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Paternal addiction to cigarettes, alcohol, and opium and the psychological distress of their youths in southeast Iran

Majid Kazemi[1], Parvin Khalili[2], Hadi Hasani[3], Fatemeh Chavoshian[4], Zahra Jalali[5,6], Maryam Hadavi[5,7], Carlo La Vecchia[8] & Zahra Jamali[9,10]✉

Previous studies have reported inconsistent findings regarding paternal addiction to cigarettes, alcohol, and opium with psychological distress in youths. This study examined the association between paternal addiction to cigarettes, alcohol, and opium and the psychological distress of youths in southeast Iran. This cross-sectional study was conducted on 895 youths (aged 15–35) from the baseline phase of the Rafsanjan Youth Cohort Study (RYCS) whose fathers also participated in the Rafsanjan Cohort Study (RCS). The RYCS is a part of the RCS, a branch of prospective epidemiological research studies in Iran (PERSIAN). Smoking, alcohol consumption, and opium usage in youths and their fathers were assessed using a self-reported questionnaire. Psychological distress was assessed using the Kessler Psychological Distress Scale (K6 and K10). Fathers who used opium were more likely to have youth with psychological distress based on the K6 score (OR:1.37, CI:1.01–1.86) and K10 score (OR:1.34, CI: 1.01–1.80). The duration of opium consumption lower than or equal to the median was associated with increased odds of having a youth with psychological distress based on the K6 or K10 scores (OR:1.62, CI:1.14–2.31, OR:1.44, CI:1.01–2.03 respectively), but there was no significant association with duration above the median. In addition, consuming opium more than the median dosage increased the chance of having a psychologically distressed youth up to 1.47 times based on the K6 score (OR 1.47, CI 1.01–2.14) and 1.55 times based on the K10 score (OR 1.55, CI:1.08–2.22). Smoking cigarette duration lower than or equal to the median increased the chance of having a psychologically distressed youth to 1.52 times more based on the K6 score (OR 1.52, CI 1.07–2.15). There was no significant association between paternal alcohol consumption and the odds of having a psychologically distressed youth. Parental addiction to opium can lead to an increase in psychological distress in youths in the absence however of a consistent dose and duration relationship.

Keywords Paternal addiction, Cigarette, Alcohol, Opium, Psychological distress, Youth, Rafsanjan Cohort Study (RCS), Prospective epidemiological research studies in Iran (PERSIAN)

Living healthy is everyone's right and the role of external factors in achieving this right is certain[1]. The young population is on the edge of vulnerability in terms of its ability to control external factors such as biological changes, economic, cultural, and social factors, as well as school or family conditions. The young population

[1]Department of Medical Surgical Nursing, Faculty of Nursing and Midwifery, Non-Communicable Disease Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [2]Department of Epidemiology, School of Public Health, Social Determinants of Health Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [3]Department of Nursing, School of Nursing and Midwifery, Shahroud University of Medical Sciences, Shahroud, Iran. [4]Department of Medical Surgical Nursing, Faculty of Nursing and Midwifery, Geriatric Care Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [5]Molecular Medicine Research Center, Research Institute of Basic Medical Sciences, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [6]Department of Clinical Biochemistry, School of Medicine, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [7]Department of Anesthesiology, Paramedical Faculty, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [8]Department of Clinical Sciences and Community Health, Università degli Study di Milano, Milan 20133, Italy. [9]Pistachio Safety Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. [10]Clinical Research Development Unit (CRDU), Niknafs Hospital, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. ✉email: zahrajamali2959@gmail.com

frequently has psychological problems, and being in an unfavorable environment in the family can put more pressure and make it more difficult for them to adapt to problems that are out of their control[2]. National surveys in the United States have shown that the prevalence of depression in adolescents and young adults has increased in recent years[3]. A national study on Iranian youth reported that 39% had some level of psychiatric disorder and 37.3% had at least one risky behavior[4].

Psychological distress is associated with substance addiction, increased use of health services, impaired activities of daily living, and physical health[5]. Addiction is one of the social problems that causes psychological disorders for addicts and their families. Statistics show that between 2009 and 2014, about 3% of American children under 17 years old lived in a home with at least one parent with a substance abuse problem[6]. Most of the children's behavioral problems were closely associated with the family in which they live[7,8]. Hanson et al. reported that parental alcohol or drug abuse can lead to psychiatric disorders in adolescents[9]. Fuller-Thomson et al. reported that adults exposed to parental drug and alcohol addiction had 69% higher odds of depression compared to the control group after controlling the confounding factors[10]. Some articles specifically evaluated the psychological problems of children and youths with addicted parents. Pederson reported that lack of good paternal care was a stronger predictor for some of the internalizing disorders such as anxiety and depression, while lack of good maternal care was a better predictor for externalizing disorders like delinquency[11]. Ohannessian et al. reported that the depression or alcohol dependence of only the father can predict adolescent alcohol dependence and maternal alcohol dependence had no relationship with adolescent psychiatric problems[12].

To our knowledge, no study has been done on the prevalence of psychological distress among youths with paternal addiction in Iran. Considering the high prevalence of opium addiction in southeast Iran[13] and the fact that the children of addicted parents often grow up in environments with weak emotional relationships[7,8], it is important to evaluate the relationship between paternal addiction and the psychological distress of youths to take preventive measures and reduce health costs and improve the health system.

Materials and methods

Study population

The current cross-sectional study was conducted on 3006 youths aged 15–35 years in the Rafsanjan Youth Cohort Study (RYCS). The RYCS is a part of the Rafsanjan Cohort Study (RCS)[14], which is a branch of prospective epidemiological research studies in Iran (PERSIAN)[15]. The RYCS started in 2016 in both urban and rural regions of Rafsanjan in southeast Iran and follow-up visits are ongoing. RYCS aimed to evaluate the prevalence and incidence of psychiatric disorders such as suicide, depression, substance abuse, and injuries, and its related factors. The target population of the RYCS was randomly selected and invited to attend the study.

In the present study, we included 895 of the 3006 participants from the baseline phase of the RYCS whose fathers also participated in the adult RCS (aged 35–70).

