100.53±91.82 minutes to arrive to the emergency department after any suicide attempt in the current study. 130 (30.5%) patients were transferred to ICU, and 45 (10.5%) patients were followed in the clinical departments. The mean ICU stay was 2.37±1.48 days.

The patients who needed intensive care due to suicide attempts were also examined. In a previous study, it was determined that 12.8% of the patients, who applied due to suicide attempt, were admitted to ICU (22). In the present study, 130 (30.5%) patients were transferred to ICU. According to the classification of the ICU levels, 120 patients with suicide attempts, who took drugs, were kept in ICU at first level, 4 patients at the second level (one needed CPAP ventilation, two needed hemodiafiltration, 1 had a Glasgow coma scale of 10). Mechanical ventilation was required for 6 patients, so they were accepted as the ICU level 3. Two of these patients jumped from a high place, 1 attempted suicide with a gun, and 3 had a respiratory failure due to the use of drugs. All the patients in the 1st level were accepted to ICU due to the possible adverse events like arrhythmia, loss of consciousness and respiratory, cardiac, renal or hepatic failures and they were monitored according to the said adverse events as mentioned in the previous studies (6).

In a study in Turkey, it was determined that the rate of deaths caused by the suicide attempts by using drugs is 6%. In another study, this rate was found to be 0.1% (24, 25). According to the findings of World Health Organization, mortality rate after a suicide attempt is 11,4 per 100.000 (1,25,26). In the current study, it was found that 1 patient died by blowing his/her brains out in a suicide attempt. No patient died due to the suicide attempts by using drugs. The result supports the low mortality rate in the suicide attempts in Turkey.

A major limitation of this study is the retrospective design. There are no detailed psychiatric examination findings in the emergency departments.

Conclusion

The suicide attempts were prominent in acute poisoning. Majority of the patients stated domestic violence and family issues as a reason of suicide. They were discharged mostly from the emergency department and 10.5% of the patients were kept under surveillance in the departments. When the suicide attempts were evaluated in terms of their time, they were observed during day time at a higher rate.

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Determining knowledge and administration of nurses in preventing surgical site infections

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Abstract

Objective: This study was conducted to define the knowledge and administrations of nurses working in surgical clinics for the prevention of surgical site infections.

Material and Methods: The research sample consisted of 199 nurses who were working in surgical clinics and operating rooms of a university hospital between 02 October and 29 December 2017 and who were volunteers to participate in the study and met the limitations of the study. Data were collected by the researchers through face to face interviews with the nurses included in the study. Data collection tools were developed by the researchers in line with the literature. Sociodemographic characteristics information form, SSI Information Questionnaire and Practice Evaluation Form of Nurses in Preventing SSI were used as data collection tools.

Results: The mean age of nurses participating in the study was 35.2 ± 6.2 years, 97.5% of them were women, 89.4% of them were graduate's degree, 36.2% of them were working in surgical units between 13-60 months, 58.3% in the last two years, 48.7% of them have received training in the site of surgical site infections in the last two years. It was found that 62.3% of the nurses' knowledge status was "moderate". The average score of the practice statements answered by the clinical nurses participated in the research was found out to be $65,16 \pm 6,11$, by the operating room nurses participated in the research was found out to be $64,09 \pm 6,93$. It was found that there was a statistically significant relationship between the training status of the operating room nurses participating in the study and their administration scores ($p < 0.05$).

Conclusion: Results obtained from the study; the knowledge and administration scores of the nurses who were trained in CAE were found to be higher.

Key words: Surgical wound, infection, nurses, knowledge, administration

Introduction

Nosocomial infections (NI), which are indicator of quality in inpatient treatment institutions, cause problems such as increased mortality / morbidity rates, prolonged hospital stay and treatment process. NI rates in inpatient treatment institutions can be reduced by following up the surveillance results, comparing these results with other institutions' infection rates and taking effective infection control measures (1). The World Health Organization states that 20% of NI in developed countries and more than 40% in developing countries are preventable (2). Surgical site infection (SSI) is one of the most serious surgical complications and causes serious mortality, morbidity and economic losses. Factors related to the patient and the surgical process influence the improvement of SSI (3,4).

It is vital to fully apply the asepsis rules to prevent SSI which occurs in 2-5% of the surgeries and ¼ of all the nosocomial infections. In the surgical wound care which is the responsibility of the nurse and the physician; the most important main goal is to be able to discharge the patient from hospital as soon as possible, before the infection occurs (5). Nurses are one of the primary health workers who interacts the most with patients. Therefore, the contribution of nurses to the prevention of healthcare-related infections is significant (2). The knowledge, attitudes and administrations of nurses to prevent surgical site infections must be up to date and evidence-based (6,7). This study was conducted to define the knowledge and administrations of nurses working in surgical clinics for the prevention of surgical site infections.



Material and Methods

This study is descriptive. The population of the study consisted of 288 nurses working in surgical clinics and operating rooms of a university hospital between 02 October and 29 December 2017. The research sample consisted of 199 nurses who were working in surgical clinics (138 nurses) and operating rooms (61 nurses) and who were volunteers to participate in the study and met the limitations of the study and the 69.0% of these samples were reached. Data were collected by the researchers through face to face interviews with the nurses included in the study. Data collection tools were developed by the researchers in line with the literature. Sociodemographic characteristics information form, SSI Information Questionnaire and Practice Evaluation Form of Nurses in Preventing SSI were used as data collection tools.

In Sociodemographic Characteristics Information Form there are ten questions in total on nurses' age, gender, educational status, the department in which they work, working time in the unit, the status of training received on hospital infections and surgical site infections in the last two years, determining the resources of the trainings received. Surgical Site Infections Information Questionnaire includes 10 information questions prepared in line with current guidelines on SSI (8,9). There are information questions about the definition of SSI, types of SSI, risk factors related to surgical process, patient risk factors, results of surgical site infections, surgical site hair removal tool, place of hair removal in surgical site, prophylactic antibiotic renewal time and solutions used in skin preparation. According to the answers given to the information questions by the nurses who participated in the study, their knowledge status was rated as "weak", "moderate" and "good. According to the information questions, 0-40 points were classified as "weak", 41-70 points were classified as "moderate" and 71-100 points were classified as "good".

Practice Evaluation Form of Nurses in Preventing Surgical Site Infections, which includes evidence based nurse administrations in the light of current guidelines, was prepared as two separate questionnaires for clinical and operating room nurses by taking the differences in their administrations into account. There are 15 questions in each form. A 5 points likert-type scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always) was used for the answers of the questions. In converting the score into a system of 100, the scores were calculated as; 1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100. In the questions prepared for clinical nurses; new developments related to nosocomial infections, if they follow the current guidelines, their hand washing times, changing gloves when passing from one patient to another, paying attention and compliance with sterility in invasive procedures, recording the medications used routinely by patients and informing the related physician, suggesting patients to stop smoking in the preoperative period, suggesting patients to take a shower with antiseptic solutions at least one day before surgery, checking the blood glucose levels of patients with diabetes before and after surgery, the status of applying prophylactic antibiotics, checking the saturation value of patients in the

postoperative period and applying the relevant nursing interventions, following the nutritional status of the patients in the postoperative period, taking appropriate isolation measures according to the microorganism that grows in culture results (contact, droplet, respiration), paying attention to signs and symptoms of infection around the operated area in the postoperative period (swelling, redness, gleet, pain, fever), supporting the hydration of the patients if there is no restriction in the postoperative period, informing patients about infection symptoms before discharge from the hospital were questioned. The Cronbach alpha internal consistency coefficient of the form was found to be 0.806.

In the questionnaire prepared for operating room nurses; new developments related to hospital infections, if they follow the current guidelines, frequency of changing their uniforms, using nail varnish or nail polish during working hours, their compliance with the principles of surgical asepsis, notifying the infection control committee about any operating room personnel with respiratory system infection or nasal colonization, if they leave the operating room in their operating room uniforms, their applying the surgical hand washing processes, wearing goggles and face protection against the possibility of splashing blood to the eyes and mucous membranes, wearing masks, changing gloves / aprons during surgery if there are visible contaminations or damage, ensuring that surgical sets are opened just before use, controlling the indicators of the sets that come from the sterilization unit, their performing flash sterilization administrations, keeping the traffic, temperature, ventilation and humidity of the operating room under control were questioned. A 5 point likert-type scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always) was used for the answers of the questions. In converting the score into a system of 100 the scores were calculated as; 1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100. The Cronbach alpha internal consistency coefficient of the form was calculated as 0.765. In order to carry out the research, approval of the Scientific Research and Publication Ethics Committee of the related university, application permission from the institution where the research will be conducted and informed consent forms were obtained from the nurses participating in the research.

Statistical Analyzes: Statistical Package for Social Science (SPSS) package software was used. The research population consisted of 288 nurses working in surgical clinics and operating rooms of a university hospital. The research sample included 199 nurses who were working in surgical clinics and operating theaters, volunteered to participate in the research and met the limitations of the study, and 69.0% of the populations were reached. The reliability of the questionnaires was checked with Cronbach alpha coefficients. The normal distribution assumption of knowledge and practice scores was tested by Kolmogorov Smirnov and Shapiro-Wilk tests. As the knowledge and practice scores were not normally distributed, these scores were evaluated using non-parametric tests (Mann Whitney U). When the p value, which is the significance value of all tests, was less than 0.05, it was evaluated as statistically significant.

Results

The age average of the nurses participated in the study was calculated as 35.2 ± 6.2 years. The 97.5% of the nurses participating in the study were women and 89.4% had bachelor's degree. When the term of employment of the nurses in their current units was analyzed, it was found that 36.2% worked between 13-60 months and 30.7% worked over 120 months (Table 1).

The 30.7% of the nurses participated in the study worked in the operating room and 69.3% worked in the clinic. It was found that 58.3% of the nurses participated in the research received training on nosocomial infections in the last two years and 48.7% received training on surgical site infections in the last two years. It was determined that 17.6% of the nurses participated in the research received the training on nosocomial infections during their undergraduate education and 62.3% of them received it during an in-service training program. It was determined that 18.3% of the nurses participated in the research received their training on surgical site infections during their undergraduate education and 65.0% of them received it during an in-service training program.

The average score of the nurses participated in the research was found out to be 40 ± 12.45 and the lowest score was 20 and the highest score was 70, according to their answers to the information questions. The average score of the practice statements answered by the clinical nurses participated in the research was found out to be 65.16 ± 6.11 and the lowest score was 42 and the highest score was 75. The average score of the practice statements were answered by the operating room nurses participated in the research was found out to be 64.09 ± 6.93 , and the lowest score was 50 and the highest score was 75 (Table 2). It was found that 35.7% of the nurses' knowledge status was "weak", 62.3% was "moderate" and 2.0% was "good" (Table 3).

It was found that there was no statistically significant relationship between the SSI training status and the knowledge scores of the nurses who participated in the research ($p > 0.05$). It was found that there was no statistically significant relationship between the SSI training status of clinical nurses and their practice scores ($p > 0.05$). It was found that there was a statistically significant relationship between the SSI training status and practice scores of operating room nurses participated in the study ($p < 0.05$) (Table 4).

Table 1. The distribution of Sociodemographic and Professional Life Characteristics of Nurses

Sociodemographic Characteristics		Number	Percentage
Age	25 and below	8	4.1
	26-30	43	21.6
	31-35	55	27.6
	36-40	58	29.1
	41 and above	35	17.6
Gender	Male	5	2.5
	Female	194	97.5
Graduation status	High school-Associate degree	4	2.0
	Bachelor's degree	178	89.4
	Master's degree-PhD	17	8.6
Term of employment in the current unit	6 -12 months	19	9.5
	13-60 months	72	36.2
	61-120 months	47	23.6
	Above 120 months	61	30.7
Total		199	100.0

Table 2. Distribution of Average Knowledge and Practice Scores of Surgical Site Infections of Nurses

Measurements	Number	The Lowest Score	The Highest Score	Average Score	SD	Median	Range
Knowledge Scores of Nurses	199	20	70	40	12.45	40.0	50.0
Practice Scores of Clinical Nurses	138	42	75	65.16	6.114	66.0	33.0
Practice Scores of Operating Room Nurses	61	50	75	64.09	6.932	65.0	25.0

Table 3. Distribution of Knowledge Scores of Nurses on Surgical Site Infections

Knowledge Score	Number	Percentage
Weak	71	35.7
Moderate	124	62.3
Good	4	2.0
Total	199	100.0

Table 4. The Effect of Training Status of Nurses on Surgical Site Infection on their Knowledge and Administrations

Measurements	Training Status	n	$\bar{x} \pm SD$	Test	p
Knowledge Score of Nurses	Received	116	41.64 $\pm$ 12.44	Z=-1.899	0.058
	Not received	83	37.83 $\pm$ 12.20		
Practice Scores of Clinical Nurses	Received	84	65.71 $\pm$ 6.47	Z=-1.825	0.068
	Not received	54	64.30 $\pm$ 5.46		
Practice Scores of Operational Room Nurses	Received	32	66.0 $\pm$ 6.22	Z=-2.193	0.028*
	Not received	29	62.0 $\pm$ 7.18		

*: p<0.05 significant

Discussion

Although there have been improvements in asepsis and antisepsis administrations, sterilization methods, operating room ventilation, surgical techniques and appropriate antibiotic prophylaxis, SSI is still an important problem in surgery. This situation leads to more postoperative antibiotic use, prolonged length of hospital stay and increased treatment costs. When the risk factors of SSI are examined, it is stated in the literature that more than half of it can be prevented. It is important that nurses make accurate and rapid decisions to prevent infections and know evidence-based recommendations to ensure quality nursing care.

It was seen that 58.3% of the nurses participated in the research received training on nosocomial infections in the last two years and 51.3% did not receive any trainings on surgical site infections in the last two years. When the literature is reviewed, the ratio of those who received training on nosocomial infections varies between 64.0-95.3% (2,10,11). Although there are many studies in the literature defining the status of nurses receiving in-service training related to NI, the rates vary in all studies. Among the reasons of this variability are the educational policies of the institutions, the number of patients per nurse / workload, the volunteering of nurses / encouraging participation in training and etc. When the information sources of the nurses included in the research were analyzed, it was found out that there were mostly in-service trainings. It shows that in-service training has an important place in updating information on behalf of nursing care. Although the source of information is secondly during undergraduate, graduate and PhD education, the rate is lower. As it is known that most of the nurses participated in the research had bachelor's degree, this ratio suggests that the undergraduate curricula should give more importance to NI and SSI issues. 98% of the nurses included in the research gave the "correct" respond to the statement about SSI results.

The post-operational infection extends the hospital stay for 5-20 days (8,12,13) reported that SSI increased hospital costs by 0.5% on average for all patients (13). SSI has been reported to increase mortality twice, to 60% prolong the length of hospitalization in intensive care units and to increase the readmissions to the hospital by 5 times, resulting in economic loss (14,15). When the relationship between the knowledge score and graduation status of the nurses is analyzed, according to the result of Kruskal Wallis test, there was no statistically significant difference between knowledge score and graduation status. It is similar in literature. Graduation status and knowledge score could not be associated significantly (3,16,17,18). When the relationship between term of employment and knowledge score of the nurses was examined, no statistically significant relationship was found between the two. In support of our study, Mankan and Kaşıkçı (2015) and Tank (2016) reported in their studies that there was no significant difference between term of employment of the nurses and their knowledge level in preventing infections (2,19). Contrary to our study, in Naharcı's (2006) research which was conducted with intensive care nurses, when the duration of professional experience and the number of correct questions answered by nurses are compared; as the duration of professional experience increased, the number of correct answers increased (20). It was found that nurses who were trained on SSI had higher knowledge score. In the studies comparing the training status and knowledge level in literature, different results have been obtained. This is thought to be due to factors such as sample size, duration of training received and its effectiveness. When the relationship between SSI training status and practice score of operating room nurses was examined, it was found that there was a statistically significant relationship. In a research conducted by Hasanoğlu on the SSI knowledge level of nurses working in the surgical ward, as a result of the Mann Whitney-U test which was applied in order to determine whether the average scores show a significant

difference according to the variable whether they received training related to surgical site infections or not, the difference between the group averages was found to be statistically significant (21).

Conclusion

The results of the research show that the knowledge and practice scores of nurses who received SSI training were higher. It was determined that the practice score of the operating room nurses who got trained about SSI was significantly higher.

According to the results of the research, it is recommended for the consciousness it will create in nurses in preventing SSI more effectively that, to include more SSI related subjects in undergraduate and graduate education programs, to present in-service training programs related to SSI to healthcare workers in line with current guidelines, to emphasize the importance of sharing the results of surveillance performed in hospital with all nurses responsible for the care of surgical patient, to share the result of the study with the related institution and to organize the in-service training program, since this study, which is carried out as a master thesis, is limited in terms of the number of volunteers and the place of study, to recommend that similar studies should be conducted in broader time periods and with increased number of people.

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Evaluation of risk factors predicting surgical treatment in tuboovarian abscess cases

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Abstract

Objective: The main outcome measure of the present study was to find out the predictive factors affecting the need for surgery in patients diagnosed with tuboovarian abscess (TOA). We also examined the success of different medical treatment regimens in those patients.

Material and Methods: This was a retrospective clinical study performed on 96 TOA patients who were treated in the current hospital between August 2015 and August 2019. All patients underwent physical examination and ultrasonographic imaging with some laboratory tests to investigate the presence of TOA. Two different medical treatment regimens were administered as recommended by the international guidelines after the initial diagnoses. Patients with worsening clinical and/or laboratory findings and/or who did not respond to medical treatment were taken to surgery. Predictive factors for surgical intervention and success rates of medical treatment regimens were evaluated.

Results: White blood cell (WBC) levels ≥ 16000 and abscess size ≥ 7 cm was strongly correlated with the requirement for surgery. The 94 patients received the Regimen 1. Six patients underwent surgery urgently when they were under medical treatment. Regimen 1 failed in 21 (22.34 %) patients out of 94, Regimen 2 was shifted to. Six patients (28.5%) out of 21 underwent surgery because of treatment failure with Regimen 2. Recovery was achieved in the remaining 15 (71.4%) patients.

Conclusion: The success of medical TOA treatment was found to be high. Therefore, medical treatment can be applied first, except in case of acute abdomen. It was found that WBC and abscess diameter in patients with TOA in admission were the most important factors affecting the need for surgery. The factors affecting the duration of medical treatment were found to be age, WBC count, CRP (C-Reactive Protein), ESR (Erythrocyte Sedimentation Rate) and NLR (Neutrophil/Lymphocyte Ratio) levels.

Key words: Tuboovarian Abscess, Medical Treatment, Surgical Approach

Introduction

In patients staying in clinics with pelvic inflammatory disease (PID), prevalence of tuboovarian abscess (TOA), which is among the most serious complications of PID, is reported as 10-30% (1, 2). Actual prevalence of PID can be difficult because of the ambiguity in the diagnosis of subclinical PID, which is one of the types of PID together with acute and subacute PID. Early start of sexual life, multiple sexual partners, not using barrier contraceptive and chlamydia or gonorrhea infections are among factors affecting the occurrence of PID (3).

The risk factors related to TOA resemble the risk factors of PID. Past PID in personal history is also a significant risk factor for TOA (4). Pelvic inflammatory disease will have long term complications including chronic abdominal pain,

ectopic pregnancy and infertility in almost 25% of women because of delayed medical therapy because of varying clinical features and lack of specific laboratory tests (5).

Polymicrobial anaerobic and aerobic bacterial infections result in PID and TOA. Although *Neisseria gonorrhoeae* and *Chlamydia trachomatis* rarely grow in cultures in PID and TOA, they are the suspected facilitators (6, 7). *Escherichia coli* and *Bacteroides* species are the most commonly isolated organisms in TOA (8). TOA optimal approach is still controversial. In the treatment, oral antibiotics follow the classical intravenous antibiotic therapy. Surgery such as laparoscopy or laparotomy with drainage of the abscess, unilateral or bilateral adnexectomy, or hysterectomy will be required in case of failing medical



treatment. Drainage with the guidance of imaging techniques or needle aspiration of the abscess is another approach for TOA treatment, and is combined with antibiotics(9). Center for Disease Control and Prevention recommends empiric broad-spectrum antibiotics for the medical therapy of TOA (10). If it is understood that antibiotic resistance is of question, surgery will be required. Our primary purpose in this study was to find out the predictive factors affecting the need for surgery and antibiotic resistance reported by the laboratory, and clinical and sonographic findings of patients diagnosed with TOA on admission. The second purpose was to investigate the success of medical treatment regimens. Thirdly, factors effective the duration of medical treatment were analyzed for medically-treated patients.

Material and Methods

This is a retrospective study conducted on 94 inpatients diagnosed with TOA in Ankara Liv Hospital, Obstetrics and Gynecology Department between August 2015 and August 2019. Approval of the ethical committee of our hospital was obtained for our study (Liv Hospital Ankara Local Ethical Committee Date: 09 August 2019 Approval Number: 2019/004-003) and Our study was conducted in accordance with the principles of the Declaration of Helsinki.

