

## Factors Associated with the Transition from Drug Abuse to Initiation of Injection Drug Use

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**Objectives:** Drug injection carries with it many risks and therefore it is important to understand the initiating factors of injection and its origins. Thus, the purpose of this study was to identify factors associated with the initiation of injection drug use among substance abusers.

**Methods:** Study method was a cross-sectional study. The research statistics universe constitutes all people suffering from a substance dependence disorder with a pattern of injection use in Tehran and Hamedan. This study was conducted among 216 individuals with substance dependence disorders who were selected from harm reduction centers in Tehran and Hamedan. The sampling selection method was simply random. The instruments used for data collection included: demographic information, patterns of drug use and initiation of injection scales.

**Results:** In this study, the average age of initiation to injections was 22.5 years. Factors associated with initiation of drug injection included: acquired more pleasure, easier use, faster effect of injection, ineffective previous use method, curiosity, peer pressure, lack of availability of the drug, poverty, and low quality drugs.

**Conclusions:** Results of this study indicate that initiation factors to drug injection are multifaceted (Psychological, Social, Economic and Environmental), therefore, injection interventionists should consider all these factors for prevention, treatment and harm reduction.

**Keywords:** Addiction, Transition, Injection Pattern, Initiation of Injection

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### Introduction

Injection is the most dangerous method of drug use and is an important issue of public health. Drug injection has a very negative impact on the physical, emotional, economic and legal fronts, and is considered as a risk factor for premature death and a variety of infectious diseases. In addition, sexually transmitted diseases and even male infertility (1), accidents caused by injection into the skin and vein, violence and victimization, fatal and non-fatal overdose, depression and other mental health problems, social isolation, homelessness, unemployment, poverty, and repeated incarceration are all common with injection drug use (2). There are many risks associated with drug injecting; hence it is important to understand its roots (3). In fact, drug injection is primarily a public health issue (4). The

risk of infection is high from the start of injecting (5). The injection of cocaine and crack often requires the use of lemon juice, vinegar or ascorbic acid, which brings certain risks of damage to the blood vessel. Heroin, depending on its shape (e.g. tar or powder form) is injected in a different way, which is associated with risks such as HIV and HCV (6). Injection of methamphetamine is associated with a particularly high sexual risk taking among men who have sex with other men. Ketamine is often injected intramuscularly, and there are specific risks associated with the use of multiple doses of pharmaceutical bottles during the time of injection, predisposing used to share (4). Studies in the field of a variety of risk factors leads us to understand the beginning of injection practices,

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as well as its transmission among drug injection users. Outside of Iran, multifaceted studies highlight the transition to injection heroin. Various factors such as the influence of local subcultures, social norms and institutional policies at the macro level, history of injection drug use for the first time, level of physical and psychological dependence, duration of heroin addiction, heroin use in the family and the community, social networking features and a close relationship with parents who inject heroin or other drug injectors, purity of heroin, arrest and lack of access to drug treatment are risk factors for the onset of injection (7).

Crofts studied the onset of drug injection among 300 drug injector adolescents and found that 88% of the start of injection takes place for the first time at the recommendation of a friend (8). Other researchers found that the onset of drug use occurs among friends and due to peer pressure influence (9). Also in the research of Strick et al. (10), a lot of injectors reported that their decision to inject for the first time was their own, and that they had been actively looking for a first injection. The most common motivations to start drug injection include: desire to use drug in an efficient way, being cost-effective, to get more fun and mimic the injection from friends (2). In research (10,) sexual abuse was associated with an increased risk of starting to inject. A retrospective survey of injecting drug users associated individual and environmental factors with the injection. Some common factors among injection drug users compared with people who do not inject reveals that these factors include substance abuse by parents, family dysfunction, early onset of drug and other abuse, history of non-injecting use of crack, cocaine, heroin or methamphetamine, homelessness, violence and networks at risk of friends and the neighborhood (10). The environmental reasons for changing the method of smoking opium to injecting heroin included the increased ease of obtaining and using heroin, more easily hidden injections and injection paraphernalia from the family or in public use and in prison. Participants also pointed to the low cost and ease of injection of crack due to its high solubility in water without an acidic substance (such as lemon juice) or heating. Factors associated with early onset of the injection were a family member who injects drugs, school dropouts and unstable income (11).