Interviews, measurements, and physical examinations were done according to the PERSIAN cohort protocol[15]. All the interviews were done face-to-face and interviewers recorded individual responses directly on the computer. Questionnaires were validated in the PERSIAN cohort study[15]. Demographic information, physical activity, medical history, and psychological distress were assessed by trained interviewers using a comprehensive standard questionnaire. Also, smoking, alcohol consumption, and opium usage in youths and their fathers were assessed using a self-reported questionnaire. Written informed consent was obtained from the participants. The ethics committee of Rafsanjan University of Medical Sciences (IR.RUMS.REC.1402.043) approved this study. All methods were carried out in accordance with relevant guidelines and regulations.

Personal habit assessment of youths

Young participants were asked about alcohol consumption (have you ever consumed alcohol in your life?), opium (have you ever used opium in your life?), and cigarette smoking (have you ever smoked at least one whole cigarette in your life). The answer was yes or no.

Personal habit assessment of the father

Paternal addiction to opium was considered if the father reported a history of opium consumption at least once per week for 6 months or longer[13]. We used a structured questionnaire with detailed questions (such as age at the time of starting opium use, opium dose and duration, frequency of use, administration routes, and age at the time of quitting for those who had quit opium use) to assess opium use. Duration of opium usage was defined as the number of years the father used opium throughout her/his life. Opium dose (dose-year) included the dose the father used opium throughout her/his life (the number of years the father used opium once per day). For opium users, the duration and dose of opium usage were divided into two groups based on the median. Also, the route of opium usage was categorized into oral and smoking.

Smoking was classified into nonsmoker, current smoker, and former smoker or nonsmoker and smoker. The fathers who reported smoking at least 100 cigarettes during their lifetime were defined as smokers. The number of cigarettes smoked was defined as the average number of times the father smoked in 24 h. The dose of cigarettes (pack-year) was considered as the dose of cigarette use throughout the father's life. For cigarette smokers, there were two groups based on the median, in terms of duration, dose, and the number of cigarettes smoked.

The fathers reported drinking approximately 200 ml of beer or 45 ml of liquor at least, once per week for at least six months were considered as alcohol drinkers. Alcohol dose (dose-year) was defined as the alcohol dose used throughout the father's life (the amount–milliliter- of alcoholic drinks that the father used per day during a year. Duration of alcohol use included the number of years the father used alcohol throughout his life. Tobacco use included using naas, hookah, pipe, or chop once per week for at least six months. The frequency difference between the total number and some of the covariates was related to missing data.

Psychological distress assessment

Psychological distress was assessed using the Kessler Psychological Distress Scale. The K10 screening questionnaire is a simple measure of psychological distress that involves 10 questions about emotional states. The respondents choose on a five-point scale how true the statement is for them[16]. In this study, the interview version of the questionnaire was used.

The questions ask how frequently in the past month the respondents have felt tired out for no good reason (Q1), nervous (Q2), so nervous that nothing could calm them down (Q3), disappointed (Q4), restless or fidgety (Q5), so restless that they could not sit still (Q6), depressed (Q7), so depressed that nothing could cheer them up (Q8), everything was an effort (Q9), and worthless (Q10). Responses to each question ranged from "never" (=0) to "always" (=4). The K10 score is based on responses to Q1 to Q10 with a total score ranging from 0 to 40.

The K6 score is based on responses to Q2, Q4, Q5, Q8, Q9, and Q10 with a total score ranging from 0 to 24[5]. We use cutoff points of 15 for the K10 score (>=15 as psychological distress) and 10 for the K6 score (>=10 as psychological distress) according to a previous study of the Persian K10 and K6 in Iran[17]. At these cutoff points, the measures had sensitivities of 0.77 and 0.73, specificities of 0.74 and 0.78, and positive predictive values of 0.48 and 0.52, respectively[17]. Cronbach's alpha of this Persian questionnaire was 0.92 for K6 and 0.87 for K10 which indicated excellent reliability and internal consistency[17]. Persian K10 and K6 have acceptable psychometric properties as screening questionnaires for common mental health disorders[17].

Assessment of other variables

Anthropometric measurements were performed by trained health professionals. In terms of age, participants were divided into categories as ≤20, 21–30, and ≥30. Education level was classified as ≤12 years and >12 years according to the median.

The physical activity score was assessed according to weekly physical activity using a questionnaire with 2 items: " During the past week, how many days did you exercise or do at least 10 minutes of moderate to vigorous physical activity"? "How many minutes a day did it take?"

Fathers' socio-economic status (SES) was evaluated using the wealth score index (WSI). WSI was calculated by multiple correspondence analysis (MCA) of the economic and social factors related to individuals[18].

Data analysis

Individual baseline characteristics were compared across our study groups using chi-square (χ^2) and t-test for categorical and continuous variables. Frequency (%) for categorical variables and the mean (SD: standard deviation) for the quantitative variables were used. Logistics regression models were applied to determine the odds ratios (ORs) and the corresponding 95% confidence intervals (CI) for the relation between paternal addiction and the psychological distress of youths. Potential confounders were recognized using published research and statistical significance (p-value < 0.25). The potential confounders were sequentially entered into models according to their hypothesized strengths of association with paternal addiction to cigarettes, alcohol, and opium and the psychological distress of youths. (The baseline model (crude model) was stratified based on the personal habits of the father.) The multivariable model included age (continuous variable), gender (male/female), education years (continuous variable), wealth status index (continuous variable), physical activity level (continuous variable), history of mental and psychological problems in first-degree relatives (yes/no), and the history of opium usage at least once in a lifetime. All analyses were conducted in Stata V.14.

Results

Among 895 participants, 277 (30.95%) youths were dealing with psychological distress based on the K6 questionnaire, while 316 (35.31%) youths had psychological distress based on the K10 score. Table 1 presents the demographic characteristics and personal habits of youths dealing with psychological distress based on the K6 score. The prevalence of psychological distress based on the K6 score in youths was 30.9%. Based on the K6 questionnaire results, the youths who were dealing with psychological distress were more frequently females ($P<0.001$), physically less active ($P=0.014$), and had lower education years ($P=0.008$). We also found that the youths who had a history of using opium at least once in their lifetime were more likely to experience psychological distress than youths who had not ($p=0.032$). Age, BMI, history of mental illness in first-degree family members, and the history of cigarette and alcohol usage in their lifetime were not meaningfully different between the youths with psychological distress and youths without it (Table 1).