Physical examination and laboratory tests were carried out on patients with lower quadrant abdominal pain to investigate PID and TOA. At least 2 major criteria (lower abdominal quadrant tenderness, cervical motion tenderness, adnexal tenderness), and at least one minor criteria (body temperature >38.3 °C, cervicovaginal mucopurulent discharge, white blood cell (WBC) > 10 000/ml, erythrocyte sedimentation rate (ESR) > 15 mm/ hour, C-reactive protein (CRP) > 10 mg/L and cervical infection with *N. gonorrhoeae* or *C. trachomatis* (10) were required for the diagnosis of PID. An ultrasound examination was performed to diagnose TOA.

One of the two medical treatment regimens were administered as recommended by Sexually-transmitted diseases treatment guidelines, 2015 (11)

Regimen 1: Ampicillin (2 g IV every 6 hours) + Clindamycin (900 mg IV every 8 hours) + Gentamicin (2 mg/kg loading dose then 1.5 mg/kg every 8 hours IV or IM)

Regimen 2: Levofloxacin (500 mg IV once daily) + Metronidazole (500 mg IV every 8 hours)

Initial therapy with Regimen 1 was administered for ten days. Upon observation of improvement in clinical and laboratory findings, the patient was discharged with the recommendation of Metronidazole (500 mg orally twice daily) + Doxycycline (100 mg orally twice daily) for 14 days.

In cases where Regimen I was not successful within 48-72 hours, Regimen 2 was administered for ten days more. In resistant cases (no improvement within 48 to 72 hours with Regimen 2) patients were taken to surgery. Patients with worsening clinical and/or laboratory findings during

treatment with Regimen 1 or 2 were taken to emergency surgery.

Surgery options included unilateral salpingo-oophorectomy or total abdominal hysterectomy and bilateral salpingo-oophorectomy.

Patients of the study group were divided into two groups:

Group 1: Patients who responded well to medical treatment.

Group 2: Patients who did not respond to medical treatment and needed surgical treatment.

In this study, clinical, laboratory and sonographic parameters were taken into consideration as the predictive values for the success of medical treatment in Group 1 and requirement for surgery in Group 2 in the first place. Secondly, success of the medical treatment regimens was also evaluated. Patients of the Group 2 responding well to medical treatment were evaluated for the factors affecting the duration of medical therapy.

Statistical Analyzes: SPSS 18.0 was used for the statistical analysis. Kolmogorov–Smirnov test was used to determine if distribution of continuous variables was normal. Independent sample t-test was used for normally-distributed variables, and the Mann–Whitney U test was used for abnormally distributed variables. Relative risks (RRs) with 95% confidence intervals (CIs) were calculated. Level of statistical significance was accepted as the value of $p < 0.05$. A receiver operating characteristic was used to evaluate cut-off, positive predictive values, and negative predictive values.

Results

Ninety-four patients in total were hospitalized with the diagnosis of TOA. The all patients firstly received the Regimen 1. Six (6.38%) of these 94 patients were found to have acute abdominal findings, and were taken to emergency surgery while taking Regimen 1. Recovery was achieved with Regimen 1 in 67 (71.2 %) patients out of 94 patients. Regimen 1 failed in 21 (22.3%) patients and Regimen 2 was shifted to. Six patients (28.5%) out of 21 underwent surgery because of treatment failure with Regimen 2. Recovery was achieved in the remaining 15 (71.4%) patients. Number of patients who underwent surgery was 12 in total. 8 underwent unilateral salpingo-oophorectomy and 4 underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy (Figure 1).

The overall total success rate of the medical treatment was found as 87.2% (82/94) with 71.2% (67/94) and 71.4% (15/21) success rates for Regimens 1 and 2, respectively. The average age, smoking, previous surgery in history, length of hospital stay and failure of Regimen 1 were similar in Groups 1 and 2.

The mean gravida number in both groups were 2.8 ± 1.7 and 3.5 ± 3.1 , respectively ($p = 0.04$), while the same for parity were 2.6 ± 1.2 and 3.6 ± 2.3 , respectively ($p = 0.003$). Venereal disease in history was positive in 40.4% and 75%, in Groups 1 and 2, respectively ($p = 0.003$). The IUD usage of

the groups was determined as 76.1% and 83.3%, respectively ($p=0.009$). The mean abscess diameter measured in groups 1 and 2 was 4.7 ± 0.9 and 6.9 ± 1.2 cm, respectively ($p=0.000$). The mean body temperature in group 1 and 2 was 37.3 ± 0.6 °C and 38.7 ± 0.3 °C, respectively ($p=0.000$). The mean WBC count was 10.430 ± 3.290 in Group 1 and 18.260 ± 2.860 K/uL in Group 2 ($p=0.000$). The mean CRP levels in Groups 1 and 2 were 42.5 ± 39.8 and 78 ± 11.4 respectively ($p=0.001$). The ESR rate was significantly different between the two groups with 52.2 ± 9.5 in Group 1 and 82.4 ± 11.2 in Group 2 ($p=0.000$) (Table 1). Analysis of the groups' neutrophil/lymphocyte ratio (NLR) values showed that the surgical treatment group had significantly higher NLR 6.2 ± 5.3 and 9.4 ± 5.1 , respectively ($p=0.001$). As regards the factors affecting the duration of medical treatment, body temperature, previous pelvic surgery,

smoking, parity and venereal diseases were similar among patients with periods of medical treatment exceeding 10 days and among patients with periods of medical treatment equal to or less than 10 days (both groups were treated medically) (Table 2). Also, longer duration of medical treatment was correlated with average age, average dimension of the abscess, medical drug exchange, gravidity, high leukocyte values, CRP levels, high NLR, ESR rate and intrauterine device (IUD) ($p=0.001$, 0.04, 0.000, 0.005, 0.000, 0.000, 0.001 and 0.01, respectively) (Table 2). Parameters predicting the requirement for surgery were also evaluated. WBC levels ≥ 16.000 and abscess size ≥ 7 cm was strongly correlated with the requirement for surgery (PPV 92.6% and 98.1 % respectively). The positive predictive value of Age >36 was 71.7%, the same for body temperature $\geq 38.5^\circ\text{C}$ was 78.1%, for NLR >6 it was 73.4% (Table 3).

Table1: Comparison of medical treatment and surgical treatment in patients diagnosed with TOA

	Medical treatment (Grup 1, n= 84)	Surgical treatment (Grup 2, n= 12)	p value
Age	33.5 $\pm$ 9.6	37.1 $\pm$ 4.2	0.09
Gravidity	2.8 $\pm$ 1.7	3.5 $\pm$ 3.1	0.04
Parity	2.6 $\pm$ 1.2	3.6 $\pm$ 2.3	0.003
Smoking	41 (48.8%)	7 (58.3%)	0.1
Previous Pelvic Surgery	22 (26.1%)	4(33.3%)	0.09
Previous Sexually Transmitted Diseases	34 (40.4%)	9 (75%)	0.003
IUD	64 (76.1%)	10 (83.3%)	0.009
Duration Of Hospitalization	8.8 $\pm$ 2.5	11.4 $\pm$ 1.2	0.08
Abscess Diameter (cm)	4.7 $\pm$ 0.9	6.9 $\pm$ 1.2	0.000
Body Temperature (°C)	37.3 $\pm$ 0.6	38.7 $\pm$ 0.3	0.000
WBC	10.430 $\pm$ 3.290	18.280 $\pm$ 2.860	0.000
CRP	42.5 $\pm$ 39.8	78 $\pm$ 11.4	0.001
ESR	52.2 $\pm$ 9.5	82.4 $\pm$ 11.2	0.000
NLR	6.2 $\pm$ 5.3	9.4 $\pm$ 5.1	0.001

Abbreviations: IUD: Intrauterine Device, WBC: White Blood Cell (K/uL), CRP: C-Reactive Protein (mg/L), ESR: Erythrocyte Sedimentation Rate (mm/h), NLR: Neutrophil/Lymphocyte Ratio. Independent sample t test and χ^2 was used for normally distributed variables and the Mann-Whitney U test for abnormally distributed variables. Values are given as mean $\pm$ SD or number (percentage). $p<0.05$ was considered statistically significant

Table 2: Comparison of patients diagnosed with TOA on admission whose medical treatment lasted >10 days or ≤ 10 days

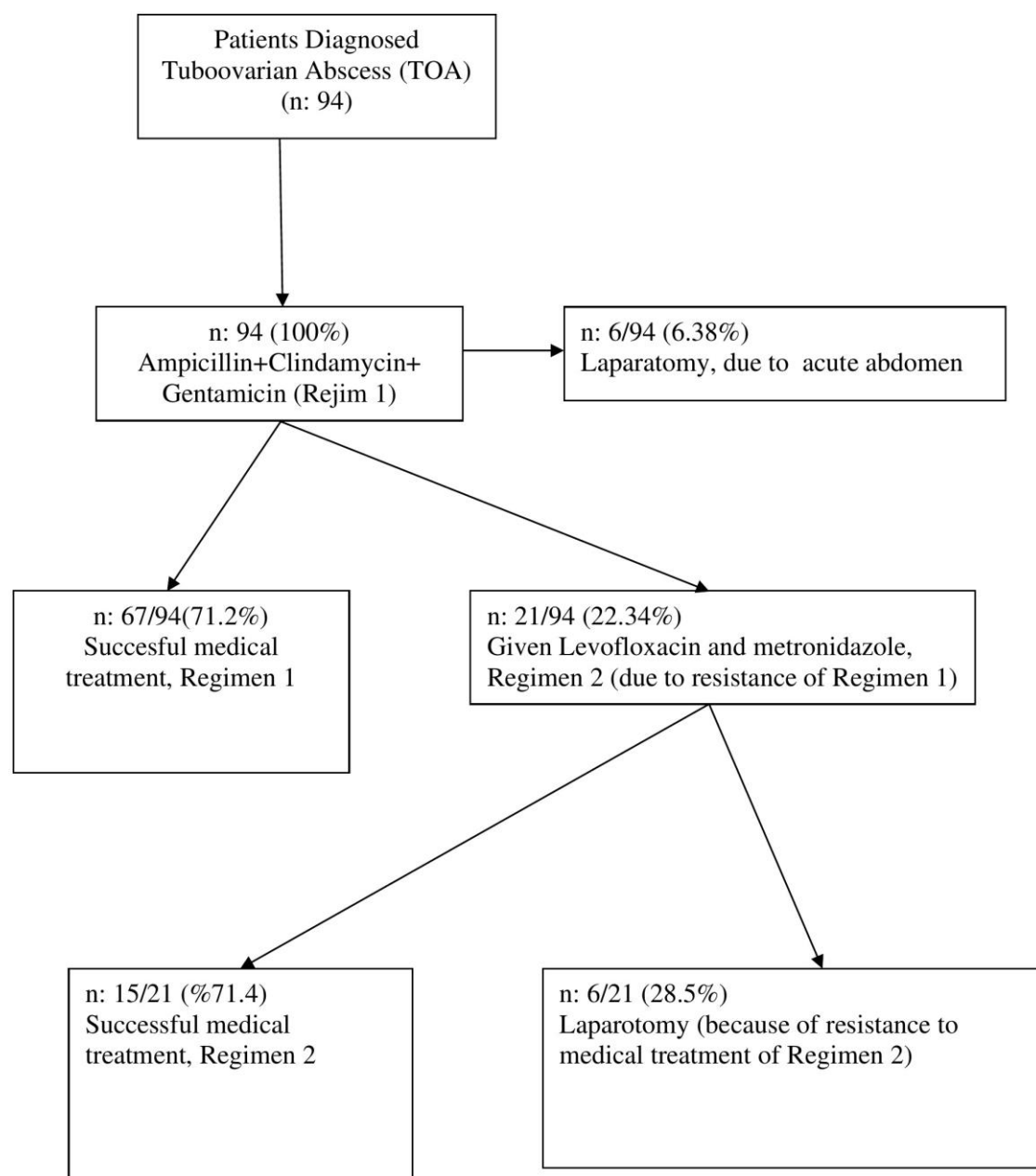
	Duration of treatment ≤ 10 days (n:73)	Duration of treatment > 10 days(n= 19)	p value
Age	34.8 $\pm$ 5.7	38 $\pm$ 6.4	0.001
Medical drug exchange	8 (9.8%)	13 (68.4%)	0.000
Abscess diameter (cm)	5 $\pm$ 1.1	5.4 $\pm$ 1.3	0.04
Body Temperature(°C)	37.4 $\pm$ 0.8	37.7 $\pm$ 0.9	0.3
Previous pelvic surgery	32 (31.4%)	2 (10.5%)	0.03
Previous sexually transmitted diseases	46 (45.1%)	8 (36.4%)	0.5
Smoking	48 (47.1%)	10 (52.6%)	0.5
Gravidity	2.8 $\pm$ 1.7	4 $\pm$ 1.7	0.005
Parity	2.5 $\pm$ 1.3	3.8 $\pm$ 1.9	0.007
WBC	11.190 $\pm$ 3.450	16.740 $\pm$ 2.460	0.000
CRP	51.1 $\pm$ 28.6	79.5 $\pm$ 13.1	0.000
ESR	58.3 $\pm$ 21.8	71.3 $\pm$ 20.1	0.01
NLR	6.1 $\pm$ 4.7	9.6 $\pm$ 8.1	0.001
IUD	53(72.6%)	21 (100%)	0.001

Abbreviations: WBC: White Blood Cell (K/uL), CRP: C-Reactive Protein (mg/L), ESR: Erythrocyte Sedimentation Rate (mm/h), NLR: Neutrophil/Lymphocyte Ratio, IUD: Intrauterine Device. Independent sample t test and χ^2 was used for normally distributed variables and the Mann-Whitney U test for abnormally distributed variables. $p<0.05$ was considered statistically significant

Table 3: The predictive values of surgery requirement in patients diagnosed with TOA on admission

	Sensitivity %	Specificity %	PPV %	NPV %	P value	Relative risk (95% CI)
Abscess diameter ≥ 7 cm	66.5	98.1	83.6	92.7	0.000	10.6 (2.4-52.6)
WBC count $> 16 \times 10^3$	87.6	92.6	76.5	97.4	0.000	7.54 (4.9-14.2)
Age >36	44.4	71.7	26.6	88.3	0.001	1.5 (0.8-2.8)
NLR >6	71.7	73.4	66.6	87.3	0.001	3.2 (1.8-4.9)
Body Temperature ≥ 38.5 °C	88.7	78.1	48	96.8	0.000	2.8 (1.6-5.2)

Abbreviations: WBC: White Blood Cell (K/uL), NLR: Neutrophil/Lymphocyte Ratio. Relative risks (RRs) with 95% confidence intervals (CIs) were calculated. Level of statistical significance was accepted as the value of $p < 0.05$. A receiver operating characteristic was used to evaluate cut-off, positive predictive values, and negative predictive values.

**Figure 1:** Flow of patients with treatment of Tuboovarian Abscess (TOA)

Discussion

TOA treatment with antibiotics with broad spectra is successful in 34% to 87.5% of patients (6), while 25% will be taken to surgery because of resistance(12). However, superiority of any of the antibiotics to each other have not been shown yet (13). Clindamycin and metronidazole can be preferred, because they are effective on anaerobic bacteria and penetrate will into the abscess cavity (14). In a study of 232 patients, clindamycin gentamicin was reported as successful in 68% of patients (15). In another study, clindamycin+ gentamicin combination reportedly provided cure in 47%+ of patients, while ampicillin+ clindamycin+ gentamicin combination was successful in 87.5% (16). Furthermore, Güngördük et al. found that clindamycin+ gentamicin or ceftriaxone+ metronidazole was successful in 74.3% of patients (17).

In our study, we found that Ampicillin (2 g IV every 6 hours) + Clindamycin (900 mg IV every 8 hours) + Gentamicin (2 mg/kg loading dose then 1.5 mg/kg every 8 hours IV or IM) was effective in 71.2% of patients consistently with the reports in the literature.

The success rate of Levofloxacin (500 mg IV once daily) + Metronidazole (500 mg IV every 8 hours) regimens in resistant cases, was identified as 71.4%.

The overall total success rate of medical treatments was 87.2% (82/94). These results are supportive for the continuance of medical treatment till signs or symptoms makes emergency surgery necessary.

We found no studies in the literature reporting sequential administration of the two regimens that we have used in our study. Sequential administration of these two regimens can be recommended in TOA treatment.

The predictability of the necessity for surgical treatment:

Randomized controlled trials are needed to compare these two regimes. Group1 and Group 2 were found as significantly different in Gravidity, Parity, Positive Venereal Diseases in Medical History of Patients, Abscess Size, Body Temperature, WBC, CRP, NLR and ESR rate, while differences were insignificant as regards the Age, Previous Pelvic Surgery History, IUD and Duration of Hospitalization Stay (Table 1).

In a previous study, while 35% of patients with abscesses with sizes 7 and 9 cm underwent surgery, 60% of patients with abscesses $60 \geq 10$ cm underwent surgery(9).

In another study, rates of surgery in patients with abscesses with sizes ≤ 8 cm and >8 cm were 23% and 35%, respectively ($p= 0.24$)(18).

Mizushima et al. reported that abscess size alone increased the probability of surgery. They found that abscess size of > 5 cm increased the risk of surgery by 69 folds. They also found that there are no significant differences in age, gravidity, parity, body temperature, leukocyte levels and CRP levels between medical and surgical therapy groups (19). In their study, Güngördük et al, found statistically significant differences between patients treated medically or surgically as regards CRP levels, ESR, and abscess

diameter ≥ 7 cm; however, differences in WBC were not significant.

In our study, the mean abscess size was 4.7 ± 0.9 cm in the medical therapy group and 6.9 ± 1.2 cm in the surgical treatment group ($p= 0.000$). Surgery was performed in 83.6% (RR (95% CI) 10.6 (2.4-52.6)) of the patients with an abscess size of ≥ 7 cm (Table 3), indicating that abscesses larger than 7cm require surgery.

The need for surgery is frequently linked to the abscess size. In our study however, Age, WBC, Body Temperature, NLR levels were found associated with the requirement for surgery in addition to abscess size, with mean WBC level being highly significant. Surgery was required in 76.5% (RR (95% CI) 7.54 (4.9-14.2)) of the patients with ≥ 16.000 baseline leukocyte count. Based on these results, the most important factors in the patient's surgery risk were WBC level and abscess size.

Conclusion

The results of this study showed the success rate of the treatment regimen of Ampicillin (2 g IV every 6 hours) + Clindamycin (900 mg IV every 8 hours) + Gentamicin (2 mg/kg loading dose then 1.5 mg/kg every 8 hours IV or IM) to be 71.2%, the success rate of Levofloxacin (500 mg IV once daily) + Metronidazole (500 mg IV every 8 hours) regimens in resistant cases was 71.4% and the total success rate of medical treatment was 87.2%.

The most important markers in the prediction of surgical treatment were determined as WBC count and abscess diameter. If abscess diameter is ≥ 7 cm and $WBC \geq 16.000$, the risk of a need for surgical intervention is high. The most important factors in the duration of medical treatment were found to be age, WBC count, CRP and NLR levels.

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Tobacco-alcohol consumption, socio-sanitary profile and factors influencing the anthropometric and cardiorespiratory parameters of Kinshasa smokers

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Abstract

Objective: To determine the prevalence of alcoholism and the influence of the associated «tobacco-alcohol» consumption on the anthropometric and cardiorespiratory parameters of some smokers in Kinshasa.

Material and Method: Cross-sectional and prospective study, conducted in Kinshasa from January to October 2017, including 120 tobacco smokers with at least 5 years of service, with a mean age of 36 ± 9 years. The Global Tobacco Surveillance System (GTSS) Validated Adult Tobacco Surveillance Questionnaire has been adapted and used. Socio-demographic, anthropometric, cardiorespiratory parameters and behavioral of consumption were the variables of interest. At the $p \leq 0.05$ threshold, correlation and multiple linear regressions allowed for statistical inference.

Results: The sex ratio was 19/1 (M / F), 84.2% of the smokers were alcoholics. The median seniority in smoking and alcohol consumption was 8 years. The median amount of tobacco consumed was 27 pack-years; it was positively correlated with the amount of alcohol consumed, the oldest in smoking and alcoholism. The BMI of smokers was influenced by seniority in smoking and the amount of alcohol consumed ($R^2 = 0.049$, $p < 0.001$). RR rest was influenced by the amount smoked, seniority in tobacco and alcohol ($R^2 = 0.187$, $p < 0.001$). While the DBP was influenced by age, the amount of smoked tobacco, alcohol consumed as well as seniority in smoking and alcoholism ($R^2 = 0.102$, $p < 0.001$).

Conclusion: The prevalence of alcoholism is very high in Kinshasa smokers; this association "tobacco-alcohol" has an influence on their BMI, RR rest and DBP.

Key words: Body mass index, blood pressure, respiratory rate, smoking, alcoholism, Kinshasa

Introduction

Tobacco kills, it currently causes more than six million deaths each year and will probably cause more than eight million by 2030 (1-3). Since the 16th century, tobacco was described as a grass huge therapeutic virtue by Jean Nicot and was long used to treat nausea, migraine, wounds, the art sores and rheumatism (4). Today, apart from the mortality attributed to it, tobacco consumption is also implicated in comorbidities and the severity of diseases in adults (1, 5, 6).