In the research of Sherman, Smith, Lani, Astrdy (12), a wide range of factors caused people to inject drugs, including: family, friends, sexual partners,

inhalation cost compared to the cost of injection, and the local nature of injections in urban neighborhoods. Also, considerable risk factors for the transition to injecting drug use include: having an injecting sexual partner, low education level, a history of smoking heroin or cocaine, or reporting a high level of addiction to heroin or cocaine. Many participants in the study stated that they had chosen to transition to injection as an attempt to reduce the total daily intake of heroin. In their point of view, injection was a cost-effective way to reduce the cost of heroin use, but in fact this was not true. The amount that was injected, compared to the amount that was previously inhaled, rapidly intensified (12). Werb, Kerr, Buxton, Shovelle, Richardson examined the trends in drug use from smoking to injection use in young street addicts, with the results showing that 57% of injection had occurred with friends, 13% with a family member and 10% with acquaintances. The study suggests that the risk of starting injection with street drug users has increased (13). Therefore, it should be made clear that starting intravenous consumption patterns in opioid-dependent patients is associated with many factors. Understanding these factors for designing successful approaches to prevent or delay the onset of injection is useful. The aim of this study is to identify factors associated with the onset of injection consumption patterns in opioid dependent people, so we can make sure we identify those at risk, so that they can be targeted with preventive interventions and prevention strategies for all relevant factors.

### **Methods**

This study employed a post-event and cross-sectional method. The statistical population of the study consisted entirely of patients with opioid dependence disorder with injecting drug use patterns in Tehran and Hamadan. The sample consisted of 216 individuals with substance dependence disorders that were selected based on DSM-IV criteria. The data of the study was obtained from people with substance dependence disorders who attended harm reduction centers in Tehran and Hamedan. The sampling method was simply random, and participation in the study was voluntary with individual consent. According to the study, the prevalence of drug injection is 20 to 25 percent of a lifetime and 10 to 15 percent is considered prevalent (14). A rapid assessment of drug abuse in Iran stated that drug injection stood at 5.21 percent among addicts (15). The average probability of the

occurrence of injection was obtained as being 17.0%, according to formula for calculating sample size  $96/1 = z$ ,  $83/0 = p$ ,  $05/0 = d$ ,  $05/0 = \alpha$ ,  $17.0 = p-1$ . The number of samples was 216. Inclusion criteria included (a) Eligibility criteria for substance dependence disorder according to DSM-IV criteria; (b) drug use patterns through injection at least for three months; (c) age from 15 to 45 years. Exclusion criteria of the study included (a) having severe mental disorders that prevent collecting data and distortion of the data. (b) refusal to participate in the study.

The following questionnaires were executed in this study. (a) questionnaire for demographic data, patterns of substance abuse and the onset of the injection pattern. This included questions in two areas: 1) demographic information; 2) patterns of substance abuse and the onset of the injection pattern. (b) Diagnostic interview based on criteria of DSM-IV. In this study, the purpose of the opioid dependence disorder is a diagnosis that the person is diagnosed as a person with substance dependence disorders, using the Structured Clinical Interview for Disorders Axis I in DSM-IV.

To collect data, Tehran and Hamedan harm reduction centers first referred patients with an early diagnosis based on DSM-IV criteria for substance dependence disorder. After this, considering that injecting drug users are unsuitable in terms of physical and mental condition, and do not have the ability to fill in their research questionnaires, they were asked the questions by interviewers, with each interview lasting one and a half to two hours. Members of the interviewing group fulfilled the following conditions: 1) education in the field of psychology, 2) a history of substance abuse treatment, 3) familiarity with interview skills and research on drug use, 4) communication skills with people with substance dependence disorder.

Ethical considerations: (a) Respect for the principle of informed consent. At the beginning of the study, participants were made aware of the different aspects of the study, and gave full consent, without any pressure to participate. Once the interviewer had described the confidentiality of information, people were asked if they were ready to participate. If they agreed, the questionnaire was undertaken. (B) Respect for the principle of confidentiality and privacy of individuals. The names of the participants in the study were not asked, and it is not possible to connect data to a specific person. The participants were assured that the confidentiality of their personal information remains confidential and not available to others. (C) Respect for the principle of non-physical and psychological pressure. The participants in the study were individuals with substance dependence disorder, and had suffered from various addictions, so every effort was made not to subject them to physical and psychological pressure. This aimed to leave them in complete mental freedom and peace. The data were analyzed descriptively using frequency, percentage, mean, standard deviation and compiling tables, using SPSS18 statistical software.