As presented in Table 2, the prevalence of psychological distress based on the K10 score in youths was 35.31%. The results of demographic characteristics and personal habits of youths dealing with psychological distress based on the k10 score were the same as the results of the K6 score (Table 2).

Paternal demographic characteristics and personal habits of youths with psychological distress based on the k6 score are presented in Table 3. Table 3 shows that paternal cigarette smoking duration, opium consumption, dose, duration, and route of opium consumption were significantly different between youths with psychological distress and those without it based on the K6 score ($p<0.05$).

The results of Table 4 which shows the paternal demographic characteristics and personal habits of youths with psychological distress based on the K10 were similar to those of Table 3. We did not find a statically meaningful difference in terms of age, education year, wealth level, cigarette smoking, cigarette smoking number, cigarette smoking pack year, alcohol consumption, dose and duration of alcohol consumption, and tobacco use between the fathers who had a psychologically distressed youth based on the K6 or K10 score and whom they hadn't.

Table 5 shows the association between paternal personal habits and the chance of having a psychologically distressed youth based on the K6 and K10 scores using the multivariate models. Fathers who used opium were 37% and 34% more likely to have a youth with psychological distress based on the K6 score (OR:1.37, CI:1.01–1.86) and K10 score (OR:1.34, CI: 1.01–1.80) respectively. The duration of opium consumption lower than or

Characteristics	Total (895)	With psychological distress (277)	Without psychological distress (618)	*P*-Value
Gender – n (%)				0.001
Female	388 (43.35)	143 (36.86)	245 (63.14)	
Male	507 (56.65)	134 (26.43)	373 (73.57)	
Age – year – n (%)				0.84
<=18	322 (35.98)	101 (34.46)	221 (35.76)	
> 18	573 (64.02)	176 (63.54)	397 (64.24)	
Mean (± SD)	21.31 (± 4.95)	21.36 (± 5.06)	21.29 (± 4.91)	0.83
Education – Year - n (%)				0.008
<=12	523 (58.50)	180 (34.42)	343 (65.58)	
>=13	371 (41.50)	97 (26.15)	274 (73.85)	
Mean (± SD)	12.33 (± 2.82)	11.96 (± 2.78)	12.49(± 2.82)	0.008
BMI – n (%)				0.620
Normal	602 (67.56)	189 (31.40)	413 (68.60)	
Abnormal	289 (32.44)	86 (29.76)	203 (70.24)	
Mean (± SD)	5.33 (± 23.41)	23.28 (± 5.12)	23.47 (± 5.42)	0.62
Physical activity - min/week- n (%)				0.014
0	403 (45.03)	146 (36.23)	257 (63.77)	
1–30	53 (5.92)	14 (26.42)	39 (73.58)	
31–180	236 (26.37)	68 (28.81)	168 (71.19)	
>=181	203 (22.68)	49 (24.14)	154 (75.86)	
History of mental and psychological problems in first degree relatives - n (%)				0.059
No	446 (49.83)	125 (28.03)	321 (71.97)	
Yes	449 (50.17)	152 (33.85)	297 (66.15)	
History of cigarette usage in life time - n (%)				0.091
No	629 (70.28)	184 (29.25)	445 (70.75)	
Yes	266 (29.72)	93 (34.96)	173 (65.04)	
History of alcohol consumption in life time - n (%)				0.815
No	661 (73.85)	206 (31.16)	455 (68.84)	
Yes	234 (26.15)	71 (30.34)	163 (69.66)	
History of opium usage in life time- n (%)				0.032
No	824 (92.07)	247 (29.98)	577 (70.02)	
Yes	71 (7.93)	30 (42.25)	41 (57.75)	

Table 1. Demographic characteristics and personal habits of youths with psychological distress based on the k6 score in Rafsanjan youth cohort study.

equal to the median showed a 1.62 times increase in the chance of having a youth with psychological distress based on the K6 score (OR:1.62, CI:1.14–2.31). In addition, consuming opium dose more than the median increased the chance to 1.47 times based on the K6 score (OR: 1.47, 95% CI 1.01–2.14). Also, smoking cigarette duration lower than or equal to the median increased the chance of having a psychologically distressed youth to 1.52 times more based on the K6 score (OR: 1.52, 95% CI 1.07–2.15).

The odds of having a psychologically distressed youth based on the K10 score was higher among opium users with a duration of opium consumption lower than or equal to the median and a dose of opium consumption more than the median compared with non-users (OR: 1.44 (95% CI 1.01–2.03) and OR: 1.55 (95% CI 1.08–2.22) respectively). There was no significant association between paternal alcohol consumption and the odds of having a psychologically distressed youth.

Table S1 shows the association between paternal personal habits and the chance of having a psychologically distressed youth based on the K6 and K10 scores using the multivariate models stratified by age groups (15–18 years/19–35 years) in Rafsanjan youth cohort study. Among youth 19–35 years, fathers who used opium were 47% more likely to have a youth with psychological distress based on the K10 score (OR:1.47 (CI: 1.01–2.13). Among youth 19–35 years, the duration of opium consumption lower than or equal to the median and smoking cigarette duration lower than or equal to the median, increased the chance of having a psychologically distressed youth based on the K6 and K10 scores.

We also performed an additional analysis to assess the interaction of the personal habits of the father and the low level of WSI (WSI ≤ median in the current study) on the psychological distress of youths based on the k6 & K10 scores (Table S2). We found that there is a significant interaction between the alcohol consumption of the father and WSI ≤ median. The odds of having a psychologically distressed youth based on the K6 and K10 scores significantly increased among fathers with alcohol consumption and WSI ≤ median (3.16 (1.33- 7.00) for K6 score and 2.33 (1.04–5.2) for K10 score, respectively).