Regardless of the mode of consumption (chewed, snorted, smoked, hookah, etc.) (7, 8), the consequences of tobacco consumption are the same (1, 9, 10) and are directly proportional to the consumption, number of years of smoking, and sedentary lifestyle (1, 6, 11-13). Since tobacco is a risk factor for many chronic diseases, its pejorative effects on the respiratory, cardiovascular and metabolic systems are demonstrated (1,5,6). Although the biochemical mechanism of its deleterious effects is not always well understood (5, 6,11,12);

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Physiologically, tobacco alters blood lipids, increases heart rate and blood pressure, decreases weight and body mass index (8,12,14,15). In addition, smoking is found to be associated with higher alcohol consumption (16), and despite lower purchasing power, this association " tobacco-alcohol " is mainly observed among youth, workers s e qualified and unemployed (2,3,17-20).

In the world, it is now estimated that 49% of under-qualified workers are regular smokers, the majority of tobacco users live in low-income countries whose populations pay the highest price for tobacco misdeeds (1.3%). Tobacco use is struggling to decline in European countries where 28% of the population is still smokers (21). In Africa, where 25% of the population smoke (2,21), this prevalence varies widely depending on the population's purchasing power (22). In the countries south of the Sahara, 5 to 47% of the population smoke (23).

In the Democratic Republic of Congo (DRC), there is less than 20% of smokers, this prevalence varies according to sex, age and environment : 10 to 26% of men and less than 10% of women ; 29% of 12- to 16-year-old schoolchildren in Kinshasa (2).

In the DRC, moreover, studies on tobacco are rare, there is no data neither on the consumption behavior «tobacco-alcohol»; nor on the amount of tobacco consumed and their influence on physiological parameters (2,22). The majority of the studies conducted in Congo or Kinshasa smokers being essentially epidemiological and clinical (24-28), they do not provide sufficient information on the interrelation of consumption "alcohol-tobacco", neither on the general characteristics, weight and changes in the cardiovascular and respiratory parameters of smokers, and even less on their determinants.

This study aims to describe the general characteristics of Kinshasa smokers, their smoking behavior in association with alcohol consumption, in order to find their influences on anthropometric, cardiovascular and respiratory parameters. Observations made may direct medical attitudes to smokers in Congolese or even African clinical settings and, where appropriate, motivate smoker surveillance strategies.

Material and Methods

This transversal and prospective study took place in the city of Kinshasa, Democratic Republic of Congo, from January to October 2017. This study was accepted by the ethics committee of the Faculty of Medicine of the University of Kinshasa. Verbal consent to participate in the study was obtained.

Population and sampling: Our study population consists of active tobacco smokers and alcohol consumers living in the 4 districts of the city of Kinshasa. Recruitment was conducted randomly, with 200 active smokers at 50 per district enrolled. The inclusion criteria hereafter allowed to consider 120 active smokers:

- Voluntary membership in the study ;
- Be at least 18 years old and reside in the city of Kinshasa ;

- Being an active tobacco smoker for at least 5 years, not practicing a risky activity on the respiratory system.
- Not having any illness in the last trimester before the study ;
- Do not have a personal history of chronic disease or diagnosed and known cardiovascular disease.
- Do not have a physical disability.

Each participant was randomly selected to obtain a homogeneous distribution among the four districts of the city of Kinshasa.

Methodology

A data collection form was developed and adapted e from Tobacco Surveillance adult questionnaire Global Tobacco Surveillance System (GTSS) (1). This fact sheet asked the following information:

- Sex, age (in years), weight (kg) and height (cm).
- The municipality and the district of residence,
- The profession, the practice of sport and the consumption of alcoholic beverages.
- Tobacco consumption.
- Heart rate, resting respiratory rate, systolic and diastolic blood pressure.

The occupation was defined as the gainful occupation or job held by the smoker at least 20 hours per week for at least 6 months. Different socio-professional categories were listed: the unemployed (not working for 6 months); senior managers (clerical employees with a higher level of education); students ; technicians (worker or self-employed) ; sellers and traders ; low-level employees (supervisors, cleaners, cooks, carriers and security guards). The practice of physical activity and sport was defined as a physical activity (PA) or sports for fun or competition (including walking) for at least 60 minutes, once a week for at least six months. Alcohol consumption was described as the average weekly consumption of 5 bottles of beer, with or without wine or whiskey. The number of bottles consumed per week and the seniority (number of years) of consumption were considered. Tobacco consumption resumed the number of years of use, the amount consumed: the number of cigarettes smoked per day (c/d) and converted in pack-years (PY). The resting respiratory rate (RR) was taken at least three times in a subject sitting at rest for at least 5 minutes; it was not stated to the subject that the measurement of his respiratory rate was performed at this time. Three measurements of heart rate (HR) and systolic and diastolic blood pressures (SBP and DBP) (using a branded device OMRON®, model HEM-741CRELN2 (HEM-8705-WM) ReliOn) were obtained in a sitting position, at rest for at least 5 minutes, with an interval of 5 minutes between each measurement. The lowest value of each value was selected.

The existence of a history of respiratory disease was based on a diagnosed respiratory disease that required medical follow-up for more than one week, either on an outpatient basis or in hospital since the onset of smoking. Finally, the reported subjective evolution of weight (weight loss or weight gain) since the beginning of smoking was noted.

Statistical analysis: The statistical analysis was performed using IBM SPSS version 20.0 software. Qualitative data is presented in terms of frequency and percentage. After verifying the normality of the data, the results are presented either by the mean $\pm$ standard deviation (for age), or by the median (quartile interval: QI 25-75) for the other parameters. Simple correlations are indicated by a Spearman (r) correlation coefficient and (R²) determination and the factors influencing the anthropometry and physiology of Kinshasa smokers were studied by multiple linear regressions. Significant statistical relationships were considered at the CI $\leq$ 95 confidence interval ($p < 0.05$).

Ethical considerations: The data was collected, recorded, analyzed and interpreted in accordance with the Helsinki declaration on human manipulation of the World Medical Association (WMA). No incident related to the study was observed.

Results

General Characteristics of Kinshasa smokers

Of the 120 smokers studied, 95% were male, with a sex ratio of 1 woman to 19 men. The average age was 36 ± 9 years, range: [18-65 years]. Three-quarters of smokers (74.1%) were under 40 years of age, of which 30-39 years had the highest number of smokers (45.8%). Half of the smokers did not work (50%) and almost a quarter (23.3%) was students. With respect to their antecedents and habitus, 97.5% of smokers were sedentary (did not engage in physical activity or sports); 84.2% regularly consumed alcohol. However, only 2.5% of smokers reported having ever had a diagnosed respiratory illness, while almost half (48.3%) of smokers surveyed reported a significant decrease in body weight a few years after they started smoking (Table 1).

Quantity of tobacco and alcohol consumed by Kinshasa smokers

Table 2 shows that the median amount of smoked tobacco was 27 (QI 25-75: 1-53) pack-year, extreme: 7.2-144 pack-years. Half of smokers surveyed consume since 8 (QI: 1-17) years with a maximum of 40 years. Alcoholic smokers consumed alcohol for a median of 8 (QI: 0-16 years), the median of bottles consumed was 12 (QI: 3-21) per week.

The anthropometric and cardiopulmonary parameters of smokers in Kinshasa

Anthropometrically, Table 2 shows that half of smokers weighed less than 65 kg. The median BMI of smokers was 23 (QI: 20-26) Kg/m², 14% of smokers were lean and 62% had BMI in standards (Table 3). In terms of cardiorespiratory fitness, these smokers had a median resting FR of 24 (QI: 22-26) cycles per minute (cpm), of which 88% were in tachypnea at rest (RR $>$ 20 cpm); median HR of 80 (QI : 66-94) beats per minute (bpm) including 25% of tachycardia (HR $>$ 90bpm). The median was 110 SBP (QI: 90-130) mm Hg, 10% hypertensive, the elevated systolic (SBP $\geq$ 140mmHg), while the median was 90 DBP (QI: 70-110) mm Hg, 59% were high diastolic hypertension (DBP $>$ 90mmHg) (Tables 2 and 3).

Table 1: Profile by gender, age, physical activity, smoking habits and history of cardio-respiratory diseases

Characteristics	N = 120 (%)
Sex	
Male	114 (95)
Female	6 (5)
Age groups (years)	
18-29	34 (28.3)
30-39	55 (45.8)
40-49	18 (15)
50-59	9 (7.5)
≥ 60	4 (3.4)
Profession	
Without jobs	60 (50.0)
Senior executives	12 (10.0)
Students	28 (23.3)
Technicians	10 (8.3)
Sellers / traders	7 (5.8)
Low-level employees	3 (2.5)
Physical activity and sport	
Practice PAS	3 (2.5)
Do not practice PAS	117 (97.5)
Alcohol consumption	
Yes	101 (84.2)
No	19 (15.8)
ATCD of respiratory disease	
Yes	3 (2.5)
No	117 (97.5)
Observation of slimming	
Slimming observes	58 (48.3)
No slimming observes	62 (51.7)

Relation smoking and alcoholism

We found in this study, a positive correlation between the age of smoking and the amount of smoked tobacco (PY) $r = 0.524$ ($p < 0.001$). Regarding the alcoholism of these smokers, a positive correlation was also found between the amount of smoked tobacco (PY) and the number of weekly bottles of beer consumed $r = 0.419$ ($p < 0.001$), but also with the age of the smoker. Alcohol consumption $r = 0.488$ ($p < 0.001$). In addition, seniority in smoking was strongly correlated with that in alcoholism $r = 0.64$, ($p < 0.001$) (Table 4).

Factors Influencing IMC, DBP and RR

Table 5 shows that the body mass index was inversely influenced by the weekly amount of alcohol consumed ($p < 0.001$) and the age of tobacco consumption ($p < 0.003$). The diastolic blood pressure was positively influenced by age ($p < 0.001$), the amount of smoked tobacco ($p < 0.001$), the quantity of alcohol bottles consumed weekly ($p < 0.001$) and the age of consumption of tobacco ($p = 0.008$). It was negatively influenced by the age of alcohol consumption ($p < 0.001$) (Table 5). The frequency of rest was positively influenced by the age of alcohol consumption ($p < 0.001$), the amount of tobacco consumed ($p < 0.001$) and the age of smoking ($p < 0.001$) (Table 5).

Table 2: Description of smoking habits, alcoholics and anthropometric and haemodynamic parameters of Kinshasa smokers

Settings	N	Minimum - Maximum	Mean $\pm$ Standard deviation
Age	120	18-65	36 $\pm$ 9
Tobacco and alcohol			Median (IQ: 25-75)
Tobacco (stems / days)	120	2-40	12 (1-25)
Tobacco (packs-year)	120	7.2-144	27 (1-53)
Smoking seniority	120	5-40	8 (1-17)
Alcohol (bottles / week)	101	1-21	12 (3-21)
Alcoholism seniority	101	5-32	8 (0-16)
Anthropometric and cardio-respiratory parameters			
Weight	120	39-85	65 (56-74)
Height	120	100-192	168 (155-181)
BMI	120	16-29	23 (20-26)
RR	120	12-28	24 (22-26)
HR	120	65-105	80 (66-94)
SBP	120	90-160	110 (90-130)
DBP	120	60-130	90 (70-110)

BMI : Body mass index ; HR : Heart rate ; FR : Resting respiratory rate ; PAD : diastolic blood pressure ; SBP : systolic blood pressure.

Table 3: Categorization of Anthropometric and Hemodynamic Parameters of Tobacco Smokers in Kinshasa

Settings	N = 120 (%)
Weight	
≤ 59 Kg	21 (18)
60-79 Kg	92 (77)
≥ 80 Kg	7 (6)
BMI	
< 18.5 Kg / m ²	17 (14)
18.5-24.9 Kg / m ²	75 (62)
≥ 25 Kg / m ²	28 (23)
RR	
≤ 19 cpm	14 (12)
≥ 20 cpm	106 (88)
HR	
≤ 89 bpm	90 (75)
≥ 90 bpm	30 (25)
SBP	
≤ 139 mm Hg	108 (90)
≥ 140 mm Hg	12 (10)
DBP	
≤ 89 mm Hg	49 (41)
≥ 90 mm Hg	71 (59)

cpm : cycles per minute ; bpm : beats per minute.

Table 4: Correlation of substances usually consumed.

Correlation	R	p <
Tobacco (PY) / Alcohol (bottles / week)	0419	0.001 *
Tobacco (PY) / Alcohol seniority	0488	0.001 *
Tobacco (PY) / Tobacco seniority	0524	0.001 *
Tobacco seniority / Alcohol seniority	0641	0.001 *

* significant p; PY: pack-years

Table 5: The influencing factors anthropometric and cardiorespiratory parameters of smoking Kinshasa

Regression equation	validity of the regression model					
	coefficient	P	r	R ²	F	p value
Body mass index						
Constant	24252	0.001 *				
Age	0098	0.455				
Alcohol (bottles / week)	-0074	0.001 *	0208	0049	9544	0.000 ^a
Alcohol seniority	-0.01	0.636				
Tobacco (PY)	-0015	0.238				
Age of smoking	-0057	0.003 *				
Diastolic Blood Pressure						
Constant	76584	0.001 *				
Age	2.484	0.001 *				
Alcohol (bottles / week)	2878	0.001 *	0319	0102	23877	0.000 ^a
Alcohol seniority	3499	0.001 *				
Tobacco (PY)	2259	0.001 *				
Age of smoking	1886	0.008 *				
Respiratory rate rest						
Constant	20366	0.001 *				
Age	-0181	0.104				
Alcohol (bottles / week)	-0033	0.061	0433	0187	48.53	0.000 ^a
Alcohol seniority	0134	0.001 *				
Tobacco (PY)	0083	0.001 *				
Age of smoking	0054	0.001 *				

* significant p; ^a valid regression model; PY: pack-years

Discussion

The characteristics of smokers: Our study conducted on some active smokers in Kinshasa, aimed to determine the general characteristics of Kinshasa smokers, the prevalence of alcohol consumption, as well as the factors influencing their anthropometry and physiological parameters. The result is a dominance of men, youth and non-workers among the smokers studied. Several African publications corroborate our findings, stating that men and young people between the ages of 20 and 35 are the most likely to smoke (2,20,23,26). Theoretically, one of the effects sought by tobacco consumption is that of reducing stress, ascribed to one of its components, nicotine; Tobacco use therefore seems to grant physical, psychological and spiritual well-being; it gives a good image of oneself (29,30). It is thus possible that men and young people, being more socially active and more exposed to stress (17,31), consume more tobacco, certainly in search of these virtues in order to alleviate the stress related to their daily life. . Studies in North America and Europe also report that these two groups are the most smoking tobacco categories (3,5,17,29,31). However, in contrast to North American and European data, where it is workers and lower-level workers who are the most likely to smoke, in Kinshasa, a significant proportion of unemployed people are reported to be smokers (2,9,32). This difference in socio-occupational status between Kinshasa smokers and those from elsewhere is certainly due to the high unemployment rate observed in the Kinshasa population, from which the sample of the study was taken (32,33).

Behavior, antecedents and factors influencing the anthropometric and cardiorespiratory parameters of Kinshasa smokers

Regarding the practice of physical activities and sports (PAS), almost all smokers in Kinshasa do not practice PAS. Several publications indicate that smoking potentiates the effects of physical activity, increases energy expenditure and has the same effects on the body (well-being) as PAS alone (12, 30). Thus, tobacco users already observing these effects would no longer feel the need to practice PAS. In addition, PAS practice reduces smoking and speeds smoking cessation; smoking is mainly linked to a sedentary lifestyle (34). It is therefore difficult to find a significant number of PAS practitioners in a population of smokers, corroborating the observation made in our series.

The median tobacco consumption was 12 stems / day (27 PY), for a maximum of 40 stems / day (144 PY). This consumption of smokers in Kinshasa is higher than that of Canadian smokers (13), but comparable to that of French and Belgian smokers (3,29,34).

Smoking more tobacco stems is not without consequences on health, the Congolese publications (24,35), American and European confirm (5,22). The authors describe the intensity of cumulative smoking as a risk factor for respiratory and cardiovascular diseases (8,15,24,34). Comparing the amount of smoked tobacco reported by these authors and that of our series, we observe that in the present study, the quantity consumed is greater than that observed in these publications; however, only 2.5% of the

smokers interviewed in our series reported having had a respiratory illness since they smoked. This can be explained by the fact that smoking-related respiratory illnesses generally occur after several decades of exposure to tobacco (23) and the median exposure to tobacco observed here is only 8 (QI : 1- 17 years. In addition, African cultural considerations would be another element of explanation. Indeed, the evocation of a disease is a taboo subject for an African; see a weakness that smokers certainly did not want to reveal. Also, medical screening at the asymptomatic stage, is not culture among Congolese (2,25). As a result, the reality of respiratory problems in the smokers studied is probably difficult to estimate.

The high prevalence (84.2%) of observed alcohol consumption is strongly related to tobacco consumption ($r = 0.4$, $p < 0.001$). The seniority of alcohol and tobacco consumption are also similar in the two groups, respectively 8 (QI: 0-16) years and 8 (QI: 1-17) years, with a strong correlation ($r = 0.6$, $p < 0.001$). Moreover, significant links were found between the amount of smoked tobacco (PY) with the alcohol bottles consumed, and with the number of years of alcoholism (respectively $r = 0.5$ and $r = 0.5$; $p < 0.001$). Several authors corroborate our observations (3,16,22,38). Molimard describes that there is a strong link between tobacco and alcohol and that cigarette consumption increases with the amount of alcoholic beverages. He further argues that it is rather alcohol dependence that leads to heavy tobacco consumption (38). The reverse has been observed among Canadian teen smokers where the majority of alcohol insiders (71%) have never tried smoking cigarettes, whereas among tobacco initiates, the majority (63%) has already consumed alcohol in their lives (39). There is also a biochemical and physiological dependence between these two products. Indeed, the biochemical actions of alcohol and tobacco all pass through the same neuroendocrine pathways. The consumption of alcohol activates the need for nicotine. It acts by attenuating the psychotropic effects of alcohol by activating dopaminergic, serotonergic, gabaergic and glutamate receptor inhibition systems (38). Thus drunkenness and euphoria seem to be reduced in the smoking drinker, motivating a consumption behavior that combines the two addictive.

Although smokers studied had a median BMI in the normal range and less than 1/6th or in leanness. Nearly half (48.3%) of them reported that they had lost weight since smoking ; corroborating the literature that reports a decrease in BMI decrease of 3 to 5 kg of weight in regular smokers (12). Nevertheless, without establishing a numerical assessment of the weight loss associated with alcohol or tobacco consumption, we found that smoking-alcohol consumption is a factor that negatively influences BMI significantly ($r^2 = 0.049$, $p < 0.001$). This is theoretically explained by the fact that nicotine acting on the same receptors as ethanol influences BMI by decreasing appetite, increasing energy expenditure and slowing down fat storage (11,38). The meta-analyses of Nanhou and Piirtola confirm, as in our series, that long-term smoking decreases BMI (14,39).

In terms of haemodynamics, Kinshasa smokers have a median DBP of hypertensives, and 59% of them have a value greater than or equal to 90 mmHg. The increase in this DBP is positively influenced by age, the amount of tobacco stem and bottles of alcohol consumed ($p < 0.001$), and the age of smoking ($p = 0.008$). This contrasts with the negative relationship between this DBP and seniority in alcoholism ($p < 0.001$). Linneberg does not associate smoking with the elevation of DBP (15). But several other authors corroborate our series, associating smoking with increased blood pressure in a way general ; in fact, the work carried out in the DRC and elsewhere report that the amount of tobacco smoke regularly (pack-years) and the tobacco seniority are factors influenced ant hypertension (6,8,13,26). In addition, there are recognized relationships between heavy alcohol consumption and increased blood pressure regardless of race (40). Thus, a positive relationship between seniority for alcoholism and cumulative blood pressure has been reported (38,40), which does not support our series. The neuroendocrine arguments underlie tobacco and alcohol acting on the same receptors of the autonomic nervous system. They each have specific effects on vascular tone, myocardial activity and the angiotensin-aldosterone system (38,40). They work by increasing blood pressure through SBP and DBP. Although the receptors seem to have more affinity with nicotine; but in the situations of combined consumption of the two drugs, one would attribute the effects on the arterial pressure to the synergistic action of the compounds of two additives (38); alcohol having the most action on the aldosterone-angiotensin system (40).

In the absence of comparison with a control, dyspnea, clinical and spirometric indicator group in these smokers, only the resting respiratory rate allowed to get an idea about the respiratory function of the studied sample. . The resting respiratory rate was high in more than 80% of smokers. We observed that it increased with the age of smoking ($p < 0.001$), the age of alcohol consumption ($p < 0.001$) and the amount of smoked tobacco ($p < 0.001$). The majority of studies conducted on smokers report that smoking and alcoholism influence respiratory symptoms and worsen respiratory disease clinics, but do not specify their influence on the resting respiratory rate (41,42). It is also known that smoking is a risk factor for respiratory diseases (5,24,28). Therefore we can understand that the resting respiratory rate which is an indicator of respiratory disease is high in our series ; and that it is influenced by the associated behavior smoking-alcoholism, both addictive having a cumulative effect on the stimulation of the autonomic nervous system, regulator of the respiratory rate (38).