## Results

Results showed that the participants of the study had begun drug injection at the following ages: 9.78% at the age of (11-15 years), 33.62% at the age of (16-20 years old), 26.81% at the age of (21-25 years), 14.04% at age (26-30years), 6.81% at the age of (31-35 years), 3.4% at age (36-40 years), 2.55% at age (41-47years). Therefore, in this study the most common age of onset of age-related injection was (16-20years) with 33.62%, and after that age (21-25years) with 26.81% (table 1).

**Table 1.** Description of injection onset age of participants

Onset age of injection	F	p	Onset age of injection	F	p	Mean age of injection	Standard deviation
11-15	23	9.78	31-35	16	6.81		
16-20	79	33.62	36-40	8	3.4		
21-25	63	26.81	41-47	6	2.55	22.44	7.96
26-30	33	14.04	No answer	7	2.98		
	Total			235	100		

Results showed that the location of the first participants' injection had been 31.1% in the individuals' home, 20.9% in the homes of friends, 14.5% in ruined areas, 8.9% in parks, 5.5% in alleys and streets, 4.3% in the workplace, 22.1% in cars,

1.3% in prison, 0.9% in gardens and 0.4% in a military barracks. In this research, the first places to start injection often were related to individual houses, homes of friends and ruined places (table 2).

**Table 2.** The location of first injection

First place of injection	F	P	First place of injection	F	P
Individuals' home	73	31.1	Military Barracks	1	0.4
Friends' home	49	20.9	Workplace	10	4.3
Park	23	9.8	Prison	3	1.3
Ally and street	13	5.5	Garden	2	0.9
Ruined places	34	14.5	Car	5	2.1
No answer	22	9.36	-	-	-
Total				235	100

Results showed that regular injection places of participants included 34.47% in ruined areas, 23.82% in the individual's home, 11.91% in the streets, 6.81% in the park, 5.96% at homes of friends, 4.26% in cars, 3.4% in the workplace, 1.28% in prison, 1.28% and 0.43% in the garden and

at the military garrison. In this research, the most important sites of injection were ruined places, the individual's house, alleys and streets, the park, or a friend's house (table 3).

**Table 3.** Injection locations

place of injection	F	P	place of injection	F	P
Individuals' home	56	23.83	Military Barracks	1	0.43
Friends' home	14	5.96	Workplace	8	3.40
Park	16	6.81	Prison	3	1.28
Ally and street	28	11.91	Garden	3	1.28
Ruined places	81	34.47	Car	10	4.26
No answer	15	6.38	-	-	-
Total				235	100

Results of this study show that drug-dependent individuals had the following drug injection rates: 63.40% alone, 44.68% with drug user friends, 5.53%

with strangers, and 4.7% with family members and relatives (table 4).

**Table 4.** Partners with a drug injector

Injection partners	F	p	Injection partners	F	p
Alone	149	63.40	With strangers	13	5.53
With friends	105	44.68	With relatives	11	4.7
Total				235	100

Results also showed that factors associated with the onset of injection include: to gain more pleasure in 129 patients (54.90%), easier use in 52 patients (22.13%), the rapid effect of injection in 44 patients (18.72%), use by previous method being ineffective in 43 cases (18.30%), curiosity in 39 patients (16.59%), the insistence of friends in 32 patients (13.62%), the unavailability of other drugs in 22 patients (9.36%), injection being cheaper (financial

weakness) in 18 patients (7.65%), and the low quality of drugs (impurities) in 16 patients (6.81%). The most important factors respectively for starting to inject were: to achieve more pleasure, easier to use, faster effect of injection, ineffective use of previous methods, curiosity, friends' insistence, unavailability of other drugs, injection being cheaper (financial weakness), and the low quality of drugs (impurity) (table 5).