Characteristics	Total (895)	with psychological distress (316)	without psychological distress (579)	*P*-Value
Gender - n (%)				< 0.001
Female	388 (43.35)	165 (42.53)	223 (57.47)	
Male	507 (56.65)	151 (29.78)	356 (70.22)	
Age - year- n (%)				0.44
<=18	322 (35.98)	119 (37.66)	203 (35.06)	
> 18	573 (64.02)	197 (62.34)	376 (64.94)	
Mean (± SD)	21.31(± 4.95)	21.24 (± 4.997)	21.35(± 4.935)	0.75
Total years of education - n (%)				0.003
<=12	523 (58.50)	206 (39.39)	317 (60.61)	
>=13	371 (41.50)	110 (29.39)	261 (70.35)	
Mean (± SD)	12.33(± 2.82)	11.94 (± 2.83)	12.53 (± 2.79)	0.003
BMI - n (%)				0.259
Normal	602 (67.56)	219 (36.38)	383 (63.62)	
Abnormal	289 (32.44)	94 (32.53)	195 (67.47)	
Mean (± SD)	23.41 (± 5.33)	23 (± 4.90)	23.56 (± 5.54)	0.249
Physical activity - min/week - n (%)				0.012
0	403 (45.03)	165 (90.94)	238 (59.06)	
1–30	53 (5.92)	18 (33.96)	35 (66.04)	
31–180	236 (26.37)	75 (31.78)	166 (68.22)	
>=181	203 (22.68)	58 (28.57)	145 (71.43)	
History of mental and psychological problems in first degree relatives - n (%)				0.004
No	446(49.83)	137(30.72)	309(69.28)	
Yes	449(50.17)	179(39.87)	270(60.13)	
History of cigarette usage in life time - n (%)				0.123
No	629 (70.28)	212 (33.70)	417 (66.30)	
Yes	266 (29.72)	104 (39.10)	162 (60.90)	
History of alcohol consumption in life time - n (%)				0.826
No	661 (73.85)	232 (35.10)	429 (64.90)	
Yes	234 (26.15)	84 (35.90)	150 (64.10)	
History of opium usage in life time- n (%)				0.04
No	824 (92.07)	283 (34.34)	541 (65.66)	
Yes	71 (7.93)	33 (46.48)	38 (53.52)	

Table 2. Demographic characteristics and personal habits of youths with psychological distress based on the k10 score in Rafsanjan youth cohort study.

Discussion

Mental health disorders, weak relationships, financial problems, and family conflicts are common in addicted fathers[19]. On the other hand, youths' mental health is highly connected to the conditions in their homes[20,21]. The present study was conducted to determine the association between paternal addiction to cigarettes, alcohol, and opium and its relationship with the psychological distress of youths. For that, we assessed 895 fathers and their youths in southeast Iran. Some paternal factors including cigarette smoking duration, opium consumption, and the dose, duration, and route of opium consumption were associated with youths' psychological distress.

The prevalence of psychological distress among youths was determined to be 35.3% (based on the K10 questionnaire). Kelishadi et al. reported that the prevalence of psychiatric distress among 14,880 school students in 30 provinces of Iran was 9 to 38% in different regions[22]. In another study in Iran, Arayeshgari et al. reported that the prevalence of psychiatric distress among 1259 college students was 41%[23]. The higher prevalence of psychiatric distress in the study of Arayeshgari et al. could be due to the higher level of education in that study (100% had education years > = 13 years) compared to the current study (41.5% had education years > = 13 years). Jaisoorya et al. conducted a study on 7560 teenagers in India and showed that the prevalence of mild, moderate, and severe psychological distress was 10.5%, 5.4%, and 4.9% respectively[24]. Pengpid et al. reported that among 6745 adolescents in Morocco, 23.3% had psychological distress[25]. The prevalence rates of psychological distress in studies in Iran were higher than in other countries. These differences may be due to cultural and regional differences, sample size, differing procedures for recruitment and sampling, method of measuring psychological distress, and age range, but also attributable to environmental factors, and lifestyle.

Fathers who used opium were 34–37% more likely to have a youth with psychological distress. Besides, consuming more dosage of opioids (more than the median) in fathers was associated with higher odds of psychological distress in youths. Azizi et al. reported that the family of drug users in Afghanistan faced many mental issues and problems. Around 10% of Afghanistan's population aged 15–64 years old is estimated to be drug users. Over half of the family members who participated in that study had been hit by an addicted relative.