Conclusion

This study on regular active smokers in Kinshasa showed that it is men, young people under 40 and the unemployed who smoke the most. These smokers have a sedentary behavior and more than 4/5ths of them consume alcohol regularly. This consumption of alcohol is strongly correlated with smoking. The quantity and duration of consumption of these two addictive substances are factors influencing their anthropometric and cardiorespiratory

parameters. Regular awareness of this group on the combined consumption dangers of these two drugs is necessary.

Limitations on the methodology: low sample size to generalize, the subjective nature of the general characteristics, clinical and history of smokers studied will certainly be a significant factor in the interpretation of this study and its generalization.

Nevertheless, the study provides global information on Kinshasa smokers, the influence of addictive smoking-alcohol consumption behavior, while allowing to project future studies taking into account the limitations of the present.

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Author's Contributions:

LVPG: field surveys, collection and analysis of data, preparation of the manuscript, **DG:** statistical analysis, manuscript revision and literature search. **KMA:** reading and revision of the manuscript. **KKL:** collection data and preparation of the manuscript. **LBF:** development of the manuscript. **MNR:** Reading and correction of the manuscript. **NBH:** reading, manuscript correction and literature search.

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Determination of the anxiety, depression and psychological resilience levels of mothers with children diagnosed with attention deficit hyperactivity disorder

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Abstract

Objective: This descriptive study was carried out for determining the anxiety, depression and psychological resilience levels of mothers with children diagnosed with Attention Deficit Hyperactivity Disorder.

Material and Method: Study population was comprised of mothers with children diagnosed with ADHD who applied to a state hospital in central Gaziantep province for outpatient treatment during April – August 2017, whereas the number of samples was determined as 54 according to power analysis. The study was carried out with 163 mothers. “Sociodemographic Questionnaire”, “Zung Self-Rating Depression Scale”, “Beck Anxiety Scale” and “Psychological Resilience Scale for Adults” were used for obtaining the required data. The data were analyzed using SPSS Windows version 24.0 software.

Results: It was determined that the depression and anxiety levels of mothers with children diagnosed with ADHD are at a low level, while their psychological resilience levels are good. A statistically significant relationship was determined between the mental health state of mothers and the adaptation of the child to the environment and Zung Self-Rating Depression Scale, Beck Anxiety Scale and Psychological Resilience Scale ($p < 0.05$).

Conclusion: It should be kept in mind that having a child diagnosed with ADHD may cause mothers to experience mental issues such as anxiety and depression while also decreasing their psychological resilience. Thus, the importance of carrying out psychological assessments not only for the child but also on the parents with emphasis on mothers should not be ignored during the treatment process.

Keywords: Attention Deficit Hyperactivity Disorder, Mother, Depression, Anxiety, Psychological Resilience, Psychiatric Nursing

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is an important public health issue since it is the most frequent psychiatric disorder during childhood. Its prevalence in the world varies between 8 % to 12 % (1,2). It is indicated that children with ADHD have a more negative relationship with their parents because they are stressful, demanding and insistent resulting in adverse impacts on familial relations as well as the mental states of parents (3). Studies carried out indicate that mothers of children with ADHD experience greater parenthood stress, have less self-confidence with more anxiety and Depression in comparison with mothers of normal children and that their problem solving skills are lower (4,5).

Whereas anxiety and depressive disorders are important psychological disorders that are frequently observed in society with severe impacts on the social and professional functions of individuals resulting in decreased quality of life (6). Studies put forth that lifetime prevalence of depression is 10-25% for females, 5-12 % for males and that females are affected twice more than males (6,7). It is also accepted when anxiety disorders are examined with regard to gender that they are twice more frequent among females than among males (7). Majority of the mothers experiencing psychological disorders in our society are diagnosed but cannot be treated. Untreated mothers may experience many different issues such as lack of the



self-confidence, negative parenthood attitudes, problematic marital relationships, loss of labor, child abuse and child neglect (8). Whereas Psychological Resilience considered as the ability of an individual to adapt to and cope with important stressors such as a personal trauma, threat, familial-relational problems, health issues and economic issues is reduced in psychological disorders such as anxiety and depression (9,10).

Treatable issues of depression and anxiety lead to loss of ability and impairments in health perception thereby reducing the quality of life (11). Early diagnosis and treatment prevents adverse impacts on child development in addition to preventing the mothers from harming themselves and others around them due to increasing depression and anxiety intensities while also strengthening their psychological resilience (8).

It is important that these mothers in the society are diagnosed early on and directed to treatment. Nurses who spend the highest amount of time with the patient, patient relatives and families, who take care of them and with whom the patient and his/her relatives can share their needs and problems as well as psychiatric nurses who have the opportunity to closely monitor and assess the families and the patients play vital roles in this process.

In this study we aimed to determine the anxiety, depression and psychological resilience levels of mothers with children diagnosed with Attention Deficit Hyperactivity Disorder.

Material and Methods

Population and Sample Group

The study population was comprised of mothers of children diagnosed with ADHD who applied to the state hospital in central Gaziantep during April – August 2017 for outpatient treatment. The number of samples was determined as 54 as a result of the power analysis carried out. A total of 163 mothers who meet the study criteria at the time of the study comprised the sample group.

Data Acquisition Tools

Sociodemographic Questionnaire; The sociodemographic questionnaire prepared by the researcher in accordance with literature was comprised of 28 questions. The questions included those on the age, marriage age, marital status, number of children, education level, occupation, income level and mental illness status for mothers of children diagnosed with Attention Deficit Hyperactivity Disorder; the age, profession, education level, economic status of the spouse as well as those on the place of residence of the family, family structure and the age, diagnosed age, school success and environmental adaptation for the diagnosed child.

Beck Anxiety Scale (BAS); It is a self-assessment scale used for measuring the symptoms of anxiety experienced by the individual. The Likert type scale is comprised of 21 items and scored between 0-3. The Turkish reliability and validity study for the scale developed by Beck et al. in 1988 was completed in 1998 by Ulusoy et al. Questions are directed at the individual to determine the level of distress caused by the sense of anxiety in the past

week. Classification is made based on the test scores as light, moderate and severe anxiety. The highest score that can be obtained from the scale is 63. High total scores indicate high anxiety levels or intensity. Anxiety levels have been classified according to scores obtained from BAS as; scores of 0-17 low, scores of 18-24 moderate, scores of 25 and + high anxiety (12). The Cronbach alpha for the scale has been calculated as 0,909 in the present study.

Zung Self-Rating Depression Scale (ZDS); The original Zung Self-Rating Depression Scale has been developed by Zung in 1965 for evaluating depression symptoms. The reliability and validity study for the scale was carried out by Ceyhan et al. The items in the scale include the affective, cognitive, behavioral and physiological dimensions of depression. Comprised of 20 items, the scale includes 10 non-reverse and reverse (scored reversely) questions. It is a Likert type scale for which each item is evaluated in four levels as; never or very rarely, sometimes, frequently and most of the time. Scale items numbered 1., 3., 4., 7., 8., 9., 10., 13., 15. and 19 are non-reverse, whereas items 2., 5., 6., 11., 12., 14., 16., 17., 18., and 20 are reverse. Non-reverse items in the scale are scored from 1 to 4, whereas reverse items are scored from 4 to 1. The item scores are then summed up and the raw score acquired from the scale is transformed into a value out of 100. The lowest raw score that can be obtained from the scale is 20 which corresponds to an SDS (Depression score) of 25 out of 100 whereas the highest raw score is 80 corresponding to an SDS score of 100. The following formula is used for transforming the raw scores into a value out of 100:

Index = (Raw Score Total / Maximum Score of 80) x 100

Scores of 50 % or above indicate depression. When the cutoff scores are examined, scale scores of less than 50 % is considered as normal; between 50-59 % as light depression; 60-69 % indicates moderate depression; whereas scores that are above 70 % are defined as severe depression (13,14). The Cronbach alpha of the scale was determined as 0,778 in this study.

Resilience Scale for Adults (RSARSA); The scale originally entitled as 'Resilience Scale for Adults' has been developed in 2005 by Friborg et al. and the Turkish validity and reliability for the scale has been carried out in 2011 by Nejat Basım and Fatih Çetin. The scale comprised of 33 questions has been prepared to eliminate acquaintance bias and enables any desired assessment by way of its 5-point Likert structure with 5 boxes across the responses. If psychological resilience is expected to increase with decreasing scale scores, the answer boxes should be evaluated from left to right as 54321. If it is desired that psychological resilience increases with increasing scores, answer boxes should be evaluated from left to right as 12345 (10). The answer boxes were evaluated from left to right as 12345 with the expectation that psychological resilience will increase with increasing scores. The Cronbach alpha coefficient for the original scale was 0,86 and it was determined in the present study as 0,87.

Statistical Analysis

Shaphirowilk test was used for testing whether the data fit normal distribution, Student t test was used for comparing characteristics with normal distribution in 2 independent groups, whereas Mann Whitney u test was used for comparing characteristics without normal distribution in 2 independent groups. Moreover, one way analysis of variance (ANOVA) and LSD multiple comparison tests were used for comparing numerical data in more than 2 independent groups for characteristics with normal distribution, while Kruskal Wallis test and All pairwise multiple comparison test were used for characteristics without normal distribution. The relationships between numerical variables were tested by way of Spearman correlation coefficient. Cronbach alfa coefficients were calculated for testing validity and reliability. Mean±standard deviation was calculated for numerical variables as descriptive statistics whereas number and % values were provided for categorical variables. SPSS Windows version 24.0 software was used for statistical analysis and $p < 0.05$ was accepted as statistically significant.

Ethical Principles of the Study

Study data were acquired from mothers of children diagnosed with ADHD who volunteered to participate in the study after all written permits were taken from the Gaziantep University Clinical Studies Ethics Council (2017/87) and the Public Hospitals Union under the Ministry of Health related to the study. The mothers who accepted to participate in the study were asked to sign the informed consent forms after they were informed of the purpose of the study and that their information will not be disclosed. Permits were also obtained for the scales used from their respective owners.

Results

It was determined that 30.1 % of the mothers who participated in the study are in the 30-34 age interval, 6.1 % are single, 34.4 % have 2 children, 49.1 % are primary school graduates, 82.8 % are housewives, 76.1 % do not have personal incomes, whereas it was determined that 38.0 % of the fathers are primary school graduates, 35.6 % are aged 40 and above, 52.8 % are self-employed, 58.9 % have an income level ranging between 1300-3000tl, that 23.3 % of the families do not have social security, 4.9 % live in districts, 9.8 % have an extended family structure, that 22.7 % of the mothers smoke/consume alcohol, that 6.7 % of the mothers and 9.8 % of the fathers are diagnosed with ADHD, that 17.2 % of the other children in the family are diagnosed with ADHD, that 27.6 % of the mothers have a mental illness, that of those mothers with mental illness 16 % suffer from depression, whereas 11 % have anxiety disorder, that 71.2 % do not receive psychological support for themselves regarding the state of their child, that 6.7 % do not consult to psychologists, special educators, psychological counselors, mental health specialists and that 33.74 % spend their spare time playing with their child. It was determined that 36.8 % of the children diagnosed with ADHD do not come to their controls regularly, 19.6 % are not successful and that 28.8 % have bad adaptation with their environment. The total score average for the Zung Self-Rating Depression Scale Ham (scale total score) for mothers of children diagnosed with ADHD was determined as 40.56 ± 8.93 (min=24.00, max=73.00), the total score average for the Zung Self-Rating Depression Scale SD (total scale score transformed to 100 system) was determined as 50.70 ± 11.17 (min=30.00, max=91.25). The Beck Anxiety Scale total score average for the mothers was determined as 17.41 ± 11.05 (min=1.00, max=57.00). Psychological Resilience Scale (RSA) total score average was calculated as 116.68 ± 19.74 (min=48.00, max=157.00) (Table 1).

Table.1. Zung Self-Rating Depression Scale, Beck Anxiety Scale and, Psychological Resilience Scale Total Score Averages

Scales	Min-Max	Avg.-Std.
Zung Self-Rating Depression Scale Ham	24.00-73.00	40.56 ± 8.93
Zung Self-Rating Depression Scale SD	30.00-91.25	50.70 ± 11.17
Beck Anxiety Scale	1.00-57.00	17.41 ± 11.05
Psychological Resilience Scale	48.00-157.00	116.68 ± 19.74

Table.2. Correlation between Zung Self-Rating Depression Scale, Beck Anxiety Scale and Psychological Resilience Scale

Scales	Correlation Values	Zung Self-Rating Depression Scale	Beck Anxiety Scale	Psychological Resilience Scale
Zung Self-Rating Depression Scale	r	1.000	0.635**	-0.572**
	p		0.001	0.001
Beck Anxiety Scale	r		1.000	-0.382**
	p			0.001

r: Spearman correlation coefficient, ** statistically significant at a level of $r = 0.001$, * statistically significant at a level of $r = 0.005$

A strong and positively significant correlation was determined between the Zung Self-Rating Depression Scale and Beck Anxiety Scale ($r=0.635$, $p: 0.001$). There was a negative and moderate correlation between the Zung Self-Rating Depression Scale and Psychological Resilience Scale ($r=-0.572$, $p: 0.001$). A moderate and negative statistically significant correlation was observed between the Beck Anxiety Scale and Psychological Resilience Scale ($r=-0.382$, $p: 0.001$) (Table 2). A statistically significant difference was determined between the environmental adaptation of children diagnosed with ADHD and the mental illness states of the mothers and total score averages for ZDS, BAS and RSA ($p<0.05$). A statistically significant difference was determined between the school success levels of the children and the ZDS and RSA total score averages of the mothers ($p<0.05$); a statistically significant difference was observed between the family structure and the ZDS and BAS total score averages of the mothers ($p<0.05$); a statistically significant difference was observed between the father being diagnosed with ADHD and the ZDS and RSA total score averages of the mothers ($p<0.05$); a statistically significant difference was determined between the income level of the father and the ZDS and RSA total score averages of the mothers ($p<0.05$);

a statistically significant difference was determined between whether mothers receive psychological support for themselves regarding the state of their child and the ZDS and BAS total score averages of the mothers ($p<0.05$); a statistically significant difference was determined between the income levels of the mothers and their RSA total score averages ($p<0.05$); a statistically significant difference was observed between the education level of the mothers and their RSA total score averages ($p<0.05$); a statistically significant difference was determined between whether mothers receive psychological support for themselves regarding the state of their child and their BAS total score averages ($p<0.05$); a statistically significant difference was determined between the profession of the mothers and their RSA total score averages ($p<0.05$); a statistically significant difference was determined between the education level of the fathers and the RSA total score averages of the mothers ($p<0.05$); a statistically significant difference was determined between the mental illness diagnosis of the mothers and their RSA total score averages ($p<0.05$); a statistically significant difference was determined between whether mothers smoke/consume alcohol and their ZDS total score averages ($p<0.05$) (Table 3).

Table.3: Comparison of Sociodemographic Data with Zung Self-Rating Depression Scale, Beck Anxiety Scale and Psychological Resilience Scale Total Score Averages

Attributes	Zung Self-Rating Depression Scale	Statistics	Beck Anxiety Scale	Statistics	Psychological Resilience Scale	Statistics
Child's Adaptation to the Environment						
Good (50)	45.92±8.42	f=9.962	14.06±10.15	f=4.613	120.06±15.37	f=3.243
Moderate (66)	50.89±11.77	p=0.001***	17.59±11.71	p=0.011*	118.40±19.96	p=0.042*
Bad (47)	55.53±10.93		20.72±10.14		110.68±22.46	
Mental Illness State of the Mother						
Yes (45)	56.22±12.03	z=-3.708	23.93±10.55	z=-5.333	106.60±20.33	z=-4.106
No (118)	48.60±10.11	p=0.001***	14.92±10.23	p=0.001***	120.53±18.17	p=0.001***
School Success of the Child						
Successful (42)	48.21±11.55	x²=6.093	17.33±12.67	x²=0.519	120.45±16.96	x²=3.084
Moderate (59)	50.95±10.38	p=0.048*	17.59±10.16	p=0.772	116.18±15.90	p=0.049*
Not successful (32)	54.60±11.74		18.59±11.80		110.06±21.91	
Family Structure						
Nuclear Family (147)	49.86±10.98	z=-2.903	16.61±10.85	z=-3.023	117.87±19.21	z=-1.922
Extended Family (16)	58.43±10.11	p=0.004*	24.68±10.47	p=0.003*	105.81±21.84	p=0.055
ADHD Diagnosis State of the Father						
Yes (16)	57.81±11.44	z=-2.666	21.00±13.88	z=-0.927	106.75±24.98	z=2.143
No (147)	49.93±10.90	p=0.008*	17.92±10.68	p=0.354	117.76±18.87	p=0.034*
Income Level of the Father						
No income (8)	59.21±10.56	x²=9.772	24.12±12.48	x²=6.045	107.50±16.66	x²=12.205
0-1300£ (27)	52.54±9.63	p=0.021*	19.55±11.53	p=0.109	112.14±18.50	p=0.007*
1301-3000£(96)	50.82±11.42		17.14±10.93		115.14±19.41	
3001£ and above (32)	46.67±10.51		14.71±10.10		127.43±19.11	
State of the Mother Receiving Psychological Support for their Child						
Yes (47)	54.28±12.86	z=-2.369	22.68±12.59	z=-3.786	115.44±24.17	z=-0.082
No (116)	49.25±10.11	p=0.018*	15.27±9.63	p=0.001***	117.18±17.73	p=0.934

Income Level of the Mother						
No income (124)	51.63±10.43	$\chi^2=6.572$ p=0.087	17.58±10.11	$\chi^2=3.523$ p=0.318	112.55±18.50	$\chi^2=27.528$ p=0.001***
0-1300₺ (13)	49.61±12.91		20.38±14.85		123.15±17.16	
1301-3000₺ (10)	50.75±17.40		16.00±15.94		124.10±19.22	
3001₺and above (16)	44.37±9.42		14.56±11.55		138.81±14.46	
Education Level of the Mothers						
Illiterate+primary school	52.11±11.51	$\chi^2=4.344$ p=0.227	18.21±10.62	$\chi^2=6.358$ p=0.095	111.25±17.79	$\chi^2=29.562$ p=0.001***
Secondary school	52.11±10.65		20.31±13.55		113.68±16.33	
High school	47.15±9.96		14.44±8.14		122.44±17.51	
University	47.90±11.02		14.32±11.03		132.68±22.43	
State of Mothers Applying to Psychologists, Special Educators, Psychological Counselors, Child Mental Health Specialists for their Child						
Yes (152)	50.95±11.02	z=-1.059 p=0.289	17.76±10.87	z=-2.109 p=0.035*	116.65±20.19	z=-0.007 p=0.995
No (11)	47.27±13.14		12.59±12.82		117.09±12.56	
Profession of the mother						
Housewife (135)	51.39±10.65	$\chi^2=5.969$ p=0.051	17.82±10.56	$\chi^2=4.570$ p=0.102	113.63±18.20	$\chi^2=22.881$ p=0.001*
Private sector employee (10)	53.00±15.87		19.20±15.76		120.70±25.10	
Public employee (18)	44.23±10.50		13.33±11.48		137.33±15.33	
Education Level of the Fathers						
Illiterate+primary school (65)	51.65±10.55	$\chi^2=2.015$ p=0.569	17.84±10.41	$\chi^2=2.005$ p=0.571	109.69±19.24	$\chi^2=13.901$ p=0.003*
Secondary school (29)	49.48±10.20		16.79±10.08		120.41±15.07	
High school (36)	51.84±12.43		18.97±13.42		119.97±18.05	
University (33)	48.67±11.84		15.39±10.39		123.60±22.44	
Mental Disease Diagnosis of the Mother						
Depression (26)	58.94±12.04	t=1.965 p=0.056	24.46±10.65	t=-0.765 p=0.444	100.34±19.56	t=0.408 p=0.011*
Anxiety disorder (18)	51.87±11.25		23.11±10.95		116.11±18.64	
Age of the father						
18-24 (0)	-	$\chi^2=4.433$ p=0.218	-	$\chi^2=2.404$ p=0.493	-	$\chi^2=7.953$ p=0.047*
25-29 (15)	50.66±8.88		16.00±10.07		122.33±16.48	
30-34 (40)	51.75±11.02		19.60±13.08		115.17±19.63	
35-39 (50)	52.27±11.98		18.44±11.68		111.08±22.63	
40 and above (58)	48.64±11.02		15.37±8.88		121.10±17.41	
Smoking/Alcohol Use State for the Mothers						
Yes (37)	55.37±11.75	z=-2.841 p=0.004*	18.89±10.42	z=-1.233 p=0.218	112.35±18.91	z=-1.648 p=0.099
No (126)	49.33±10.66		16.97±11.23		117.96±19.87	

Discussion

It was determined in our study that the depression and anxiety of the mothers are at a low level and that they have good psychological resilience. It was observed upon evaluating the correlation between the scales that psychological resilience levels are low for mothers with high depression and anxiety levels. Xia W et al. (2015) carried out a study as a result of which it was put forth that mothers of children diagnosed with ADHD experience anxiety and depressive symptoms more; Durukan et al. (2008) reported in their study that the depression and anxiety levels are high for mothers of children diagnosed with ADHD; where as McAuley et al. (2009) put forth as a result of their study that the anxiety and depression ratios of the mothers are high (15,16,17). While Şimşek et al. (2012) identified that mothers of children diagnosed with ADHD have higher psychiatric symptoms, Vincent Chin et al. (2014) concluded that mothers of children diagnosed with ADHD have higher depression levels (3,18).