**Table 5.** Factors associated with start of injection

The causes of start of injection	F	p	The causes of start of injection	F	p
Rapid effect of injection	44	18.72	Unavailability of drug	22	9.36
To gain more pleasure	129	54.90	To cure addiction	5	2.13
Previous method being ineffective	43	18.30	Being cheaper (financial weakness)	18	7.65
Lack of awareness of the dangers of injection	15	6.38	Low quality of drugs (impurities)	16	6.81
Insistence of friends	32	13.62	Easier to use	52	22.13
Curiosity	39	16.59	-	-	-
Total				235	100

## Discussion

Research findings showed that the highest age of onset of age-related injection was (16-20 years) with 33.62%, and after that (21-25 years) with 26.81%. The results showed that the mean age of onset of injection in patients with substance dependence disorder was 22.44 years. These results were consistent with studies from Debeck et al. (16) and Lankenau (17). In Debeck et al.'s (16) research, the average age of onset of injection in patients with substance dependence disorder was 22 years old. The findings in relation to the location of the first injection are, respectively, the individual's home, friend's houses, ruined places, parks, streets, workplaces, cars, jail, gardens and military garrisons (18). In this research, the first place of injection was often related to the individual houses, homes of friends and places which were ruined. These results were consistent with studies from Allahverdi Pour et al. (18) and Verb, Kerr, Buxton, Shoveller, Richardson, Montaner (13). In the research of Allahverdi Pour et al. (2006), the most common locations of first consumption were their own homes, those of friends, the park and the street (18). Also, Verb et al. (2013) examined the process of moving from drug smoking to injection in young street addicts who were using crystal meth, but were not injectors. During 5 years of follow up, 16 percent of these youths injected drugs for the first time.

In this study, in patients with substance dependence disorder reported that their regular injection places had been ruined places, their own homes, streets, parks, friends' homes, cars, workplaces, prisons, military barracks and gardens. In this research, the most important places of injection had been respectively ruined places, their own homes, streets, parks and the homes of friends. Available research indicates that exposure to people and the environments where injection is common increases the risk of transition to injection (19). The results of Nandi, Glass, Cole, Chu, Galea (2010) showed that the neighborhood environment may be an important determinant of injecting behavior, and is independent of the individual level characteristics (20). The results of Chamy et al (2013) (19) showed that living in high-risk neighborhoods affects the initiation of injecting drug use among street youth (21), using a multivariate model to assess the risk factors at the start of cocaine injection.

The results of this city center research on an imprisoned community showed that the onset of cocaine injection was associated with temporary

housing, imprisonment, prostitution, borrowing syringes and other drug use. Smith and colleagues found that cocaine was associated with frequent injection, thus highlighting the important role of mediation in the place of injury associated with injection drug use (21). Residents of certain neighborhoods put themselves at risk of starting to inject drugs as a result of the social structure, the economy, their environment (regardless of the race or socio-economic status of the individual). For example, in poor neighborhoods, more drugs are available (22). Also in these areas there are higher levels of psychological distress and fewer alternative activities (for example, jobs) (23). Research has shown that exposure to an environment in which drug use is common may be a main cause of risks associated with injection drug use. Available researches show that exposure to people and environments in which injection is common increases the risk of transition (19).

Researches show that a network of friends plays an important role in transitioning to injection and drug abuse; one of the most common places for drug abuse is a friend's house. This shows the necessity of informing the parents in these areas, and increasing parents' monitoring of adolescents in activities with peers, as well as recognizing the children's friends. Also, homeless people are at a high risk of trying drug injection. In this study, a large number of drug injectors were homeless people due to the lack of housing. Current levels of injection are high in locations such as ruined places. Injection use in such places is associated with high-risk behavior associated with injection, so intervention policies should work to prevent homelessness in order to reduce drug injection and risky behaviors associated with injection (24). Also, the development of preventive interventions in high risk areas (ones which have the greatest risk of drug injection) should be prioritized (19).