Characteristics	Total (895)	With psychological distress (277)	Without psychological distress (618)	*P*-Value
Age – year				
Mean (± SD)	52.51 (± 7.46)	52.71 (± 7.53)	52.42 (± 7.43)	0.593
Education years				
Mean (± SD)	9.29 (± 4.54)	8.97 (± 4.72)	9.44 (± 4.44)	0.157
WSI				
Mean (± SD)	0.249 (± 0.827)	0.194 (± 0.84)	0.279 (± 0. 818)	0.217
Cigarette smoking- n (%)				0.051
Yes	519 (58.45)	174 (33.53)	345 (66.47)	
No	369 (41.55)	101 (27.37)	268 (72.63)	
Cigarette smoking – n (%)				0.843
Never	369(41.55)	101 (27.37)	268 (72.63)	
Current	337(37.95)	114 (33.83)	223 (66.17)	
Former	182(20.50)	60 (32.97)	122 (67.03)	
Cigarette smoking number- n (%)				0.059
0	373(41.82)	102 (27.35)	271 (72.65)	
<=20	436(48.88)	141 (32.34)	295 (67.66)	
>=21	83(9.30)	33 (39.76)	50 (60.24)	
Duration of cigarette smoking. year- n (%)				0.020
0	373 (41.86)	102 (27.35)	271 (72.65)	
<=27	273 (30.64)	102 (37.36)	171 (62.64)	
>=28	245 (27.50)	72 (29.39)	173 (70.61)	
Dose of cigarette smoking. pack /year - n (%)				0.122
0	373 (42.00)	102 (27.35)	271 (72.65)	
<=15.99	264 (29.73)	86 (35.58)	178 (67.42)	
>=16	251 (28.27)	87 (34.66)	164 (65.34)	
Opium usage- n (%)				0.008
No	430 (48.42)	115 (26.74)	315 (73.26)	
Yes	458 (51.58)	160 (34.93)	298 (65.07)	
Route of opium usage- n (%)				0.015
None user	430 (48.26)	115 (26.74)	315 (73.26)	
Oral	34 (3.82)	15 (44.12)	19 (55.88)	
Smoking	427 (47.92)	146 (34.19)	281 (65.81)	
Duration of opium usage-year- n (%)				0.007
0	434 (48.49)	116 (26.73)	318 (73.27)	
<=14	234 (26.15)	90 (38.46)	144 (61.54)	
>=15	227 (25.36)	71 (31.28)	156 (68.72)	
Total opium dose - n (%)				0.012
0	437 (48.83)	117 (26.77)	320 (73.23)	
<=14.99	237 (26.48)	76 (32.07)	161 (67.93)	
>=15	221 (24.69)	84 (38.01)	137 (61.99)	
Alcohol usage - n (%)				0.688
No	746 (84.01)	229 (30.70)	517 (69.30)	
Yes	142 (15.99)	46 (32.39)	96 (67.61)	
Duration of alcohol usage-year - n (%)				0.154
0	750(83.89)	230 (30.67)	520 (69.33)	
<=9	76(8.50)	30 (39.47)	46 (60.53)	
>=10	68(7.61)	17 (25.00)	51 (75.00)	
Total alcohol dose- n (%)				0.823
0	753(84.23)	231 (30.68)	522 (69.32)	
<= 128.57	70(7.83)	24 (34.29)	46 (65.71)	
>= 128.58	71(7.94)	22 (30.99)	49 (69.01)	
Tobacco use- n (%)				0.634
No	781(87.95)	244 (31.24)	537 (68.76)	
Yes	107(12.05)	31(28.97)	76 (71.0)	

Table 3. Demographic characteristics and personal habits of fathers of youths with psychological distress based on the k6 score in the rafsanjan youth cohort study. *WSI* wealth status index.

Characteristics	Total (895)	with psychological distress (316)	without psychological distress (579)	*P*-Value
Age – year				
Mean (± SD)	52.51 (± 7.46)	52.62 (± 7.63)	52.45 (± 7.36)	0.748
Education years				
Mean (± SD)	9.29 (± 4.54)	8.79(± 4.61)	9.57 (± 4.47)	0.015
WSI				
Mean (± SD)	0.249 (± 0.827)	0.194 (± 0.839)	0.279 (± 0.818)	0.139
Cigarette Smoking- n (%)				0.102
Yes	519 (58.45)	195 (37.57)	324 (62.43)	
No	369 (41.55)	119 (32.25)	250 (67.75)	
Cigarette smoking - n (%)				0.213
Never	369 (41.55)	119 (32.25)	250 (67.75)	
Current	337 (37.95)	130 (38.58)	207 (61.42)	
Former	182 (20.50)	65 (35.71)	117 (64.29)	
Cigarette smoking number- n (%)				0.158
0	373 (41.82)	120 (32.17)	253 (67.83)	
<=20	436 (48.88)	160 (36.70)	276 (63.30)	
>=21	83 (9.30)	35 (42.17)	48 (57.83)	
Duration of cigarette smoking - n (%)				0.029
0	373(41.86)	120 (32.17)	253 (67.83)	
<=27	273(30.64)	114 (41.76)	159 (58.24)	
>=28	245(27.50)	81 (33.06)	164 (66.94)	
Pack year of cigarette smoking - n (%)				0.230
0	373 (42.00)	120 (32.17)	253 (67.83)	
<=15.99	264 (29.73)	101 (38.26)	163 (61.74)	
>=16	251 (28.27)	93(37.05)	158 (62.95)	
Opium use - n (%)				0.005
No	430 (48.42)	132 (30.70)	298 (69.30)	
Yes	458 (51.58)	182 (39.74)	276 (60.26)	
Route of opium usage - n (%)				0.017
None user	430 (48.26)	132 (30.70)	298 (69.30)	
Oral	34 (3.82)	15 (44.12)	19 (55.88)	
Smoking	427 (47.92)	168 (39.34)	259 (60.66)	
Duration of opium usage - n (%)				0.015
0	434 (48.49)	133 (30.65)	301 (69.35)	
<=14	234 (26.15)	96 (41.03)	138 (58.97)	
>=15	227 (25.36)	87 (38.33)	140 (61.67)	
Total opium dose - n (%)				0.002
0	437 (48.83)	134 (30.66)	303 (69.34)	
<=14.99	237 (26.48)	83 (35.02)	154 (64.98)	
>=15	221 (24.69)	99 (44.80)	122 (55.20)	
Alcohol use - n (%)				0.880
No	746 (84.01)	263 (35.25)	483 (64.75)	
Yes	142 (15.99)	51 (35.92)	91 (64.08)	
Duration of alcohol usage - n (%)				0.276
0	750 (83.89)	264 (35.20)	486 (64.80)	
<=9	76 (8.50)	32 (42.11)	44 (57.89)	
>=10	68 (7.61)	20 (29.41)	48 (70.59)	
Total alcohol dose - n (%)				0.699
0	753 (84.23)	265 (35.19)	488 (64.81)	
<= 128.57	70 (7.83)	23 (32.86)	47 (67.14)	
>= 128.58	71 (7.94)	28 (39.44)	43 (60.56)	
Tobacco use - n (%)				0.802
No	781 (87.95)	275 (35.21)	506 (64.79)	
Yes	107 (12.05)	39 (36.45)	68 (63.55)	

Table 4. Demographic characteristics and personal habits of fathers of youths with psychological distress based on the k10 score in the rafsanjan youth cohort study. *WSI* wealth status index.