No study could be determined during literature surveys carried out which evaluate the correlation between the depression, anxiety and psychological resilience of mothers of children diagnosed with ADHD.

It was determined in our study that the depression and anxiety levels are high for mothers with mental illness. ADHD is evaluated as a significant stressor for the family and especially for the mothers (14). Studies carried out indicate that psychiatric issues are observed more frequently in families of children diagnosed with ADHD (19). It was determined that the psychological resilience levels of mothers with anxiety disorder are lower in comparison with mothers diagnosed with depression. McCormick et al. (1995) carried out a study as a result of which major depression was determined at a ratio of 17,9 % in mothers of children diagnosed with ADHD, whereas minor depression ratio was determined as 20,5 % (20). Karakoç Demirkaya et al. (2015) carried out a study

evaluating the disease burden in the families of cases diagnosed with ADHD as a result of which it was determined that 15,6 % of the mothers have a psychiatric disease story (21).

It was determined in the study that bad environment adaptation of children diagnosed with ADHD leads to increased depression and anxiety levels in their mothers while also decreasing their psychological resilience. Çakaloz et al. (2007) carried out a study as a result of which it was reported that social issues are observed frequently in both the ADHD and ADHD+KOKGB group (22). McAuley et al. (2009) put forth in their study that the mothers of children diagnosed with ADHD who experience more issues related with behavior problems and environment adaptation suffer more from anxiety and depression (17). It is observed that the results of this study are in parallel with those of others. It is reported that children with ADHD frequently experience problems in their relations with friends and peers, that their relationships with parents and siblings are also affected adversely and that it affects the mother more drastically leading to psychological issues since the mother plays a more effective role in childcare (23).

It was determined in our study that the depression levels are higher for mothers of students with low academic success, whereas their psychological resilience levels are lower. It is reported that children with ADHD experience learning difficulties and display academic failure, weak performance and educational issues (24,25). Biederman et al. (1996) carried out a study as a result of which it has been presented that children with ADHD have lower reading and arithmetic test scores, that their rates of repeating the class increase and that there are increases with regard to the use of corrective academic services and placement in special education classrooms (26). Whereas Çakaloz et al. (2007) carried out a study in which it failure at school was observed more in both the ADHD and ADHD+KOKGB groups (22). Özyurt et al. (2015) carried out a study indicating that issues related with children diagnosed with ADHD such as difficulties with homework, not being able to protect their objects, failure to tidy up his/her room, difficulties in carrying out their duties at home increase the parenthood stress of mothers as well as their anxiety levels (27).

It was determined in this study that while ADHD diagnosis in mothers does not have any impact on Anxiety Depression and psychological resilience, having a spouse and child diagnosed with ADHD increases the depression levels of mothers while decreasing their psychological resilience. It is reported that ADHD diagnosis in parents increases the risk of disease in children by eight times and that the disease has a strong tendency for genetic transition (2). Şimşek et al. (2012) carried out a study as a result of which it has been reported that psychiatric symptoms and ADHD symptoms are at high levels in both mothers and parents of children diagnosed with ADHD (3). McAuley et al. (2009) reported in their study that ADHD symptoms have a negative impact on mothers and that the mothers are affected not only by their own ADHD symptoms but also those by those of their children and

spouses leading to chaos in the house and stress in the mothers (17).

The depression ratio of mothers without any income was determined to be high in our study, while their psychological resilience levels were determined to be low. It was determined that the mothers with high income levels have high psychological resilience. It has been reported that ADHD is observed frequently among socioeconomically disadvantaged groups in many regions of the world (28). Russell et al. (2015) put forth that ADHD symptoms are affected by financial problems in the household at a ratio of 27,8 % and that family stress increases thus making the symptoms worse (29). Greene et al. (2002) carried out a study as a result of which it was determined that psychosocial factors and low socioeconomic level increases the risk of ADHD in children (30). It is indicated that socioeconomic difficulties lead to the onset of depression with an impact on its prognosis and that it increases the frequency of additional diagnoses (31). Yağmur and Türkmen (2017) carried out a study for determining the perceived stress and psychological resilience levels of family members providing care to patients with a mental illness as a result of which it has been reported that perceived stress is higher in the relatives of patients with low income and that the psychological resilience levels are lower ($p < 0.005$) (32).

It was determined in the present study that mothers with an extended family structure have higher depression and anxiety levels in comparison with those having a nuclear family structure. Çöp et al. (2017) determined in their study that 82,8 % of the children diagnosed with ADHD have a nuclear family structure (33). Aktepe (2011) reported in their study that the family structure is nuclear for 73,9 % and extended for 15% (34). No study was observed during the literature surveys carried out which have focused on the family structure of children diagnosed with ADHD and the stats of depression and anxiety in mothers.

It was determined in our study that mothers who receive psychological support regarding the state of their child have higher levels of depression and anxiety. No study was observed in literature that examines mothers of children diagnosed with ADHD receiving psychological support regarding the state of their children. The level of knowledge and awareness consciousness of mothers are tried to be improved during psychological support. Increase in awareness consciousness and access to knowledge may lead to an increase in the levels of anxiety of mothers related with their children. It is considered that failure of the mothers to cope effectively with increased levels of anxiety will lead to depression.

It was determined that the education levels of the mothers and fathers who participated in this study are at illiterate and primary school level, that the depression and anxiety levels are high for illiterate participants and that their psychological resilience levels are low. Whereas it was determined that mothers with university graduate spouses have high psychological resilience levels. The education level of parents is reported as a significant risk factor in psychopathology development in children. It is reported

that the child rearing methods tend to be less traditional and more positive with increasing education levels of mothers and that behavioral and emotional issues are observed less in these children (20). It was determined as a result of the literature survey carried out in accordance with our findings that the education levels are secondary school and below for majority of the parents in studies by Yıldız et al. (2016), Öztürk et al. (2000), Karakoç Demirkaya et al. (2015), Çakaloğlu et al. (2007), Çöp et al. (2017) and Özcan et al. (1998) (14,20,21,33,35,36). No study was determined on the impact of the education levels of mothers of children diagnosed with ADHD on the depression and anxiety levels of mothers and it has been reported as a result of a study by Çengelci (2009) on mothers of disabled children that the anxiety levels of mothers increase with decreasing education level (37). Fırat (2016) reported in a study on the parents of autistic children that mental symptom states and anxiety levels of mothers decrease with increasing education level (38).

It was determined in our study that mothers working as public personnel have higher psychological resilience levels in comparison with housewife mothers. Whereas, results indicate to that the psychological resilience levels of mothers working in the private sector are lower in comparison with those of public personnel mothers. A relationship could not be determined between the profession of the father and the depression, anxiety and psychological resilience levels of mothers. It is known that the education levels of the parents have a significant impact on their choice of profession which in turn also has a significant impact on their style of parenting and family relations (39). It was determined as a result of a literature survey that majority of the mothers of children diagnosed with ADHD are housewives (36,39). The results of our study are similar in this respect with the results of other studies in literature. No study was observed in literature that examines the relationship between the depression, anxiety and psychological resilience levels of mothers of children diagnosed with ADHD with regard to their profession and it has been reported as a result of the study by Uğuz et al. (2004) on the professions of mothers of disabled children that parents of disabled children who are unemployed have higher rates of depression (40).

While no relationship was determined in this study between the ages of the mothers and their levels of depression, anxiety and psychological resilience; it was determined that the psychological resilience levels are higher for mothers of children diagnosed with ADHD with the age of their spouse ranging between 35-39 and 40 and above. The results of the present study were similar with those of other studies on the age average of parents of children diagnosed with ADHD (35).

It was determined in this study that 93.3 % of the mothers of children diagnosed with ADHD have applied to psychologists, special educators, psychological counselors, child psychiatry specialists for their children. It is indicated that the problem solving skills of mothers of children diagnosed with ADHD are lower in comparison with those of the mothers of healthy children, that social skills are lower for children with ADHD and their families and hence

they experience difficulties in perceiving, evaluating and reacting properly to social processes. It is indicated that the problem solving skills and strategies of families are important and that counseling is required for increasing the problem solving skills (35,39).

This study has been carried out only on the mothers of children diagnosed with ADHD and impacts have been evaluated only for the mothers which is a significant limitation of our study. Studies including all family members can be carried out for determining the impacts of ADHD on other individuals in the family. The study carried out for the province of Gaziantep can be repeated for other provinces and comparisons can be made.

Conclusion

In conclusion, ADHD is an important public health issue with impacts primarily on the child as well as schools, families and the society. Hence, it is important that them others and the parents should be evaluated during the treatment process in addition to the child.

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Author's Contributions:

KAE, NÖ: Data Collection, Literature Search, Preparation of the article, statistical analysis, **NÖ:** manuscript revision

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Socio-Economic Status and Intelligence Quotient of primary school-aged children with asthma

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Abstract

Objective: Intelligence Quotient is said to be more variable in childhood and is thought to be influenced by the socio-economic status of the families of children. This aim of this study was to determine the relationship between socio-economic class and Intelligence Quotient (IQ) of primary school children with asthma and to compare with those of children without.

Material and Methods: One hundred and twenty children with asthma (subjects) aged 5 – 11 years were consecutively recruited at the asthma clinic of University of Nigeria Teaching Hospital Ituku/Ozalla, Enugu State, Nigeria and their age-, sex and socio-economic class (SEC) - matched normal classmates were enrolled as controls from their schools. Their SEC was obtained using the tool described by Oyediji while their academic performance was obtained from their schools using their scores over an academic session. Their Intelligence Quotient (IQ) was determined using the Draw-A-Person- test. The relationship between SEC and Intelligence Quotient of children with asthma was determined and was compared with that of the 120 controls.

Results: There was no significant difference between the IQ of the Subjects and Control in the different Socio-economic Classes. IQ has no significant correlation (Spearman's) with SEC in both Subjects ($r = 0.115$; $p = 0.21$) and Controls ($r = 0.082$; $p = 0.38$). No significant difference exists in the IQ of children with asthma across the different socio-economic classes.

Conclusion: The IQ of children with asthma is not influenced by their Socio-Economic status.

Key words: Social class, Intelligence, Asthma, Children, Schools.

Introduction

Asthma is one of the few diseases reported to be commoner in the higher social classes but atopic asthma and severe asthma are said to be commoner in the lower socio-economic classes (1, 2). Severe asthma with increased hospitalization and death has been linked to poverty, ethnic minorities, and urban living (1). Children with asthma from deprived areas are reported to be more likely to miss school than their more affluent peers, and minority ethnic children are also more likely to have poor school attendance (3).

Intelligence Quotient is said to be more variable in childhood and these variations are thought to be linked to the socio-economic status of the families of these children (4-9). Several studies have suggested that socioeconomic status (SES) modifies the heritability of children's intelligence and that children from disadvantaged family backgrounds score lower on intelligence tests than their high SES peers (10 – 13).

Turkheimer et al reported that in families with low SES, a greater percentage of the variance in IQ is accounted for by the shared environment, and that the contribution of genes is close to zero (11). They added that in affluent families however, the result is almost exactly the reverse. Similar findings were also reported by some other studies (4, 14).

However despite these studies the relationship between socio-economic class and intelligence quotient still remains a source of controversy as the moderating effect of SES on IQ in children is not consistently found as some other studies have divergent views to the extent that some report trends in the opposite direction- greater heritability of children's IQ in lower SES families (15-18).

Available studies on the relationship between SEC and IQ in children are all on otherwise stable children and to the best of my knowledge; no study has been done to find out the relationship between SES and IQ among children with asthma.



There is also a paucity of information on this relationship in low income countries such as Nigeria. This study was therefore carried out to determine the relationship between socio-economic status and intelligence quotient among children with asthma. The results are expected to contribute to the existing body of knowledge.

Material and Methods

Ethical approval for the study was obtained from the Health Research Ethics Committee of the University of Nigeria Teaching Hospital, UNTH Ituku/Ozalla Enugu State (Protocol No: NHERC/05/01/2008B) dated 21st May 2012. All parents/caregivers of eligible children were informed of the purpose of the study, expected procedures and potential risks and benefits following which a written consent was obtained before data collection. It was a cross-sectional study conducted at the Asthma clinic of the University of Nigeria Teaching Hospital (UNTH), and the primary schools attended by these children with asthma within Enugu, Enugu state between July and December 2012.

Study Population

The study population comprised of 120 school children with asthma (subjects) aged 5-11 years living in Enugu metropolis. The control population (children without asthma) was made up of 120 healthy classmates of the children with asthma who are matched for age, sex and socio-economic class. The choice of classmates as controls was informed by the need to remove school-related bias and to control for class grade as suggested by Richard and Burlew (19).

Inclusion Criteria:

1. Children aged 5-11 years, attending primary school in Enugu metropolis.
2. Asthma diagnosed by a doctor (20, 21).
3. Attendance in the same school for at least one session before study enrolment.
4. Attendance at the asthma clinic for at least 12 months.
5. Consent for the study given by care-giver.

Exclusion Criteria:

1. Out of school children.
2. Age less than five years or more than eleven years of.
3. Children with other chronic diseases such as sickle cell disease, diabetes mellitus, tuberculosis, congenital heart diseases or with history of neurologic illness like seizure disorders and cerebral palsy.
4. Children attending school outside Enugu metropolis.
5. Attendance of the present primary school for less than one session before enrolment.
6. Refusal of consent by care-giver.
7. Asthmatic children with incomplete data, since some of the information were obtained from the case notes.

Control group

The child next to the asthma patient in the class register was selected as control if he/she met the following criteria:

1. Of same sex, age (within 6 months) and socio-economic class as the child with asthma.
2. Has been in the same primary school and class as the asthmatic child for at least one session before study enrolment.
3. Does not have any of the exclusion criteria as listed for the subjects

If the next child to the asthmatic in the class register did not meet the criteria, the most suitable child without asthma down the register who meets the criteria was chosen as control.

Selection and evaluation of the subjects

At the asthma clinic

On presentation at the clinic, the caregiver and the child with asthma were informed of the study and written informed consent obtained from the caregiver. Before enrollment, in order to ascertain eligibility, the asthmatic child's socio-demographic data was obtained. The information obtained was recorded in the proforma.

Children who meet the inclusion criteria were enrolled consecutively till the sample size was reached while those excluded were scheduled for consultation. The socio-economic status of the Subjects was determined using the method described by Oyediji (22). This was determined using the occupation and educational attainment of the caregiver to get the socio-economic class. The socio-economic class was obtained by finding the mean score for the parents' educational attainment and occupation rounded off to the nearest whole number. Where any of the parents were dead, the social class of the child was assessed using that of the living parent. Socio-economic class I represent the highest socio-economic class and class V the lowest.

The Oyediji SEC classified parental occupation as follows:

Class I. Senior public servants, Professionals, Managers, Large scale traders, Businessmen & Contractors.

Class II. Intermediate grade public servants, Senior School Teachers, Nurses and Technicians.

Class III. Junior School Teachers, Clerks, Auxiliary Nurses, Drivers and Mechanics.

Class IV. Petty traders, Laborers, Messengers and Similar Grades.

Class V. Unemployed, Full-time house wives, Students and Subsistence farmers.

While the parental educational attainment is classified as follows:

Class I: University graduates or equivalents.

Class II: School certificate holders (GCE or SSSC) who also has teaching or other professional training i.e. NCE.

Class III: School certificate or Grade II teachers' certificate Holders or equivalents.

Class IV. Junior secondary school certificate, Modern three and primary six.

Class V: Those that could not read or write or are illiterates.

Each parent is scored for parental occupation and educational attainment based on the class in which the parent belongs. For example; a parent whose educational attainment falls under class IV is scored 4 for educational attainment. Four scores are obtained from educational attainment and occupation of the 2 parents. The socio-economic class is obtained by the mean of aggregate of the 4 scores for the 2 parents. This is then rounded off to the nearest whole number to get the Socio-economic level of the subject. In a situation where only one parent is alive; occupation and academic attainment of the parent is scored and then divided by 2 before it is rounded to the nearest whole number to ascertain the SEC.

With the prevailing exchange rate of 360 Naira [(Nigerian currency to 1 United States Dollar (USD)]; parents with occupation in Oyediji's socioeconomic class I earn > I, 390 USD; Class II earn between 100 and 1390 US dollars; Class III earn between 44.5 and 97.25 US dollars; Class IV earn between 30.5 and 41.75 US dollars while parents with occupation in Class V earns between 0 and 27.5 US dollars per month.

The level of asthma control was ascertained using the Childhood Asthma Control Test (C-ACT) (23). The C-ACT TM tool for children 4 to 11 years is made up of seven questions with a total score of 27 as the highest score obtainable. Each child, as much as possible, was allowed to answer the first four questions unaided while the care-giver answered the remaining three. A score of 19 and below signified poor control while scores above 19 indicate good control (24, 25).

The subjects were then given a sheet of paper and pencil and left alone with as much time as they needed with the instruction to draw a person (26, 27). Intelligence Quotient (IQ) was assessed using the Draw-A-Person Test (DAPT) (26). The IQ of the subjects was calculated using the validated Ziler criteria and the table of DAPQ by Ebigo and Izuora (26). The total number of points scored is the Draw A Person Point (DAPP). $DAPQ = DAPA / \text{Chronologic Age}$, where $DAPA = (DAPP + 3) / 4$. The DAPQ score obtained was compared with the expected DAPQ score for age and sex using the table for average DAPQ scores by Ebigo and Izuora. A score of less than 75% for sex and age was regarded as mental dullness or backwardness (26).

The child with asthma was subsequently reviewed, complaints attended to and a future clinic appointment

given. However, children with acute exacerbation of asthma were first managed in the Children Emergency Room of UNTH before evaluation for the study.

In the Schools

The clearance letter from the Ministry of Education was used to obtain permission for the study at the various schools. At the school/class of each enrolled asthmatic child, the head/class teacher was informed of the study in order to access the child with asthma and to enroll the child without asthma. Also the need to obtain the information with regards to the children's school performance was explained.

With the help of the class teacher, the non-asthmatic child, next to the study Subject in the class register, who was of the same age (+ or - 6 months) and sex as the child with asthma was selected. The child was then informed of the study and given the consent form for the caregiver to fill. The consent form was retrieved on a subsequent visit to the school. The non-asthmatic child whose caregivers gave consent was then interviewed for eligibility for the study and the socio-economic status determined as described for the subjects. The selected control was then enrolled and the questionnaire administered.

The control was also given a sheet of paper and pencil and left alone with as much time as needed with the instruction to draw a person and was scored using the validated Ziler criteria by Ebigo and Izuora (26). The DAPQ was also ascertained just as was done for the subjects.

Information obtained from the participants was recorded in the questionnaire and subsequently transferred into the data editor of Statistical Package for Social Sciences (SPSS) software for Windows® version 19.0 (IBM Inc Chicago Illinois USA, 2011) for analysis. Descriptive statistics such as mean $\pm$ (SD) and median were obtained for continuous variables while categorical variables were summarized using frequencies and percentages. The comparison of the means of IQ which was normally distributed was done using Student's t-test, ANOVA and the Duncan Multiple Comparison test while Socio-economic class which was not normally distributed was compared using the Mann-Whitney U test. The significance of the association between categorical variables was determined using chi-square. All the tests were taken as significant at $p < 0.05$. Results are presented in tables and prose.

Results

The age range of the study participants was 5 to 11 years and the overall mean age $\pm$ SD was 8.20 ± 1.92 years. Sixty-nine (57.5%) of the 120 subjects and controls were in early primary school age (5-8years) while fifty-one (42.5%) were in late primary school age (9-11 years). The mean age $\pm$ SD for males and females was 8.07 ± 1.73 and 8.47 ± 2.26 years, respectively. The difference in the mean age of males and females was not statistically significant ($t = 1.47$, $p:0.143$). Table I shows the age and sex distribution of the study participants (Table 1).

The mean IQ scores for subjects and controls were 123.28 ± 21.45 and 118.41 ± 19.87 , respectively. The difference was not statistically significant ($t = 1.83$; $p:0.07$). Thirty (25%) of the subjects were from socio-economic class I and sixty (50%) from socio-economic class II while only twelve (10%) were from socio-economic class III and eighteen (15%) from class IV. No subject or control studied was from socio-economic class V.

Thirty out of the 120 subjects (25%) had poor asthma control while 90 (75%) had good asthma control. Similarly, the difference in the median overall academic scores for the subjects (79.04%) and controls (80.01%) were also not statistically significant ($U = 6804$, $p:0.46$). There was no significant difference in the IQ of the Subjects and Control across the different Socio-economic Classes. None of the study participants (subjects and controls) were in socio-economic class V (Table 2).

No significant correlation exist between SEC and IQ in Subjects ($r = 0.115$; $p: 0.21$) and Controls ($r = 0.082$; $p:0.38$). There was no significant difference in IQ between children with poor and good asthma control across the different socio-economic classes. There was also no significant difference between the IQ of children with poor asthma control and those of children with good asthma control (Table 3).