According to the findings of the study, the factors related to the onset of injection included: to gain more pleasure, ease of application, faster effect of injection, use of previous method being ineffective, curiosity, friends' insistence, unavailability of other drugs, being cheaper (financial weakness), and low quality materials (impurity). These findings were consistent with researches of Razani et al. (11), Sherman, Smith, Lani, Astrdy, (12) Barry, S. and Smith (3), Vazirian et al. (7). Razani et al.'s study (11) on the environmental reasons for transitioning from smoking opium to injecting heroin include:

increased ease of obtaining and using heroin, easier to hide injection and injection paraphernalia in the family or when using in public and during imprisonment, the reduced availability and increased cost of opium, and opium and heroin impurities in the market. Participants also mentioned that crack was cheap and easy to inject, because it dissolves easily in water without an acidic solvent (such as lemon juice) or heating. Factors associated with early onset of injection were: having an injector family member, dropping out of school and having a non-fixed source of income. In the research of Sherman et al., a wide range of factors caused drug injection among the participants, including: family, friends, sexual partners, inhalation cost compared to cost, and the nature of local injection in urban neighborhoods. Many participants in the study of Sherman et al. mentioned that they had chosen to transition to injection as an attempt to reduce their daily intake of heroin (12). In their point of view, injection was a cost-effective way to reduce the cost of heroin. In the research of Bari, Sayid and Smith, the main reason for participants opting for drug injection was drug tolerance. Following intense consumption over time, consumers require more of the drug to reduce withdrawal symptoms and have pleasurable effects – injecting heroin is an effective way to satisfy these desires (3).

In the research of Vazirian et al., in over a fifth of participants (32%) started taking drugs before 16 years of age, and almost half (49%) started before the age of 19. Factors contributing to the change in injecting drug use were reported by the participants as including: the perceived effects of new drugs (e.g. faster and stronger effect, better relaxation and sleep, repressed feelings, exhaustion of previous material, increased self-esteem) and social factors (e.g. peer pressure, curiosity, trendiness, easier access to new drugs and the availability of drugs, particularly opium). A high percentage of consumers had started by taking drugs – 15% reported that they have

started by injecting drugs, while 15% transitioned to injection (7). Also, imprisonment was a decisive factor for causing the change from a non-injection method to injecting drugs, due to the difficulty of smoking in prison. The higher price of drugs (e.g. opium) and its limited availability was reported by participants as a reason for transferring from non-injection to injection in 2003 (7). One extra factor can be noted about drug abuse in Iran: the seeming purity and strength of heroin compared to crack (which should not be confused with crack cocaine) means that injection can be a potent stimulator.

Transitioning to injecting drugs is influenced by personal factors, social factors and environmental ones. Individual characteristics include: age and personal patterns of substance use; adverse life events, such as sexual abuse; beliefs and attitudes about the social status of injecting drug users; knowledge and fear of HIV; and having no fear of needles. Some studies highlight the role of social factors in prison as an environment that may lead to injecting heroin. Researches show that the social environment, friends, family and sexual partners play a major role in the onset of intravenous drug use. These effects are seen more strongly in women. They report significantly more pressure to inject from their social environment (3).

### Conclusion

In general, the transition towards injection drug use is increasing rapidly. The injector faces many complications as a result of injecting drugs – it is a major health priority for their families and the community to prevent the spread of injection practices. Therefore, preventative interventions should be undertaken to stop youths from having positive attitudes towards drug use and to prevent the spread of injection use, stopping potential users before they start in order to reduce the consequences for public health.

### References

1. Amini M, Shirinbayan P, Behnam B, Roghani M, Farhoudian A, Joghataei MT, et al. Correlation between expression of CatSper family and sperm profiles in the adult mouse testis following Iranian Crack abuse. *Andrology*. 2014;2(3):386-93.
2. Strike C, Rotondi M, Kolla G, Roy É, Rotondi N, Rudzinski K, et al. Interrupting the social processes linked with initiation of injection drug use: Results from a pilot study. *Drug and alcohol dependence*. 2014;137:48-54.
3. Barry D, Syed H, Smyth BP. The journey into injecting heroin use. *Heroin Addict Relat Clin Probl*. 2012;14(3):89-100.
4. Miller AB. *The Praeger International Collection on Addictions: Faces of addiction, then and now*. Santa Barbara, CA: ABC-CLIO; 2009.
5. Roy É, Boudreau J-F, Boivin J-F. Hepatitis C virus incidence among young street-involved IDUs in relation to injection experience. *Drug and alcohol dependence*. 2009;102(1):158-61.
6. Rafiey H, Narenjiha H, Shirinbayan P, Noori R, Javadipour M, Roshanpajouh M, et al. Needle and syringe sharing among Iranian drug injectors. *Harm Reduct J*. 2009;6(21.10):1186.
7. Vazirian M, Kort GD, Nassirimanesh B, Farhoudian A, Rad-Goudarzi R, Khazaeli A. Young people and drugs