	Adjusted model based on the K6 score	Adjusted model based on the K10 score
	OR (95%Ci)	OR (95%Ci)
Opium consumption		
No	1	1
Yes	1.37 (1.01–1.86)	1.34 (1.01–1.80)
Route of opium consumption		
Non-user	1	1
Smoking	1.35 (0.99–1.84)	1.34 (1.00-1.81)
Oral	1.74 (0.82- 3.69)	1.31 (0.62–2.77)
Duration of opium consumption		
Non-user	1	1
≤ Median	1.62 (1.14–2.31)	1.44 (1.01–2.03)
> Median	1.15 (0.79–1.67)	1.26 (0.88–1.81)
Dose of opium consumption		
Non-user	1	1
≤ Median	1.29 (0.90–1.85)	1.20 (0.84–1.69)
> Median	1.47 (1.01–2.14)	1.55 (1.08–2.22)
Cigarette smoking		
No	1	1
Yes	0.79 (0.58–1.07)	0.87 (0.65–1.17)
Number of cigarette smoking		
Non-user	1	1
≤ Median	1.24 (0.88–1.75)	1.15 (0.83–1.61)
> Median	1.31 (0.88–1.94)	1.15 (0.78–1.68)
Duration of cigarette smoking		
Non-user	1	1
≤ Median	1.52 (1.07–2.15)	1.39 (0.99–1.95)
> Median	1.02 (0.70–1.50)	0.93 (0.64–1.34)
Pack year of cigarette smoking		
Non-user	1	1
≤ Median	1.22 (0.89–1.68)	1.13 (0.83–1.54)
> Median	1.61 (0.96–2.72)	1.34 (0.80–2.24)
Alcohol consumption		
No	1	1
Yes	1.0 (0.67–1.50)	0.93 (0.63–1.38)
Duration of alcohol consumption		
Non-user	1	1
≤ Median	1.32 (0.80–2.18)	1.16 (0.70–1.91)
> Median	0.74 (0.41–1.33)	0.74 (0.42–1.30)
Dose of alcohol consumption		
Non-user	1	1
≤ Median	1.11 (0.65–1.90)	0.80 (0.47–1.38)
> Median	0.92 (0.54–1.59)	1.09 (0.65–1.84)

Table 5. Association of psychological distress of youths based on the k6 & K10 scores with personal habits of father in Rafsanjan youth cohort study. The adjusted model is adjusted for confounding variables including age (continuous variable), gender (male/female), education years (continuous variable), wealth status index (continuous variable), physical activity level (continuous variable), history of mental and psychological problem in first degree relatives (yes/no), and the history of opium usage at least once in a life-time.

Over one-third of the children of addicted families had been forced to leave school. Some children had to work, 15% of children said that their behaviors had changed and 7% claimed they had become ill because of the drug use in their families[26]. Parvaresh et al. in a study conducted in Iran reported that attention deficit hyperactivity disorder (ADHD), major depressive disorder (MDD), generalized anxiety disorder, obsessive-compulsive disorder, specific phobia (SP), separation anxiety disorder were more frequent in children aged 5–15 years old with addicted parents than the ones without addicted parents. In that study, they didn't find a significant difference between the two groups in the frequency of conduct disorder, social phobia, and oppositional defiant disorders (ODDs)[7]. In a community-based investigation of adolescents (age 17 years, $n=1252$) and their parents in the USA, parental alcohol dependence was associated with increased risk for offspring disorders including

ADHD, ODD, conduct disorder (CD), and adult antisocial behavior (AAB). Also, parental drug dependence was associated with increased risk for all offspring disorders except ADHD[27]. Shahrbabaki et al. conducted a study on 128 students aged 8 to 14 in Iran and reported that there was no significant relationship between opium or heroin-dependent parents and non–dependent parents in terms of disruptive behavior disorders. They suggested that the reason behind this result was that the parents of opium or heroin dependents and non–non-dependents who entered the study did not match in terms of psychiatric disorders and the outcomes of drug abuse. They also stated that having a strong relationship with at least one parent could be a protective factor against antisocial and psychological disorders. In addition, the low cost of opium in Iran could modify the financial crisis due to opium addiction in families[28]. The result of the Shahrbabaki et al. study was inconsistent with other studies[29] but was aligned with the study of Schuckit et al. which reported that externalizing disorders of children are no longer different between the nonalcoholic and alcoholic families after adjusting the familial antisocial disorders and familial socioeconomic status[30].

A shorter duration of opium consumption (less than the median) in fathers was meaningfully associated with psychological distress in youths, while a longer duration of opium consumption was not associated. Paternal addiction to opium may be more difficult for youths at first, but it becomes easier for them to accept it after a while. Bakhtiari et al. evaluated the effect of parental addiction to opium, heroin, and other drugs on the depression of adolescents in Iran and reached a different conclusion in this term. They reported that the adolescents' depression score had a direct positive association with the parental duration of addiction. The difference between the outcome (depression Vs. psychological distress), sample size (268 Vs 895), age range (9–12 Vs 15–35), and matching factors may be the reason behind this discrepancy[31]. Still, the absence of a consistent dose or duration relationship by several variables considered indicates that caution is required in the interpretation.

Fathers' cigarette smoking, the number of cigarettes smoked, and the pack year of cigarette smoking were not meaningfully associated with psychological distress in youths. However, shorter smoking cigarette duration (lower than or equal to the median) increased the chance of having a psychologically distressed youth to 1.52 times. Similar to what we see in the duration of opium consumption, the paternal addiction to cigarettes first may be harder for youths to get along with this situation rather than when it is considered a normal established situation.

Further investigations are required to understand the exact impact of alcohol consumption on youths' psychological distress. We found that paternal consumption of alcohol was not associated with youths' psychological disorders. This result is inconsistent with the Christensen et al. study which reported that children of alcoholic parents had more chance to have internalizing psychological problems such as depression and socially deviant behaviors. Their report dates back to the year 2000 in Denmark, and perhaps cultural and regional differences are involved in this discrepancy[32]. Wall et al. in the same year (2000) reported that behavioral problems in youths have no relationship with parental history of alcoholism[33]. Wolfe et al. suggested that maternal alcohol consumption leads to youths' depression in emerging adulthood[34]. Rognmo et al. suggested that maternal alcohol abuse was related to offspring's mental health but paternal alcohol abuse was not[35]. Alcohol consumption is low in Iran as compared to Western countries. In addition, alcohol consumption is a social stigma in Iran and is illegal due to religious restrictions, for this reason, some subjects may not have answered the alcohol consumption questionnaire correctly, thus introducing reporting bias.