Intelligence Quotient has a significant but weak correlation (Spearman's) with socioeconomic class among children with poor asthma control ($r = 0.403$; $p:0.03$) but not among those with good asthma control ($r = 0.047$; $p:0.66$). There was no significant difference in the IQ of children with asthma (Subjects) with respect to socio-economic class. However among controls a significant difference in IQ is noted among controls in SEC II compared to the IQ of controls in other Socioeconomic classes ($F = 5.572$, $p:0.001$) (Table 4).

Table I: Age and sex distribution of the subjects and controls.

Age (years)	Subjects		Controls	
	Male (%)	Female (%)	Male (%)	Female (%)
5 – 8	45 (55.6)	24 (61.5)	45 (55.6)	24 (61.5)
9 – 11	36 (44.4)	15 (38.5)	36 (44.4)	15 (38.5)
Total	81 (100.0)	39 (100.0)	81 (100.0)	39 (100.0)

$\chi^2 = 0.39$, d.f = 1, $p < 0.535$

Table 2: Comparison of IQ between subjects and controls across Socio-economic classes

SEC	Subjects Mean $\pm$ SD	Control Mean $\pm$ SD	T	P value
1	121.69 $\pm$ 18.82	112.88 $\pm$ 15.87	1.961	0.055
2	127.53 $\pm$ 23.74	125.26 $\pm$ 21.01	0.553	0.581
3	117.65 $\pm$ 5.26	113.16 $\pm$ 13.73	1.056	0.302
4	115.54 $\pm$ 22.09	108.27 $\pm$ 18.19	1.078	0.289

Table 3: Comparison of IQ between poor and good asthma control groups with respect to SEC

SEC	Poor Asthma Control Mean $\pm$ SD	Good Asthma Control Mean $\pm$ SD	T	P value
1	121.36 $\pm$ 3.82	118.47 $\pm$ 19.37	0.254	0.801
2	129.93 $\pm$ 20.26	125.72 $\pm$ 23.83	0.614	0.541
3	114.28 $\pm$ 11.96	118.02 $\pm$ 6.17	0.681	0.511
4	110.73 $\pm$ 13.66	114.31 $\pm$ 24.57	0.329	0.746

Table 4: Socio-economic class specific comparison of IQ.

IQ	Socio-economic class				F	P value
	Class I Mean $\pm$ SD	Class II Mean $\pm$ SD	Class III Mean $\pm$ SD	Class IV Mean $\pm$ SD		
Subjects	121.69 $\pm$ 18.82	127.53 $\pm$ 23.74	117.65 $\pm$ 5.26	115.54 $\pm$ 22.09	1.940	0.127
Controls	112.88 $\pm$ 15.87	*125.26 $\pm$ 21.01	113.16 $\pm$ 13.73	108.27 $\pm$ 18.19	5.572	0.001
Poor asthma control	121.36 $\pm$ 3.82	129.93 $\pm$ 20.26	114.28 $\pm$ 11.96	110.73 $\pm$ 13.66	2.410	0.090
Good Asthma control	118.47 $\pm$ 19.37	125.72 $\pm$ 23.83	118.02 $\pm$ 6.17	114.31 $\pm$ 24.57	1.201	0.314

*Duncan multiple comparison test indicating means significantly different

Discussion

In this study of the relationship between socio-economic class and IQ among primary school children with asthma, the IQ of the subjects was comparable with that of controls across the various Socio-economic classes. IQ was not associated with Socio Economic Status in both Subjects and Controls.

Majority of the subjects belonged to the higher socio-economic classes I and II and none of the subjects were in socio-economic class V. This is in keeping with earlier reports that noted asthma to be one of the few diseases that are more common in the higher socio-economic classes (1,2). The reason could be due to life style encounters like early use of formula feeds, canned foods with additives and other social factors that are more common among people of higher socio-economic class compared to those in the lower socio-economic classes and can predispose to airway hypersensitivity. It could also indicate that more parents in the socio-economic classes I and II, compared to those in the socio-economic classes III and IV, avail themselves of the specialized services offered by the teaching hospital (28). Furthermore the finding of more children with asthma among the higher socio-economic class lends support to the hygiene hypothesis proposed by Strachan (29).

Although children from higher Socio-economic classes had higher IQ scores in this study, their IQ was not significantly higher than those of children from lower SEC in both Subjects and controls. On the contrary, a number of studies have suggested that IQ is significantly higher among children from higher SEC compared to those from lower SEC and reasons proffered included greater exposure, absence of poverty and the moderating effect of environmental factors on genes in favour of children from higher SEC (4, 10-14). Turkheimer et al found that in families with low SES, 60% of the variance in IQ is accounted for by the shared environment, and the contribution of genes is close to zero; however in affluent families, the result is almost exactly the reverse (11). The moderating effect of SES on IQ in children however is not consistently found as some other studies report trends in the opposite direction- greater heritability of children's IQ and higher IQ in children from lower SES families (15-18). The variation in the findings of these studies is still an object of controversy and the reason(s) for the variation is still unclear. However, it may be due to the different SES and IQ tools used, the age of the children studied and the prevailing socioeconomic conditions in the areas where the studies are done. The SES tool by Oyedemi (22) used in this study may be criticized on a number of issues including the changes in the economic situation within the area this SES classification tool is used. For example an artisan who was previously considered to be a low income earner and is placed low in the SES tool by Oyedemi currently could earn same or more income than a newly employed medical doctor or university lecturer. Again a good number of people with graduate/ post-graduate certificates, due to high level of unemployment; take up jobs that were hitherto considered by Oyedemi to be low income jobs. These issues could be affecting results from the use of this tool; hence

there may be a need for a review of the Oyedemi SES classification tool.

The DAPT though non-verbal; is appealing to children and has been shown to demonstrate a high correlation with the Stanford-Binet which relies heavily on verbal items and Wechsler's Intelligence Scale for Children (WISC) tests which is both a verbal and performance IQ test but is lengthy requiring two sittings (26, 27). The DAPT has been standardized and validated for use in Nigerian children; the Stanford-Binet and WISC tests for IQ have not been validated for use in our environment.

IQ had a significant correlation with SEC in children with poor asthma control but not in those with good asthma control. The reason for this finding among children with asthma is unclear. However, the unequal distribution of children with good asthma control compared to those with poor asthma control across the various socio-economic classes may have influenced this result. The age of the study participants may also have contributed to these findings as differences in intelligence have been shown to be more variable in childhood, with some children showing substantial gains in intelligence and others considerable losses between infancy and adolescence (4-6) but highly stable from early adolescence to late adulthood (30). Further research is therefore needed on the relationship between SES and IQ among children with asthma.

Conclusion

According to our findings, the Intelligence Quotient of primary school-aged children with asthma is not influenced by their Socio-economic status.

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Author's Contributions: **NOC:** Data Collection, Literature Search, Preparation of the article, statistical analysis, manuscript revision

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Frequency of depression in patients with Type 2 Diabetes Mellitus: Psychiatric support necessity for diabetic patients

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Abstract

Objective: This study aims to determine the relationship between type 2 diabetes mellitus (DM) and the risk of depression in T2DM patients in comparison to a healthy control group.

Materials and Methods: The study sample included 100 patients diagnosed with Type 2 DM who were recruited consecutively from the general internal medicine polyclinic (46 males, 54 females, mean age 55.4±11.9 years) and 100 healthy control subjects who had no known diseases and had presented for routine check-up examinations (60 males, 40 females, mean age 37.6±3.7 years). The participants completed a questionnaire composed of a sociodemographic characteristics section and the Beck Depression Inventory, which probes the depression states of individuals based on self-report. Laboratory results of the participants were recorded.

Results: Mean Beck Depression Inventory scores of the patient and control groups, which represent self-reported depression states, were determined as 17±8.5 and 8.5±7.3, respectively. Of the 100 diabetic patients, 8 were determined to have severe depression, 38 moderate depression, 34 mild depression, and 20 minimal depression; whereas, of the 100 healthy controls, 20 were determined to have moderate depression, 18 mild depression, and 62 minimal depression, with no cases of severe depression in this group.

Conclusion: Our study reveals the importance of complementing the conventional patient follow-up procedure with psychiatric support in the management of type 2 DM patients.

Keywords: Depression; diabetes mellitus; Beck Depression Inventory

Introduction

Type 2 diabetes mellitus (DM) is a chronic metabolic disease that requires constant medical care, in which the organism cannot utilize carbohydrate, lipid, and proteins adequately due to insulin deficiency or associated defects. According to the results of TURDEP-II, which was published in 2010, the prevalence of diabetes in the adult Turkish population has reached 13.7% (1-4). The rise in the prevalence rates of diabetes and associated complications has developed into a global health problem. Depression and anxiety are two times more common among diabetic patients than the normal population. In diabetic patients younger than 64 years; smoking, a low socioeconomic status, and being female were found to be independent risk factors for depression in the presence of poor glycemic control. Depressed and anxious individuals show lower compliance with dietary guidelines and medication use.

Some controlled studies have shown the treatment of depression to improve glycemic control (5). Depression has an unfavorable effect on the progression of chronic diseases such as diabetes. It was shown to have a negative impact on lifestyle changes and reduce treatment compliance in diabetic patients. Depressed diabetic patients experienced greater difficulty with dietary compliance, poor glycemic control, and an increase in complication and mortality rates. Studies have revealed a relationship between the number of depressive episodes and hemoglobin A1c (HbA1c) levels (6). This study aims to identify the sociodemographic characteristics of adult type 2 DM patients and to determine the relationship that levels of glycemic control, diabetes education, dietary compliance, and presence of diabetes complications have with the risk of depression in these patients.



Materials and Methods

This study included 100 patients who had presented to the Internal Diseases Polyclinics of Fırat University Medical Faculty Hospital between September 2019-October 2019, who were under follow-up for a diagnosis of type 2 DM, who could comprehend and respond to questions, and provided informed consent (58 males, 70 females; mean age 60 ± 10.8 years; range 30-80 years). Patients who were not within the specified age range, who were being treated for a psychiatric disorder, were pregnant, did not provide voluntary consent, did not agree to the interview, or did not have the mental capacity to comprehend questions were excluded from the study. The patients completed a form that was constructed by the researcher and probed sociodemographic characteristics, and their height and weight, HbA1c levels and laboratory data obtained during routine follow-up were recorded. The patients were administered the Beck Depression Inventory through face-to-face interviews. The Beck Depression Inventory was developed in 1961 by Beck and colleagues. Its validity and reliability were established in our country in 1989 by Hisli and colleagues. The inventory assesses the physical, emotional, and cognitive symptoms of depression. It contains 21 items, each of which include four self-assessment phrases. The items are scored from 0 to 3. The sum of item scores produces a total depression score. A high score indicates more pronounced depressive symptoms (7, 8). Scores of 0-9 are considered to indicate minimal or no depression, 10-16 mild depression, 17-29 moderate depression, and scores of 30 and higher indicate severe depression (9). Data obtained from each questionnaire was tested for statistical significance within groups using the t-test.

The study protocol was approved by the ethics committee of the hospital. The patients provided written informed consent. The study was conducted in accordance with the guidelines stated in the Helsinki Declaration.

Statistical Analysis: Statistical analysis was conducted using IBM's SPSS for Windows Version 22 (IBM Corporation, Armonk, NY, USA). Data obtained from each group was tested for normal distribution using the Kolmogorov-Smirnov test. Data with a normal distribution were analyzed using the t-test in independent groups;

data with a non-normal distribution were analyzed using the Mann-Whitney U test and the Kruskal Wallis variation analysis. Qualitative data were analyzed using the Chi-square test. Quantitative data were presented in the form of mean $\pm$ standard deviation. Qualitative data were presented as "number (%)". A 95% confidence interval (CI) and a significance level of $p < 0.05$ were adopted.

Results

This study included 200 individuals consisting of 94 females (47%) and 106 males (53%). Of the participants, 174 (87%) were younger than 65 years and 26 (13%) older than 65 years. Diabetes mellitus patients were administered the Beck Depression Inventory in order to determine the presence of symptoms of depression. According to the Beck Depression Inventory, 80 (80%) of the 100 diabetic patients showed symptoms of depression; these symptoms were severe in 8 cases, moderate in 38 patients, and mild in 34 patients. In the healthy group composed of 100 individuals, 38 showed symptoms of depression, which were moderate in 20 individuals and mild in 18 individuals. Responses to the items in the questionnaire were compared with regard to statistical significance and the outcomes were presented in the tables provided below (Table 1) (Table 2).

Mean scores on the Beck Depression Inventory, which represent self-reported depression states, were $17 \pm 8,5$ and $8,5 \pm 7,3$ for the patient and control groups, respectively. When these scores were compared across genders, females demonstrated a higher risk of depression (63.8%) than males (54.7%). Mean scores on the Beck Depression Inventory were determined as 14.4 for females and 11.34 for males, with a statistically significant difference in terms of the risk of depression ($p = 0.014$).

In the diabetic patient group, female patients had a mean Beck depression score of 19.4 while males had a score of 14.1, and this difference was statistically significant ($p = 0.002$). The mean HbA1c value was $6,3 \pm 3,2$ and HbA1c levels were determined to have a positive correlation with depression scores ($p < 0.001$). Hemoglobin A1c levels were significantly higher in those who showed a risk of depression than in those who did not (respectively, 8.67 and 6.08), and this difference was statistically significant ($p < 0.001$).

Table 1: Sociodemographic characteristics and clinical data of the study population

	Type 2 dm(n=100)	Control(n=100)	p
Age (years)	55,8 $\pm$ 11,8	52,8 $\pm$ 12	0,08
Married (n-%)	87 (87%)	86 (86%)	0,948
Smoke (n-%)	40 (40%)	52 (52%)	0,264
FBG(mg/dL)	163,5 $\pm$ 54,3	88,9 $\pm$ 10	<0,001*
ALT(U/L)	24 $\pm$ 14,8	27,4 $\pm$ 15,7	0,111
AST(U/L)	23,1 $\pm$ 10,8	22,6 $\pm$ 6,4	0,669
LDL-C(mg/dL)	125,5 $\pm$ 47,5	108,3 $\pm$ 32,4	0,003*
Triglyceride(mg/dL)	205,9 $\pm$ 159,3	123,7 $\pm$ 57	<0,001*
BUN(mg/dl)	22,9 $\pm$ 11,5	13,3 $\pm$ 3,55	<0,001*
Creatinine(mg/dL)	1 $\pm$ 0,79	0,77 $\pm$ 0,19	0,008*
HbA1c(%)	10,3 $\pm$ 2,4	4,8 $\pm$ 0,35	<0,001*

* Statistically significant differences.

Table 2: Depression scores of the study population

these parameters were higher in males, in contrary to the

	Type 2 dm(n=100) (m=46/f=54)	Control(n=100) (m=60/f=40)	p
BDI Scores(male/female)	14,1 ±7,7/19,4±8,5	9,1 ±7,5/7,7±7	
Total	17±8,5	8,5±7,3	<0,001*
BDI risk of depression(male/female)			
Minimal depression	14/6	34/28	
Mild depression	18/16	14/4	
Moderate depression	14/24	12/8	
Severe depression	0/8	0	

* Statistically significant differences.

Discussion

Besides being a chronic physical disease, diabetes mellitus is a chronic disease that can lead to a series of mental, emotional, social, and psychosexual problems for the patient.

While it can cause psychiatric disorders by impacting brain functions, psychiatric conditions may also arise from its impact on the daily lives of the patients. Such problems that accompany diabetes mellitus affect its manifestation, severity, and progress, as well as the response to the treatment.

The holistic approach to diabetic care requires the comorbid mental, psychological, psychophysiological, and psychosocial conditions to be diagnosed and treated besides considering the patients' physiological wellbeing (10).

In a study conducted by Patten (11), individuals with long-term medical disorders were reported to demonstrate a greater risk of developing major depression than those who did not suffer from long-term medical disorders. individuals who have myocardial infarction, DM, diseases associated with the human immunodeficiency virus, cancer, cerebrovascular events, and Parkinson's disease were found to experience a greater risk of developing major depression than healthy controls.

Chronic medical diseases also show a strong independent relationship with anxiety disorders (12). In this study, we aimed to investigate the causes of the increased risk of depression in type 2 DM that has been reported in the studies cited above.

We studied the relationship that levels of glycemic control, diabetic complications, and sociodemographic characteristics of patients diagnosed with the chronic disease of diabetes mellitus have with their risk of developing depression and anxiety.

Conclusion

In conclusion, we determined that, in patients who demonstrate an increased risk of depression that parallels elevated HbA1c levels, the presence of diabetic nephropathy and retinopathy increase the risk of depression. We found that females diagnosed with diabetes mellitus had higher Beck depression scores and a higher risk of depression than males; whereas in healthy controls,

Our study shines light on the prediction of the risk of depression in patients diagnosed with DM, and with the consideration that patients could need psychiatric treatment in combination with diabetic treatment, it has revealed the importance of maintaining psychiatric treatment in the management of DM patients.

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The use of methotrexate, vincristine, L-asparaginase and dexamethasone for salvaging adult acute lymphoblastic leukemia and lymphoma: a real-life experience

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Abstract

Objective: Despite recent improvements in the treatment options, adult relapsed/refractory Acute Lymphoblastic Leukaemia (ALL) and lymphoblastic lymphoma (LBL) exhibit poorer cure rates than in childhood. Since, the mainstay difference of childhood multidrug regimens is L-Asparaginase, we sought to salvage adult patients with a protocol containing methotrexate, vincristine, conventional L-asparaginase, and dexamethasone (MOAD). In this study, we aimed to summarize our experience.

Methods: Adult patients with relapsed/refractory ALL and LBL followed-up in our institution between 2017 and 2018 were reviewed and those treated with MOAD protocol were retrospectively included in the study. Clinical data, treatment responses, and adverse events were summarised. The protocol featured 28-day cycles of methotrexate 200 mg/m² intravenously (IV) on days 1 and 15; vincristine 1.4 mg/m² IV on days 1, 8, and 15; L-asparaginase 10,000 IU/m² IV twice weekly; and dexamethasone 40 mg IV or orally on days 1–4 and 15–18.

Results: A total of eight patients were enrolled, of median age 37 years (range: 21–58 years). Four patients were recovered after transplantation. Complete remission was evident in 38%. Two such patients underwent allogeneic hematopoietic stem cell transplantation after the protocol. Another patient with lymphomatous disease achieved partial remission and underwent successful transplantation. L-asparaginase did not trigger any clinically evident hypersensitivity reaction; the most common adverse events associated with the protocol were hypofibrinogenemia, anemia, and febrile neutropenia.

Conclusions: The MOAD protocol was effective and tolerable, enabling to salvage before and after transplantation, particularly in patients with relapsed/refractory T-cell acute lymphoblastic leukemia and lymphoblastic lymphoma.

Key-words: Acute lymphoblastic leukemia, Lymphoblastic lymphoma, methotrexate, vincristine, L-asparaginase, dexamethasone

Introduction

Acute lymphoblastic leukemia (ALL) is a disease that is poorly curable in adults, despite initial complete remission (CR) rates of 80–90% in newly diagnosed cases (1-2). Most patients relapse and up to 20% develop resistant disease. An effective salvage therapy is required, but attempted salvage using conventional chemotherapies after the first relapse yields CR rates of only 30–40% (2-4). After a second or later relapse, the outcomes are even poorer (5).

Currently, the only available potentially curative treatment is allogeneic hematopoietic stem cell transplantation (allo-HSCT). However, it is important to achieve remission prior to allo-HSCT in those with relapsed/refractory disease (6). Lymphoblastic lymphoma (LBL) is a rare disease that is biologically closely allied to ALL, but features only minimal or no bone marrow (BM) involvement. In adults, initial ALL-type regimens afford survival rates of about 70%, thus better than those of ALL patients.

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However, management of relapsed/refractory disease remains very difficult. Second-line therapies using the available drugs are associated with poor survival; to ensure effective salvage, HSCT is imperative (7).

Apart from the conventional multi-drug regimens, new agents seek to increase the response rates to re-induction therapy for both ALL and LBL (8-13). However, the high cost and limited availability of such agents compromise their use; and adult cure rates are still lower than those of children. The childhood multidrug regimens include L-asparaginase, this drug may be toxic to adults because toxicity increases with age (14). In a recent phase 2 study in adults of median age 42 years, a PEGylated formulation of L-asparaginase was successfully combined with methotrexate, vincristine, and dexamethasone to salvage relapsed/refractory ALL (15). Previously, a similar combination of methotrexate, vincristine, conventional L-asparaginase, and dexamethasone (MOAD) was given to adults newly diagnosed with ALL (16). However, to the best of our knowledge, only a few studies have used the MOAD protocol (thus including conventional L-asparaginase rather than the PEGylated form) to treat relapsed/refractory patients. Here, we summarise our experience with the MOAD protocol in patients with relapsed/refractory ALL or LBL; we used the protocol to bridge patients to allo-HSCT or to salvage them after HSCT.