- towards a comprehensive health promotion policy: Tehran report. Tehran, Iran: Asian Harm Reduction Network, United Nations Office on Drugs and Crime (UNODC) in I.R. of Iran. Ministry of Health and Medical Education – IR of Iran. 2006.
8. Crofts N, Louie R, Rosenthal D, Jolley D. The first hit: circumstances surrounding initiation into injecting. *Addiction*. 1996;91(8):1187-96.
  9. Islam SN, Hossain K, Ahsan M. Sexual life style, drug habit and socio-demographic status of drug addicts in Bangladesh. *Public Health*. 2000;114(5):389-92.
  10. Hadland SE, Werb D, Kerr T, Fu E, Wang H, Montaner JS, et al. Childhood sexual abuse and risk for initiating injection drug use: A prospective cohort study. *Preventive medicine*. 2012;55(5):500-4.
  11. Razani N, Mohraz M, Kheirandish P, Malekinejad M, Malekafzali H, Mokri A, et al. HIV risk behavior among injection drug users in Tehran, Iran. *Addiction*. 2007;102(9):1472-82.
  12. Sherman SG, Smith L, Laney G, Strathdee SA. Social influences on the transition to injection drug use among young heroin sniffers: A qualitative analysis. *International Journal of Drug Policy*. 2002;13(2):113-20.
  13. Werb D, Kerr T, Buxton J, Shoveller J, Richardson C, Montaner J, et al. Crystal methamphetamine and initiation of injection drug use among street-involved youth in a Canadian setting. *Canadian Medical Association Journal*. 2013;185(18):1569-75.
  14. Mokri A. Brief overview of the status of drug abuse in Iran. *Arch Iranian Med*. 2002;5(3):184-90.
  15. Narnjyha H. Rapid assessment of drug abuse in Iran. Tehran: Substance Abuse and Dependence Research Center, University of Social Welfare and Rehabilitation Sciences; 2004.
  16. DeBeck K, Kerr T, Marshall BD, Simo A, Montaner J, Wood E. Risk factors for progression to regular injection drug use among street-involved youth in a Canadian setting. *Drug and alcohol dependence*. 2013;133(2):468-72.
  17. Lankenau SE, Wagner KD, Bloom JJ, Sanders B, Hathazi D, Shin C. The first injection event: Differences among heroin, methamphetamine, cocaine, and ketamine initiates. *Journal of drug issues*. 2010;40(2):241-62.
  18. Allahverdi Pour H, Farhadi Nasab A, BashirianSaeed M, Hossein Patterns and causes of youth substance abuse. *University of Medical Sciences and Health Services - Health Yazd*. 2007; 15(4):35- 42.
  19. Chami G, Werb D, Feng C, DeBeck K, Kerr T, Wood E. Neighborhood of residence and risk of initiation into injection drug use among street-involved youth in a Canadian setting. *Drug and alcohol dependence*. 2013;132(3):486-90.
  20. Nandi A, Glass TA, Cole SR, Chu H, Galea S, Celentano DD, et al. Neighborhood poverty and injection cessation in a sample of injection drug users. *American Journal of Epidemiology*. 2010;171(4):391-8.
  21. Lloyd-Smith E, Wood E, Li K, Montaner JS, Kerr T. Incidence and determinants of initiation into cocaine injection and correlates of frequent cocaine injectors. *Drug and alcohol dependence*. 2009;99(1):176-82.
  22. Boardman JD, Finch BK, Ellison CG, Williams DR, Jackson JS. Neighborhood disadvantage, stress, and drug use among adults. *Journal of health and social behavior*. 2001;42(2):151-65.
  23. Ganz ML. The relationship between external threats and smoking in central Harlem. *American Journal of Public Health*. 2000;90(3): 367-71.
  24. Linton SL, Celentano DD, Kirk GD, Mehta SH. The longitudinal association between homelessness, injection drug use, and injection-related risk behavior among persons with a history of injection drug use in Baltimore, MD. *Drug and alcohol dependence*. 2013;132(3):457-65.