There were some limitations in our study. First, the research design was cross-sectional, so we cannot prove any cause-effect association. Future prospective cohort studies are needed to determine paternal addiction as a cause of the psychological distress of youths. Second, our study participants were all from the Iranian population, and the results cannot be inferred from other races and ethnic populations. Third, the current samples were community-based and collected in one city; thus, the generalizability of the results to other regions in Iran due to potential sociocultural differences is limited. This underscores the need for further research to explore these variations and their impact on the study's outcomes. Fourth, these studies are susceptible to self-reporting and recall biases because it is possible that some youths have not responded to the opium use questionnaire correctly[36]. However, opium use in this geographical area has a lower social stigma, therefore, the validity of self-reported opium in the Rafsanjan population, can be considered satisfactory[37]. Fifth, the study sample was only youths whose fathers had also participated in the Rafsanjan cohort study. This requirement invited selection bias to the research thus reducing the scope of the sample population and may limit the generalizability of the findings to the entire population. Another limitation was not including mothers' and siblings' addiction profiles.

The main strength of the present study was the large sample size. One of the other strengths of our study was that we specifically assessed paternal habits. In many studies in this field, the role of mothers was often assessed but the fathers' role was overlooked[6]. In addition, some famous theories worked more on the role of mothers and overlooked the role of fathers for example, according to the Attachment theory mothers spend more time with their children, and therefore their influence on the children is greater than that of fathers[38]. Unlike previous studies, we analyzed the dose, length, and route of consuming opioids that were often poorly recorded in a relevant meta-analysis[6]. Also, our investigation was a population-based study, while studies that were available in this field focused more on drug rehabilitation centers and psychiatric hospitals[7,39]. Another strength of the present study was that paternal addiction was reported by directly interviewing fathers thus avoiding the underreporting associated with collecting reports from a relative. Concerning confounding, we were able to allow for several potentially confounding variables but most results did not materially change. This indicates that major residual confounding is unlikely.

Conclusion

Parental addiction to opium, can lead to an increase in psychological distress in youths. Therefore follow-ups, early diagnoses, and holistic management of this disorder in youths with addicted fathers are necessary to reduce health costs and improve the health system.

Data availability

The data is not available publicly. However, upon a reasonable request, the data can be obtained from the correspondence.