Materials and Methods

Study design: We retrospectively reviewed adults followed-up in our institution for 2 years (2017–2018) who were diagnosed with relapsed/refractory ALL or LBL and treated using the MOAD protocol. Their demographic and clinical characteristics, responses to treatment, and adverse events were noted. Data were extracted from a dedicated electronic database created in accordance with the guidelines of the Joint Accreditation Committee: International Society for Cellular Therapy and European Blood and Marrow Transplantation (JACIE) (Nucleus ver. 9.3.39; Monad Software Co., Ankara, Turkey); all data were verified by an independent audit group. Side effects were recorded using the Common Terminology Criteria for Adverse Events (ver. 5.0).

Evaluations/definitions: BM aspiration, flow cytometric analysis, and/or BM biopsy were scheduled for ALL patients after the first course of salvage chemotherapy. Additionally, patients with extramedullary lymphomatous disease were subjected to detailed radiological imaging. Complete response or complete remission (CR) featured all of the following:

normalization of peripheral blood data (absolute neutrophil count (ANC) $>1 \times 10^9/L$, platelet count $>100 \times 10^9/L$, BM blasts $<5\%$, and no circulating blasts or extramedullary disease).

Refractory disease (RD) was defined as a failure to achieve CR, and relapsed disease was defined by re-appearance of blasts in the blood or BM ($>5\%$) or in any extramedullary site after CR had been attained. Progressive disease (PD) was defined as an increase $\geq 25\%$ in the absolute number of circulating or BM blasts, or development of extramedullary disease. A partial response (PR) in those with lymphomatous extramedullary disease was defined as a $>50\%$ decrease in lymphomatous enlargement (17). Progression-free survival (PFS) was the time from treatment initiation to disease progression or death.

The MOAD Protocol

The MOAD treatment cycle ran for 28 days and featured intravenous (IV) methotrexate 200 mg on days 1 and 15 (reduced by 50% if the creatine clearance rate was 10–50 mL/min); vincristine 1.4 mg/m² (maximum 2 mg) IV on days 1, 8, and 15 (reduced to 1 mg in those with pre-existing neuropathy and/or a bilirubin level 2–3 mg/dL and not given to those with a bilirubin level >3 mg/dL); L-asparaginase 10,000 IU/m² given IV twice weekly on days 2, 5, 9, 12, 16, 19, 22, and 25 (withheld if the bilirubin level was >3 mg/dL and/or if pancreatitis, thrombosis, or disseminated intravascular coagulation developed); and dexamethasone 40 mg IV or orally on days 1–4 and 15–18 of each cycle (Table 1). The levels of amylase and lipase; the prothrombin time (PT) and activated partial thromboplastin time (PTT); and the fibrinogen, bilirubin, and liver transaminase levels were measured prior to each administration of L-asparaginase. Intrathecal chemotherapy was used for prophylaxis or to treat active central nervous system disease if no contra-indication was evident. Fluconazole 200 mg/day (withheld on days of vincristine administration to reduce the risk of toxicity), valacyclovir 500 mg/day, and levofloxacin 500 mg/day, were given to prevent infection.

Statistical analysis: SPSS software ver. 24.0 (SPSS Inc., Chicago, IL, USA) was used for all statistical analyses. Descriptive data are shown as numbers with percentages for categorical data, and as means with standard deviations (or ranges) for continuous data. The study protocol was approved by the Baskent University Institutional Review Board (approval no. KA19/78) and adhered to all relevant tenets of the Declaration of Helsinki.

Table 1. The MOAD protocol

Day	1	2	3	4	5	8	9	12	15	16	17	18	19	22	25
Methotrexate (200 mg/m ²)	M								M						
Vincristine (1.4 mg/m ²)	V					V			V						
L-asparaginase (10000 IU/ m ²)		A			A		A	A		A			A	A	A
Dexamethasone (40 mg)	D	D	D	D					D	D	D	D			

Results

In the interval 2017–2018, eight patients with relapsed/refractory ALL or LBL were treated using the MOAD protocol and all were included in analysis. Their median age was 37 years (range: 21–58 years). In four of the patients, MOAD served as salvage therapy after HSCT. The ALL lineage was B-cell in nature in four patients, but all patients were negative for the Philadelphia chromosome. Table 2 summarizes patient demographic and clinical characteristics. In terms of initial diagnosis, all patients presented with leukemic disease except for one presenting with lymphoma without BM involvement. Three patients with initial leukemic presentations relapsed prior to MOAD; they developed lymphomatous disease without BM involvement. The total number of completed MOAD cycles was 10; 3 uncompleted cycles were also noted.

Commencing on the first day of therapy, the mean follow-up period was 212 days (range, 10–623 days). One patient received the same protocol twice at different times, once prior to HSCT because of refractory disease and once after HSCT because of relapse. Table 3 lists the details for each case. Three (38%) of the eight patients achieved CR after the first MOAD protocol. For two of these, MOAD served as a bridging regimen to allo-HSCT. However, all three eventually developed progressive disease, including the two who relapsed despite allo-HSCT. Two patients (25%) with lymphomatous disease (patients 1 and 5 in Table 3) entered PR after the first MOAD cycle. One retained PR status after the second cycle but progressed after the third cycle; the other proceeded to allo-HSCT and is being continuously followed-up – that patient is in PR (without progression) 4 months after transplantation.

Table 2. Patient characteristics (n=8)

Median age (years), mean (range)	37 (21–58)
Gender (male:female), n	5:3
Lineage, n (%)	
B	4 (50%)
T	4 (50%)
Disease status prior to MOAD, n (%)	
Leukemia	4 (50%)
Lymphoma	4 (50%)
Number of chemotherapies prior to MOAD, n (%)	
1–2	2 (25%)
>2	6 (75%)
HSCT prior to MOAD, n (%)	
Yes	4 (50%)
No	4 (50%)

Table 3: Summary of clinical courses.

Patient	Sex/ age (years)	Origin	Prior chemotherapy	Response to MOAD	MOAD cycles	HSCT after	Follow-up after MOAD	Follow-up period (days)	Outcome
1	M/26	T	HyperCVAD, FLAG, linker protocol, allo-HSCT, high-dose methotrexate/cytarabine, nelarabine, MEC, radiotherapy	PR after the first cycle	3	No	Progression evident after the third cycle	113	Exitus
2	M/50	B	HyperCVAD, FLAG, allo-HSCT, MEC, rituximab, high-dose methotrexate	CR after the first cycle	3	No	Progression evident after the third cycle	389	Continuing on inotuzumab
3	F/21	T	HyperCVAD, ICE, IGEV, autologous HSCT, high-dose methotrexate/cytarabine, nelarabine	CR	1	Yes	Progression evident on day 123 after HSCT	623	CR developed after liposomal vincristine
4*	F/58	T	HyperCVAD	CR	1	Yes	Progression evident on day 90 after HSCT	150	Exitus
4*			HyperCVAD, MOAD, allo-HSCT	NA	1**	No	NA		Exitus
5	F/58	T	HyperCVAD, ICE	PR	1	Yes	PR persisted to month 4 after HSCT	339	Continued PR
6	M/21	B	HyperCVAD, BFM protocol, FLAG	RD	1	No	NA	68	Exitus
7	M/43	B	HyperCVAD, FLAG, MEC	NA	1**	No	NA	10	Exitus
8	M/22	B	HyperCVAD, FLAG, MEC, blinatumomab	NA	1**	No	NA	11	Exitus

Discussion

Adult patients with relapsed/refractory ALL or LBL have dismal prognoses, respond poorly to salvage regimens, and survive only briefly (2,7). The only option is to seek a second CR followed by allo-HSCT; the goal of salvage treatment is therefore a new CR. Apart from the conventional multi-drug regimens, new targeting agents increase the chance of re-induction (18), but these are expensive and not always available, so take-up is low. Moreover, most such agents target B-lineage disease; few new salvage options for T-lineage disease are available. Alternatively, the response rate can be increased by incorporating agents (such as L-asparaginase) that are widely used to treat pediatric ALL into adult regimens. This is not always easy, because the childhood drugs may be toxic to adults. Here, we report our experience with the MOAD protocol (which includes L-asparaginase) in patients with relapsed/refractory ALL and LBL; we sought to bridge them to allo-HSCT or salvage them after allo-HSCT. We found that 38% of patients (n=3) achieved CR that persisted for a median of 105 days after MOAD; 25% (n=2) evidenced PR. Two leukemic patients in CR and one lymphoma patient in PR proceeded to allo-HSCT after MOAD; all had T-cell disease. Thus, the protocol served as a useful bridging regimen, particularly for patients with T-cell disease for which new salvage options are few, in contrast to B-cell disease. Three patients underwent allo-HSCT prior to MOAD, and that regimen was used to salvage relapsed ALL in these patients. One achieved a short CR (62 days), one died without completing the protocol, and the third (with a lymphomatous relapse) achieved PR but for less than 3 months. Salvage after allo-HSCT is intended to reduce tumour load, which enables a therapeutic allogeneic effect; chemotherapy is not used in an effort to attain CR (19). Thus, two of three patients benefited from MOAD used as a salvage regimen after allo-HSCT.

A few studies have used similar drug combinations in relapsed/refractory settings and reported different CR rates and durations. Esterhay et al. (1982) prescribed the same drugs as we did, but with a different schedule, to 14 previously treated patients: the CR rate was 79% and the median CR duration was 7.5 months (20). Aguayo et al. studied 32 patients of median age 34 years (range, 20–74 years): the CR rate was 22% and the median CR duration was 16 weeks (21). The principal differences between the regimen used in these cited works and MOAD were the use of dexamethasone rather than prednisolone, and incorporation of the PEGylated form of L-asparaginase (polyethylene-glycol conjugated-asparaginase). Tapan et al. also used PEGylated L-asparaginase in combination with methotrexate, vincristine, and dexamethasone to treat patients with relapsed/refractory disease of median age 42 years (range, 22–69 years): the CR rate was 28% and the median CR duration was 4.3 months (15). In contrast, our protocol included the conventional form of L-asparaginase, which is an advantage because conventional L-asparaginase is more readily available than the PEGylated form, although the latter drug exhibits better pharmacokinetic properties and tolerance, and is associated with fewer side

effects (22). In our present study, no patient experienced an allergic reaction during L-asparaginase administration. Additionally, all other treatment-related side effects were self-limiting; the most common side effect was hypofibrinogenemia.

One limitation of this study is that we included only a relatively small number of patients. However, very few reports have focused on relapsed/refractory patients who require allo-HSCT; our real-life clinical experience contributes to the knowledge in this area.

Conclusion

In conclusion, we suggest that a combination of methotrexate, vincristine, dexamethasone, and conventional L-asparaginase is well-tolerated, and can serve both as a bridge to allo-HSCT and as a salvage regimen after allo-HSCT, particularly in patients with relapsed/refractory T-cell ALL and LBL. Nevertheless, more work with larger numbers of patients is required to have more precise remarks and we hope our study will pioneer new prospective works about the issue.

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Efficacy and safety of intravenous iron sucrose treatment in children with iron deficiency anemia

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Abstract

Objective: The purpose of this study is to investigate the efficacy and safety of intravenous iron sucrose treatment in children with iron deficiency anemia who were unresponsive to or could not tolerate oral iron therapy.

Material and Methods: Among patients determined to have iron deficiency anemia, and were intolerant or noncompliant with oral iron therapy, 92 patients who have received parenteral iron therapy between the ages of 6 months and 18 years have been investigated retrospectively. Age, gender, patient complaints at application, dietary characteristics, accompanying diseases and treatment complications, and safety, tolerability, and adverse events have been assessed from the information obtained from patient files. Treatment efficiency was evaluated with hemoglobin (Hb), mean corpuscular volume (MCV) and ferritin results from the blood samples taken before treatment, at the second week of treatment and after two months.

Results: Mean age of patients was 12.5 ± 4.7 (age interval 1-17 years), and 21% was male while 79% was female. 72% of our patients were adolescents. From an etiological aspect, 56% of our patients was determined to have an iron-poor diet, 29% had functional menorrhagia, and 15% had chronic gastrointestinal system pathologies. Mean Hb, MCV and ferritin levels before and after treatment were found as: 7.72 ± 1.21 g/dl and 11.44 ± 0.68 g/dl; 63.2 ± 7.12 fL and 76.6 ± 3.81 fL; 3.87 ± 2.52 nmol/L and 57.94 ± 17.19 nmol/L, respectively ($p < 0.001$). 94% of patients were determined to have at least 2 g/dL (mean value 3.71 [range 1.6-6.3]) increase in their Hb levels. Anaphylaxis was observed in a patient who had a history of allergy despite applying premedication.

Conclusion: Parenteral iron therapy is an efficient and safe treatment among indicated patients.

Keywords: children, intravenous iron, iron deficiency anemia, iron sucrose

Introduction

Iron deficiency anemia (IDA) is still a common health problem in childhood around the world. While it has various reasons, nutritional IDA is the most important reason for anemia. Iron deficiency (ID) and IDA are among the top fifteen diseases all around the world with regard to global burden of disease. According to 2001 data of World Health Organization, 30% of children aged between 0-4 and 48% of children aged between 5-14 are anemic in developing countries (1-3). In various studies from our country performed on childhood, it was reported that the prevalence of IDA is between 15.2% and 62.5% (4-7).

Particularly in infancy and adolescence, the most common reason for IDA development is inability to meet the increased need for iron with nutrition. It is recommended to examine the presence of underlying bleeding, parasitosis or malabsorption disorders such as celiac disease in childhood

and adolescence (1). Oral administration is primarily preferred as iron therapy since it is economic and has a low number of side effects. The use of 2-3 dose of drugs every day for two or three months is quite difficult for the child and the family, and problems in treatment compliance are common. Parenteral iron therapy can be applied upon intolerance to oral iron treatment, in cases requiring rapid recovery of anemia, and in malabsorptive-digestive problems such as celiac disease or inflammatory bowel disease. There is a small number of studies comparing parenteral and oral iron therapy for IDA due to nutritional deficiency in childhood, and there is a need for more studies in this subject. Iron supplements that have been released to the market in recent years have been safer, and have a relatively low number of adverse effects. However, it should be kept in mind that these adverse effects are serious (8).

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Parenteral iron treatment is administered through intramuscular (IM) or intravenous (IV) route. Particularly after rapid infusion, findings such as allergy, anaphylaxis, low blood pressure, nausea, vomiting, and abdominal pain may be developed (9). There are no sufficient efficacy and adverse effect results on the literature for the use of IV iron in the treatment of iron deficiency anemia in childhood. Over recent years, parenteral iron preparations on the market (such as iron sucrose and ferric carboxymaltose) have been safer and had a very low number of adverse effects (10,11). The purpose of our study is to investigate the efficacy and safety of intravenous iron sucrose treatment in children with IDA who were unresponsive to or could not tolerate oral iron therapy.

Materials and methods

Setting and study population

Among patients who have applied to Bursa Dörtçelik Children's Hospital Pediatrics Clinic between dates April 01, 2013 – March 31, 2014, determined to have iron deficiency in the result of performed tests and who have received parenteral iron therapy due to intolerance and noncompliance against oral iron therapy; the clinical and laboratory characteristics of children between the ages of 6 months and 18 years were retrospectively investigated in our study. The study was approved by the local ethics committee. Before being included in the study, written informed consent was obtained from all parents or legal guardians of the patients.

The diagnosis of IDA was determined when red blood cell mass and hemoglobin concentration was -2 SD lower than values that were recognized to be normal according to age, gender, and physiological status. Red blood cell indices of MCH (<27 pg), MCHC (<30% units), RDW (>15 units) and ferritin <12 nmol/L were included among diagnostic criteria (9). Gynecological examinations, gastroscopy and/or colonoscopy were performed on necessary patients to determine the etiology of iron deficiency. Celiac antibodies were checked in patients with positive fecal occult blood results or determined to have delays in growth development parameters.

Iron treatment

Inability to tolerate oral iron therapy, not responding to oral iron administration after a sufficient period, continued blood loss and inflammatory bowel disease have been recognized as parenteral iron therapy indications (All patients have been using at least 2 different iron preparations 2-3 doses in a day or at 5-6 mg/kg/day dose for at least 3 months before being included in the study).

Daily IV iron level to be administered was determined as 50-200 mg. For 43 patients, it was observed that test dose was applied in the first infusion. In the treatment of patients, iron deficit was calculated and treated by using a 2-hour infusion of iron preparations, which were in ampoule form and contained ferric hydroxide sucrose drug substance, after reconstituting those with 100 ml 0.09% isotonic saline, at a maximum of 50 mg/day dose below 10 kg body weight, a single dose of 100 mg / day in infants, and 2 doses of 200 mg / day IV in older children.

Iron deficit is calculated by the following formulation (12):

$$\text{Iron Deficit} = \frac{(\text{Intended Hb level} - \text{Patient's Hb level})}{100} \times \text{Blood Volume} \times 3.4 \times 1.5$$

Efficacy and safety

Patients were examined with regard to age, gender, patient complaints at application, dietary characteristics, accompanying diseases and treatment complications. Hb, MCV, and ferritin results were examined retrospectively from blood samples taken before parenteral therapy and in controls at treatment day 14 and month 2. The patients whose Hb levels were increased 2 g/dL or higher in the post-treatment control were evaluated as "benefited from treatment".

Statistical analysis

Characteristic data are presented as n (%) for categorical variables, and as mean $\pm$ SD or median (interquartile range [IQR]) for continuous variables, as appropriate.

Paired t-tests were used in order to compare parameters of our study before, during and after treatment.

All tests were two-tailed and p-values <0.05 were considered to indicate statistical significance. Statistical analyses were performed by using SPSS version 21.0 (SPSS Inc., Chicago, IL, USA).

Results

Mean age was determined as 12.5 ± 4.7 (range 1-17 years) in a total of 92 patients included in our study. Nineteen (21%) patients were male, while 73 was (79%) female. 79% of our patients were in adolescence. From an etiological aspect, 56% of our patients was determined to have an iron-poor diet, 29% had functional menorrhagia, and 15% had chronic gastrointestinal system pathologies (7% chronic gastritis, 6% celiac disease, 2% ulcerative colitis) (Table 1).

Table 1. Causes of iron deficiency anemia

Condition	n
Nutritional iron deprivation	51
Functional menorrhagia	26
Gastritis due to <i>Helicobacter pylori</i>	7
Celiac disease	6
Ulcerative colitis	2
Total	92

Efficacy

The number of iron sucrose infusions per patient ranged from 3 to 8 (median: 5), the individual doses from 100 mg to 200 mg (median: 200 mg), and the total doses from 200 mg to 1200 mg (median: 1000 mg).

Mean Hb blood level before treatment was 7.72 ± 1.21 g/dl (range 5–10.1 g/dl). It was observed that Hb levels increased to 10.0 ± 0.78 g/dl (range 8.0–11.8 g/dl) at post-treatment day 14 and to 11.44 ± 0.68 g/dl (range 9.2–13.0 g/dl) at post-treatment month 2. The rise in Hb blood

level was found to be statistically significant both 14 days and 6 months after starting iron therapy ($p < 0.001$) (Figure 1). As treatment response, at least 2 g/dL (mean value 3.71 ± 1.09 [range 1.6-6.3]) increase was determined in 94% of patients considered as having benefited from treatment.

Mean MCV levels were 63.2 ± 7.12 fL (range 43.4-81.7 fL) before treatment. It was observed that MCV levels were elevated to 72 ± 5.38 fL (range 53-82 fL) at day 14 and 76.6 ± 3.81 fL (range 65-87 fL) at the end of 2 months. A statistically significant difference was determined between levels measured before treatment and during treatment ($p < 0.001$). Serum ferritin level prior to therapy was low in all patients: mean 3.87 ± 2.52 nmol/L (range 1–12.9 nmol/L). The serum ferritin level rose to a mean of 44.9 ± 14.58 nmol/L (range 24–88 nmol/L) after 14 days, and 57.94 ± 17.19 nmol/L (range 29–102 nmol/L), after 2 months.

The rise in ferritin level was found to be statistically significant both 14 days and 6 months after starting iron therapy ($p < 0.001$) (Figure 2).

Safety

Two patients had short-term chest pain following iron infusion. Physical examination of these patients, saturation, electrocardiogram and cardiac enzymes were determined to be normal. It was found out that these 2 patients were followed up in pediatric psychiatry department due to anxiety. Despite applying premedication, anaphylaxis was observed in a patient who had a history of allergy. Two patients were observed to have swelling and discoloration on vascular access secondary to drug extravasation. No venous thrombosis was observed in any of the patients.

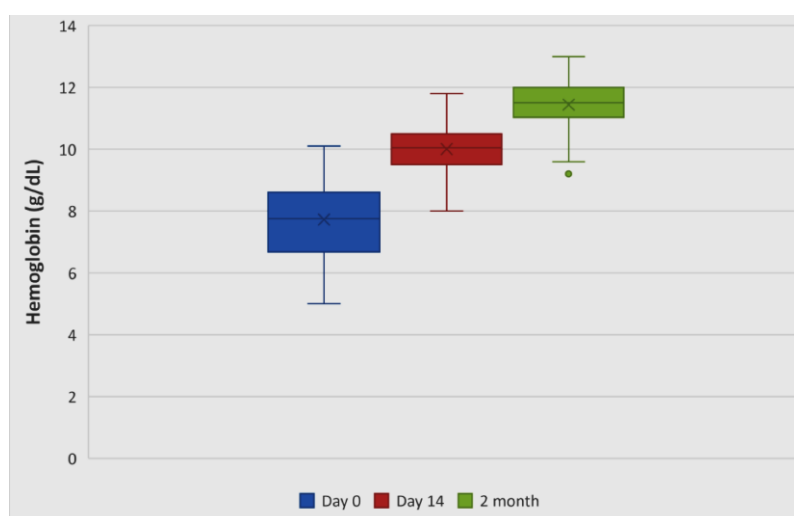


Figure 1. Differences in mean hemoglobin levels measured on day 0, day 14 and 2 month after starting intravenous iron therapy. The rise in hemoglobin blood level was found to be statistically significant both 14 days and 6 months after starting iron therapy ($p < 0.001$).

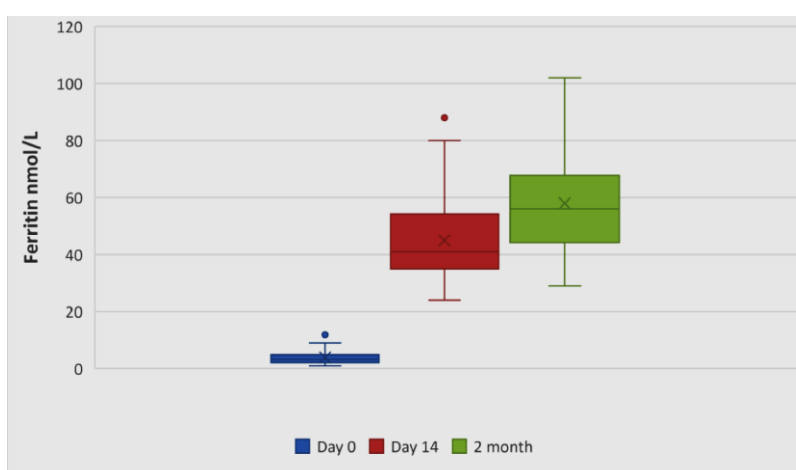


Figure 2. Differences in mean ferritin levels measured on day 0, day 14 and 2 month after starting intravenous iron therapy. The rise in ferritin level was found to be statistically significant both 14 days and 6 months after starting iron therapy ($p < 0.001$).

Discussion

Iron deficiency is the most common nutritional deficiency around the world, and it is an important public health problem particularly in developing countries. It is most commonly observed in childhood at infancy and in menstruating adolescents, however, all children with increased growth rate whose needs are not met sufficiently are under risk (8).

Since IDA is known to affect physical and neurocognitive functions in particular, it should be recognized and treated in childhood (13). In our study, 56% of cases had deficiencies in their diet that posed a problem with regard to anemia. In compliance with literature, nearly all of cases were determined to have significant deficiencies in red meat consumption (14).

It is also known that adolescents will develop IDA if increased iron need due to rapid growth is not met. The rate of adolescents with IDA in our study group were determined to be 79%, and as stated in the literature, it can be said that adolescents are under the risk of ID (10). Also, chronic blood loss is commonly observed in the etiology of this group. Functional menorrhagia was determined to be 36% in this group in our study, and it attracts attention as an important cause.

Oral administration is primarily preferred as iron therapy since it is economic and has a low number of side effects. Parenteral iron therapy can be applied upon intolerance to oral iron treatment, in cases requiring rapid recovery of anemia, and in malabsorptive-digestive problems such as celiac disease or inflammatory bowel disease.

In the study of Crary et al. (15), mean Hb increase in patients who cannot tolerate oral iron therapy was 0.05 (-1.0 - 1.0) g/dL with oral therapy, while it was 3.1 (0.8 - 7.6) g/dL with IV iron sucrose. In patients with chronic blood loss, mean Hb increase was determined as 0.65 (-1.4 - 5.7) g/dL with oral treatment while it was 1.9 (0.2 - 6.6) g/dL with IV iron sucrose. In the study of Pinks et al. (16) on the efficacy and safety of intravenous iron sucrose treatment in pediatric patients with IDA, mean Hb level was 7.43 g/dL before treatment, while it was 9.27 g/dL on day 14 and was determined to increase to 12.4 g/dL at month 6. The ferritin level, which was 3.5 nmol/L before treatment, was also determined to increase to 60 nmol/L on day 14 following treatment, and it returned to normal limits (16-250 nmol/L) on month 6, decreasing to 27.99 nmol/L.

In their efficacy and safety study of parenteral iron (ferric carboxymaltose and iron sucrose) on children with inflammatory bowel disease, Papadopoulos et al. (17) have determined 2.5 g/dl mean Hb increase and observed side effects of urticaria rash in all three cases. It was determined in our study that 94% of our patients benefited from treatment. Mean 3.71 ± 1.09 g/dl Hb increase was observed, and the efficacy of parenteral iron therapy was statistically determined.

Being first used on 1930s in only rare cases, parenteral iron (iron oxyhydroxide complex) 22 treatment was observed to have very serious adverse effects (18,19). Bioavailability was increased with a high- molecular weight iron dextran

developed in 1950s, and allergic reactions were observed at 0.6%-2.3% rate. Later, while ferric gluconate was safer compared to iron dextran, the incidence of anaphylaxis could not reach the intended level, remaining at 0.04% (20-23).

With the clinical use of iron sucrose in 2000s, the incidence of anaphylaxis was reduced to 0.002%. The biggest disadvantage of iron sucrose is the low maximum single administrable dose, and this causes numerous individual infusions in order to reach therapeutic dose. Lastly, ferric carboxymaltose was released in Europe in 2007, licensed for patients older than age 14. 1000 mg dose of iron can be administered in a single application and it can be applied for 15-60 minutes at a relatively fast manner without requiring a test dose, therefore hospitalization period and cost can be reduced (24).

In the study of Pinks et al. (16) on a group of 45 pediatric patients, it was reported that 1 patient experienced temporary hypotension half an hour after starting IV iron sucrose administration that has recovered after pausing the treatment, and 2 patients experienced discoloration without pain around the vascular access intervention area due to drug extravasation that subsided in 24 hours.

Crary et al. (15) has reported in their IV iron sucrose study performed on 38 pediatric patients that 6 patients experienced adverse effects; 1 of which was headache, 2 were abdominal pain, 1 was temporary hypotension, 1 was vasovagal syncope, and a 15-year-old patient was reported to experience an anaphylactoid reaction 10 minutes into the infusion with diffuse pain on his body, swelling on his face, weak pulse and hypotension and it was reported to alleviate with epinephrine, diphenhydramine, and methylprednisolone.

Meanwhile, Mantadakis et al. (12) have reported that 3 patients developed injection site extravasation and 1 patient had a temporary change in taste in their study performed on 12 pediatric patients. Papadopoulos et al. (17) have stated that among 35 patients receiving ferric carboxymaltose, 2 patients had rash after completing the first infusion, and one case had an urticarial rash that started in the first 30 minutes of infusion and an allergic reaction accompanied by hypotension that recovered rapidly with IV chlorphenamine.

Premedication with antihistamines (diphenhydramine) was reported to have caused the majority of perceived reactions to IV iron in one large cohort (25). Patients with asthma or drug allergies should be routinely pre-medicated with methylprednisolone or hydrocortisone prior to IV iron infusion. In our study, anaphylaxis was observed in a patient who had a history of allergy despite applying premedication, and 2 patients were determined to have swelling and discoloration on vascular access secondary to drug extravasation. No venous thrombosis was observed in any of the patients.

Compared to the patient number in literature studies, our study group seems to have a valuable number of patients. It was observed in our study that parenteral iron administration rapidly recovered the general symptoms of

anemia in suitable cases with regard to parenteral iron therapy indications in particular, and the intended increase was attained in 94% of patients with this treatment.

Since it provided rapid symptomatic recovery and improvement in quality of life in patients with IDA symptoms even while treatment is continued, it can be seen that parenteral therapy is a good option. Based on these reasons, we consider that the application of parenteral therapy would be right in indicated cases.

In the result of our study, we would like to state that nutritional ID is still an important etiological factor and emphasize the importance of evaluating gastrointestinal system in chronic blood loss, and particularly in girls, gynecological evaluation against functional menorrhagia. Contrary to usual belief, it can be said that the risk of developing anaphylaxis is lower in pediatric age group compared to adults.

Our study has contributed to the limited number of pediatric studies on literature. Nevertheless, in order to avoid the most important limitation of our study, which is the possibility of misleading results residing in the nature of every retrospective study, prospective planning of future studies is considered to be valuable.

Conclusion

Parenteral iron therapy is quite efficient in the treatment of IDA when used in suitable cases. Contrary to popular belief, adverse effects are lower and milder in pediatric patient group compared to adults. The application of parenteral iron therapy is efficient and safe in children who cannot tolerate oral iron therapy, do not benefit from oral iron therapy or have chronic diseases such as celiac disease which disrupt iron absorption.

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Evaluation of the relationship between MIH severity and dental fear among the children

Can Özükoç^{1*}

Abstract

Objective: Molar incisor hypomineralization (MIH), a quite common condition in pediatric dentistry, whose treatment might seem complicated, manifests itself with severe dental anxiety and fear that can cause behavioral problems. Although dental fear is seen in almost all cases, it is believed that dental fear will increase as the severity of MIH increases. This study evaluates the relationship between MIH severity and dental fear.

Material and Methods: Children Fear Survey Schedule-Dental Subscale (CFSS-DS) was used to measure dental fear in 58 (51.79%) children whose teeth suffered from mild, moderate or severe MIH and 54 (48.21%) children with healthy teeth. Scores between 1 (not afraid at all) and 5 (very afraid) were given according to the responses. Each question was evaluated separately in order to obtain the total score.

Results: Children with severe MIH who participated in the study were proved to be more afraid of the dentists, drill sounds, injections, placement of instruments in the mouth, choking and going to the hospital; and there was a statistically significant difference ($p < 0.05$).

Conclusion: Although it was observed that the severity of MIH and dental fear are correlated and dental fear increases with the increase in the MIH severity, further studies in this subject are necessary.

Keywords: Anxiety, CFSS-DS, Dental Fear, Molar Incisor Hypomineralization, Pediatric Dentistry.

Introduction

Molar incisor hypomineralization is defined as a morphologic enamel defect as a result of mineral deficiency due to systemic causes, that can be seen in one third or more of the occlusal surface of the molars and incisal surface of the incisors.(1) Clinically, they are demarcated qualitative defects that vary from white opaque to yellow-brown lesions. In many cases, dental problems such as severe tooth sensitivity and even loss of teeth due to demarcated hypomineralized enamel can be seen in first permanent molar teeth (2,3). The probability of dental problems varies in direct proportion to the severity of MIH. Nowadays, molar incisor hypomineralization is categorized into three groups as mild, moderate and severe (4). In the most common mild type, enamel surface loss is not observed, but opacity occurs. Enamel with a defect is of normal thickness but its color changes from white to yellow-brown. The incisors are usually slightly affected. There are demarcated opacities in the non-stress bearing areas of the molar teeth. Loss of enamel due to fracture in the opaque areas and cavity in the affected enamel are not observed.

There is no sensitivity in the tooth, but the number of atypical restorations increases as the child grows older (5).

In moderate hypomineralization, demarcated opacities occur in the incisal/occlusal surfaces of the teeth. Fractures after the eruption of the tooth or cavities are limited to 1 or 2 surfaces of the tooth, tubercles not included. It is stated that the sensitivity of the tooth is generally within normal limits. The patient or the families often have aesthetic concerns (5).

In the severe type, post-eruptive enamel loss, atypical cavities, atypical restorations and necessary tooth extraction occur. Approximately half of the children with affected permanent molars have also clinical symptoms in their incisors, 1/3 of them have severe hypomineralization (6). In children with severe type molar incisor hypomineralization, defects turn into dynamic lesions with age. The number of restorations and the number of extracted teeth are increased due to dynamic lesions (7).



The defects of the incisors also affect the psychological and social development of the children. Therefore, the treatments should not only be clinical but also meet the psychological and social needs (8).

The treatment is complex due to dental fear and behavioral disorder problems in children with molar incisor hypomineralization. A study, which evaluated the results of a fear-measuring scale on children who had hypomineralized molar teeth and children in the follow-up group who had healthy enamel, showed that children with hypomineralized teeth are considerably afraid of going to the hospital and choking (2). However, there aren't any previous researches that evaluate the relationship between the severity of MIH and fear. The purpose of this study is to examine the relationship between the severity of MIH and fear in children.

Material and Methods

The study was initiated after the necessary permissions were given by the Medical Research Ethics Committee of Istanbul Medipol University (Approval no:546). A literature review was made and it was decided to use Children Fear Survey Schedule - Dental Subscale (CFSS-DS), a validated psychometric method which had been developed by Cuthbert and Melamed in 1982 and had previously been used in several studies.(9,10)

The study was conducted at Istanbul Medipol University Faculty of Dentistry Pediatric Dentistry Clinic between the dates 06.07.2019 - 10.08.2019. Among the children whose teeth were brushed with a disposable toothbrush, 112 children in total were included in the study: 58(51.79%) (26 male, 32 female), children between the age of 8-12 who weren't mentally retarded, who had at least one permanent molar tooth affected by MIH and 54(48.21%) (27 male, 27 female) randomly selected children who didn't have any affected teeth. The severity of MIH was determined during dental examination. CFSS-DS, consisted of 15 questions, was conducted after getting written consent from the children and their parents. The participants were asked to answer all of the survey questions. The questions of the survey are shown in Table 1.

The results were examined and the relationship between the age, gender, MIH severity (mild/moderate/severe) and dental fear level was evaluated. The CFSS-DS consists of 15 items relating to different aspects of dental treatment possible scores range from 1 (not afraid at all) to 5 (very afraid). According to the scoring system, every answer had a value between 1-5 and the total score ranged between the 15-75. Every answer was evaluated separately and the total score between 15-25 showed no dental fear, 26-32 showed mild dental fear, 33-38 showed moderate dental fear but the fear can be kept under control or the fear is borderline; the total score of 39 and above showed severe dental fear.

The data were analyzed using computerized Statistical Package for Social Sciences (SPSS) 21 for windows (SPSS Inc. Chicago, IL, USA). ANOVA test was used to compare the means of multiple variables. An Independent-Samples T-test was used to compare the means of two variable, while Chi-Square test was used when proportions were compared. The level of statistical significance was chosen at $p < 0.05$.

Results

The average score of the answers to the CFSS-DS, which consisted of 15 questions, showed that all children were afraid of dental drills and injections. Children with MIH, who were similarly more afraid of the dental drills and injections, were also afraid of the dentists, dental examinations, opening their mouth, someone touching them harshly or someone looking at them, placement of any instruments in the mouth, choking and going to the hospital and there was a statistically significant difference ($p < 0.05$). The data concerning the questions and the answers are shown in Table 1.

Where the relationship between MIH severity and the answers to the CFSS-DS questions was concerned, there wasn't a statistically significant difference between the mild and moderate MIH follow-up group but the average score was higher. As for the relationship between the severe MIH and the other groups, it was proven that the children were more afraid of dental drills, injections, drill sounds, placement of instruments in the mouth, choking and going to the hospital; and there was a statistically significant difference ($p < 0.05$). The data concerning the relationship between the CFSS-DS questions and the severity of MIH are shown in Table 1.

The total CFSS-DS score, obtained by adding all the scores of the answers, showed that rate of the children whose score was between 15-25 (no dental fear) was 48.21%; between 26-32 (mild dental fear) was 27.67%, between 33-38 (moderate fear but the fear can be kept under control) was 14.28% and 39 and above (severe dental fear) was 9.82%. The distribution of the CFSS-DS total score by the number of children is shown in Table 2.

The total CFSS-DS score average showed that the control group (23.47) had the lowest score and it was respectively increasing in the mild (24.74) and moderate (26.34) groups while the severe group (41.52) highest score; and there was a statistically significant difference ($p < 0.05$). The distribution of the total score by the groups and the maximum and minimum values obtained in every group are shown in Table 3.

Table 1. Mean scores of the CFSS-DS.

Item	Control Mean±SD	Mild Mean±SD	Moderate Mean±SD	Severe Mean±SD
1.Dentists	1.49±0.77	1.54±0.74	1.98±0.96	** 3.21±1.12
2.Doctors	1.36±0.68	1.40±0.82	1.48±1.10	* 2.34±0.88
3.Injections	2.30±1.42	2.49±1.18	2.56±1.24	** 4.48±0.37
4.Having somebody examine your mouth	1.35±0.74	1.39±0.78	1.39±0.78	**2.21±0.82
5.Having to open your mouth	1.01±0.59	1.15±0.65	1.19±0.76	** 2.06±0.92
6.Having a stranger touch you	1.27±0.69	1.31±0.69	1.42±0.77	**2.49±0.99
7.Having somebody look at you	1.14±0.62	1.12±0.58	1.48±1.12	**2.40±1.02
8.The dentist drilling	2.44±1.24	2.65±1.24	2.72±1.54	**4.02±0.63
9.The sight of the dentist drilling	1.76±0.95	1.86±1.12	2.01±1.25	*2.95±1.32
10.The noise of the dentist drilling	1.84±0.92	1.92±1.03	2.00±1.22	*3.46±1.35
11.Having somebody put instruments	1.78±0.86	1.95±1.32	2.21±1.36	*3.38±1.44
12.Choking	1.77±0.91	1.82±0.99	1.72±0.95	*3.10±1.02
13.Having to go to the hospital	1.61±0.76	1.80±0.85	1.86±0.92	*3.04±1.17
14.People in white uniform	1.16±0.61	1.11±0.66	1.14±0.54	1.17±0.87
15.Having the nurse clean your teeth	1.19±0.57	1.23±0.64	1.18±0.66	1.21±0.60
Total	23.47±12.33	24.74 13.29	26.34±15.17	41.52±14.52

*p<0.05; **p<0.01.

Table 2. CFSS-DS Total score and number of children relation

CFSS-DS Total Score	Number of Children (%)
15-25	54 (48.21%)
26-32	31 (27.67%)
33-38	16 (14.28%)
>38	11 (9.82%)

Table 3. MIH severity and total CFSS-DS score relation

MIH Severity	Person n (%)	Maximum score	Minimum score	Average score
Control group	54 (48.21%)	31	15	23.47
Mild	26 (23.21%)	30	15	24.74
Moderate	19 (16.96%)	36	16	26.34
Severe	13 (11.60%)	62	19	*41.52

*statistically difference

Discussion

Dental fear; is a normal emotional reaction that occurs during dental procedures against fear stimulants. Dental anxiety on the other hand, is the concern that something terrible will happen during the dental treatment and the feeling of losing control (11).

Studies conducted on different populations reported that the frequency rate of dental fear in children is 5-28% (12). However, the probability of encountering dental fear during dental treatments in children varies between 3% and 43% depending on the populations studied (9,13-16).

Dental fear and anxiety are stated to be affected by age, gender, socioeconomic and demographic factors (17). Although there are few studies directly investigating the relationship between dental fear and anxiety and sociodemographic status, it has been reported that the relationship between dental anxiety and social class is strong (18,19). Similarly, low socioeconomic status is a part of the MIH etiology as it is one of the reasons of MIH (4). Dental fear is a common condition in children with MIH, but studies conducted on children with affected teeth showed that due to dental fear and anxiety, children often

open their mouth unwillingly and over-reach to air spray during their dental examination and when an instrument is placed in their mouth in the course of dental treatment.(6) Therefore, some researchers recommend that treatments should be performed under sedation or general anesthesia.(4,6,7) The aim of this study was to evaluate the relationship between the severity of hypomineralization and dental fear which is often seen in children who were affected by MIH. Many scales have been developed to examine the subjective concept of fear in the clinic. CFSS-DS, a scale with high-validity that had previously been used in many studies (14-16) and proved to be the best scale to measure dental fear, was preferred. The total score ranged from 15 to 75. It was stated that the score between 15-25 showed no dental fear, 26-32 showed mild dental fear that can be kept under control, 33-28 showed moderate dental fear and anxiety, 38 and above showed severe dental fear and anxiety. However, there are authors who suggest that the Borderline score is between 32-38, indicating that children in that range are at risk of having dental fear and need to be studied meticulously.(9,16) The study that was conducted showed that, the total score average was 41.52 in children with severe MIH. In addition, while the total score

was found to be the lowest in the control group (23.47), the average score gradually increased and the total score of severe MIH (41.52) was the highest. When the data was examined, it was concluded that dental fear increases with the severity of MIH. In a study (10) examining dental fear, the rate of the children with a score of 39 and above was 6%, while it was 9.82% in this study. This suggests that dental fear may be higher in children with MIH. When the answers given to the questions were examined, it was seen that children are afraid of injections, opening their mouth and the instruments used by dentists the most. Similar results (9, 20) were found in similar studies. However, the average values obtained in the severe MIH group were higher than those obtained in previous studies. These results confirm that dental fear and anxiety may be higher in children with MIH, and dental fear and anxiety will increase with the increasing severity of MIH.

Conclusion

The study showed that there is indeed a relationship between the severity of MIH and dental fear, and dental fear increases with the increasing MIH. However, some children do not have dental fear even though they have severe MIH. Since there are many factors in the etiology of MIH, it is necessary to determine the factor or factors causing dental fear and further studies are necessary.

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