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References

1. Ristevski, T. & Maiihi, N. The right to a healthy living environment in function of the right to life. *Vizione* **26** (2016).
2. Wang, B. et al. The impact of youth, family, peer and neighborhood risk factors on developmental trajectories of risk involvement from early through middle adolescence. *Soc. Sci. Med.* **106**, 43–52 (2014).
3. Mojtabai, R., Olfson, M. & Han, B. National trends in the prevalence and treatment of depression in adolescents and young adults. *Pediatrics* **138**(6) (2016).
4. Ahmadpoor, J., Mohammadi, Y., Soltanian, A. R. & Poorolajal, J. Psychiatric disorders and associated risky behaviors among Iranian university students: Results from the Iranian PDABs survey. *J. Public Health*. **29**, 1197–1204 (2021).
5. Cotton, S. M. et al. The psychometric characteristics of the Kessler Psychological Distress Scale (K6) in help-seeking youth: What do you miss when using it as an outcome measure? *Psychiatry Res.* **305**, 114182 (2021).
6. Romanowicz, M. et al. The effects of parental opioid use on the parent–child relationship and children's developmental and behavioral outcomes: A systematic review of published reports. *Child Adolesc. Psychiatry Mental Health* **13**(1), 5 (2019).
7. Parvaresh, N., Mazhari, S. & Nazari-Noghabi, M. Frequency of psychiatric disorders in children of opioid or methamphetamine-dependent patients. *Addict. Health*. **7**(3–4), 140–148 (2015).
8. Leijdesdorff, S., van Doesum, K., Popma, A., Klaassen, R. & van Amelsvoort, T. Prevalence of psychopathology in children of parents with mental illness and/or addiction: An up to date narrative review. *Curr. Opin. Psychiatry*. **30**(4), 312–317 (2017).
9. Hanson, R. F. et al. Relations among parental substance use, violence exposure and mental health: The national survey of adolescents. *Addict. Behav.* **31**(11), 1988–2001 (2006).
10. Fuller-Thomson, E., R, B. K. & Brennenstuhl, V. T. P. J. P. M. L. The long arm of parental addictions: The association with adult children's depression in a population-based study. *Psychiatry Res.* **210**(1), 95–101 (2013).
11. Pedersen, W. Parental relations, mental health, and delinquency in adolescents. *Adolescence* **29**(116), 975 (1994).
12. Ohannessian, C. M. et al. The relationship between parental psychopathology and adolescent psychopathology: an examination of gender patterns. *J. Emot. Behav. Disord.* **13**(2), 67–76 (2005).
13. Jamali, Z. et al. Prevalence of dyslipidemia and its association with opium consumption in the Rafsanjan cohort study. *Sci. Rep.* **12**(1), 11504 (2022).
14. Hakimi, H. et al. The profile of Rafsanjan cohort study. *Eur. J. Epidemiol.* **36**(2), 243–252 (2021).
15. Poustchi, H. et al. Prospective epidemiological research studies in Iran (the PERSIAN Cohort Study): Rationale, objectives, and design. *Am. J. Epidemiol.* **187**(4), 647–655 (2018).
16. Zhang, M., Zhang, J., Zhang, F., Zhang, L. & Feng, D. Prevalence of psychological distress and the effects of resilience and perceived social support among Chinese college students: Does gender make a difference? *Psychiatry Res.* **267**, 409–413 (2018).
17. Hajebi, A. et al. Adaptation and validation of short scales for assessment of psychological distress in Iran: The Persian K10 and K6. *Int. J. Methods Psychiatr. Res.* **27**(3), e1726 (2018).
18. Amini, M. et al. Socioeconomic inequalities in prevalence, awareness, treatment and control of hypertension: Evidence from the PERSIAN cohort study. *BMC Public. Health*. **22**(1), 1401 (2022).
19. Bazrafshan, M. R., Sharif, F., Molazem, Z. & Mani, A. The effect of paternal addiction on adolescent suicide attempts: A qualitative study. *Int. J. high. risk Behav. Addict.* **5**(3) (2016).
20. Bai, Y. et al. Associations of youth mental health, parental psychological distress, and family relationships during the COVID-19 outbreak in China. *BMC Psychiatry*. **22**(1), 275 (2022).
21. Flouri, E., Sarmadi, Z. & Francesconi, M. Paternal psychological distress and child problem behavior from early childhood to middle adolescence. *J. Am. Acad. Child. Adolesc. Psychiatry* **58**(4), 453–458 (2019).
22. Kelishadi, R. et al. Does the socioeconomic status affect the prevalence of psychiatric distress and violent behaviors in children and adolescents? The CASPIAN-IV study. *Minerva Pediatr.* **69**(4), 264–273 (2017).
23. Arayeshgari, M., Tapak, L., Roshanaei, G., Poorolajal, J. & Ghaleiha, A. Application of group smoothly clipped absolute deviation method in identifying correlates of psychiatric distress among college students. *BMC Psychiatry*. **20**(1), 198 (2020).
24. Jaisoorya, T. S. et al. Prevalence and correlates of psychological distress in adolescent students from India. *East. Asian Arch. Psychiatry*. **27**(2), 56–62 (2017).
25. Pengpid, S. & Peltzer, K. Prevalence and associated factors of psychological distress among a national sample of in-school adolescents in Morocco. *BMC Psychiatry* **20**(1), 475 (2020).
26. Azizi, H. et al. Impacts of Drug Use on Users and Their Families in Afghanistan (2014).
27. Marmorstein, N. R., Iacono, W. G. & McGue, M. Alcohol and illicit drug dependence among parents: Associations with offspring externalizing disorders. *Psychol. Med.* **39**(1), 149–155 (2009).
28. Eslami Shahrbabaki, M., Ziaaddini, H., Saieedi, H. & Nakhaiee, N. Disruptive Behavior disorders in 8 to 14 years old offspring's of opium and heroin dependent parents: A case-control study. *Addict. Health*. **1**(2), 81–85 (2009).
29. Moss, H. B., Baron, D. A., Hardie, T. L. & Vanyukov, M. M. Preadolescent children of substance-dependent fathers with antisocial personality disorder: Psychiatric disorders and problem behaviors. *Am. J. Addict.* **10**(3), 269–278 (2001).
30. Schuckit, M. A., Smith, T. L., Radziminski, S. & Heyneman, E. K. Behavioral symptoms and psychiatric diagnoses among 162 children in nonalcoholic or alcoholic families. *Am. J. Psychiatry*. **157**(11), 1881–1883 (2000).
31. Bakhtiari Hatami, H. & Tavakoli Fard, M. The role of parental drug addiction in depression of theiradolescents. *Pejouhesh Dar Pezeshki (Research Medicine)*. **40**(2), 63–67 (2016).
32. Christensen, H. B. & Bilenberg, N. Behavioural and emotional problems in children of alcoholic mothers and fathers. *Eur. Child. Adolesc. Psychiatry*. **9**(3), 219–226 (2000).
33. Wall, T. L., Garcia-Andrade, C., Wong, V., Lau, P. & Ehlers, C. L. Parental history of alcoholism and problem behaviors in native-American children and adolescents. *Alcohol Clin. Exp. Res.* **24**(1), 30–34 (2000).
34. Wolfe, J. D. Maternal alcohol use disorders and depression in emerging adulthood: Examining the relevance of social ties, childhood adversity, and socioeconomic status. *Psychiatry Res.* **257**, 441–445 (2017).
35. Rognmo, K., Torvik, F. A., Ask, H., Røysamb, E. & Tambs, K. Paternal and maternal alcohol abuse and offspring mental distress in the general population: The Nord-Trøndelag health study. *BMC Public. Health* **12**(1), 448 (2012).

36. Yacoubian, G. S. Jr., VanderWall, K. L., Johnson, R. J., Urbach, B. J. & Peters, R. J. Comparing the validity of self-reported recent drug use between adult and juvenile arrestees. *J. Psychoact. Drugs* **35**(2), 279–284 (2003).
37. Khalili, P. et al. Validity of self-reported substance use: Research setting versus primary health care setting. *Subst. Abuse Treat. Prev. Policy.* **16**(1), 66 (2021).
38. Phares, V. & Compas, B. E. The role of fathers in child and adolescent psychopathology: Make room for daddy. *Psychol. Bull.* **111**(3), 387 (1992).
39. Sahebi, L., Asghari Jafar Abadi, M., Mousavi, S. H., Khalili, M. & Seyedi, M. Relationship between psychiatric distress and criminal history among intravenous drug abusers in Iran. *Iran. J. Psychiatry Behav. Sci.* **9**(2), e838 (2015).

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Author contributions
Z.Jamali and M.Kazemi designed the study and supervised the project. Z.Jamali, H.Hassani, F.Chavoshian and Z.Jalali prepared Tables 1, 2, 3, 4 and 5. P.Khalili performed the statistical analysis. Z.Jamali, H.Hassani, P.Khalili, F.Chavoshian, Z.Jalali, M.Hadavi, C.Vecchia and M.Kazemi wrote the initial paper. C.Vecchia revised the manuscript. All the authors read and approved the final manuscript.

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Declarations

Competing interests
The authors declare no competing interests.

Ethics approval and consent to participate
Written informed consent was obtained from the participants. The ethics committee of Rafsanjan University of Medical Sciences (IR.RUMS.REC.1402.043) approved this study. All methods were carried out in accordance with relevant guidelines and regulations. Interviews, measurements, and physical examinations were done according to the PERSIAN cohort protocol. Questionnaires were validated in the PERSIAN cohort study.

Additional information
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Correspondence and requests for materials should be addressed to Z.J.