Chapter

Screening and Brief Intervention in Substance Use Disorders: Its Clinical Utility and Feasibility Update from Available Literatures

Sambhu Prasad and Sweta Gupta

Abstract

It is found that substance use and related complications extend from occasional mild risky/harmful/hazardous use to severe conditions. The screening instruments may help to identify them in the initial state. The brief intervention (BI) is to bring change in unhealthy or risky substance use. The intervention is carried out by a vast array of trained professionals in various settings and it is valid across substances, age and ethno-culture groups. It has six common elements summarized by the acronym FRAMES (Feedback, Responsibility, Advise, Menu for change, Empathy and enhancing Self-efficacy). The BI has shown significant evidence of efficacy reducing substances and their harmful consequences with improving functionality and quality of life.

Keywords: screening tools, readiness to change, motivation, brief intervention

1. Introduction

Substance use disorders have become matters of global concern because of their impact on individual health, family dynamics, social consequences and criminal and legal problems. Broadly, substances can be classified based on their legal statuses as licit like alcohol, tobacco or illicit like opioids, cannabis, amphetamine and cocaine. World Drug Report (2022) say around 284 million people (aged 15–64) used drug in 2020 with a rise of 26% over the previous decade [1]. Globally around 2.3 billion people aged 15 and above are drinking alcohol [2]. Globally, approximately 39 deaths/100,000 populations are attributable to alcohol and illicit drug use (35 deaths to alcohol use, and 4 deaths to illicit drug use). The use of alcohol and illicit drugs accounts for almost 13 disability adjusted life years (DALYs) lost per 1000 population worldwide [3]. According to WHO, worldwide 3.3 million deaths every year result from harmful use of alcohol representing 5.9% of all deaths and 5.1% of the global burden of disease is attributable to alcohol consumption [2]. WHO research teams indicate that in South East Asia countries, one-third to one-fourth of male population drink alcohol with increasing trends among women [2]. The harmful use of alcohol

causes huge health problems and social and economic burdens in societies. The harmful use of alcohol is a causal factor in more than 200 disease and injury conditions. Worldwide, 3 million deaths every year result from the harmful use of alcohol. This represents 5.3% of all deaths [4]. Alcohol use and cigarette smoking are rising rapidly in some of the developing regions [5]. Major increases in injecting drug use (opiate and amphetamine injection), which carries the highest health risks, were recorded in many regions of eastern European countries and South-East. Continuous tobacco use in any form may result in several cancer and data says that more than 8 million people die from tobacco use [6].

The use of cannabis is by far the most prevalent illicit substance used worldwide, next to the two licit substances tobacco and alcohol [1]. The effects of cannabis on mental health are multiple: multiple studies are available regarding cannabis and schizophrenia, cannabis and transient psychosis, affective disorders, panic, anxiety and amotivational syndrome [7]. The recently conducted largest national-level epidemiological study in India demonstrated that the prevalence figures of use of alcohol, cannabis and other illicit substances in males and females were 27.3 and 1.6, 5 and 0.6, and 4 and 0.2, respectively [8]. In India, the estimated numbers of alcohol users in 2005 were 62.5 million and among them, 10.6 million were dependent users. It has also revealed that 20–30% of all hospital admissions were due to alcohol-related problems [9]. Government statistics show only 21% of adult men and around 2% of women drink. But up to a fifth of this group, that is about 14 million people are dependent drinkers requiring 'help' [10]. It also reports that the percentage of drinking population aged under 21 years has increased from 2% to more than 14% in the past 15 years. The National Family Health Survey (NFHS) found changing trends between NFHS 2 (1998–1999) and NFHS 3 (2005–2006) reflecting an increase in alcohol use among males since NFHS 2, and an increase in tobacco use among women [11]. Tobacco use prevalence in India was high as 55.8% among male with maximum use in the age group 41–50 years. It is considered the primary licit substance of abuse in our country [8]. Studies on "bidi" smoking, the most common form of tobacco smoking in India, provide evidence towards causality of it as a carcinogenic substance [12]. Thus psychoactive substance use continues to take a significant toll, with valuable human lives and productive years of many persons being lost. Routine screening for substance use disorders could alter this statistic and get more people the help they need.

1.1 Workplace issues

In the National Survey on Drug Use and Health (United State) 22.4 million illicit drug users (68.9% aged 18 and above) are employed fully or partially. In the same survey, it was found that most binge drinkers and heavy alcohol users were also employed [79.3% (41.2 million) and 76.1% (12.4 million) respectively] [13].

Substance Abuse and Mental Health Services Administration report that 67.9% of the adult population of illegal drug users employed full-time or part-time indulged in binge and heavy alcohol use [14]. Studies show that when compared with non-substance users, substance-using employees are more likely to be: [15] less productive, up to 40% of accidents at work involve or are related to alcohol use, absenteeism is two to three times higher among habitual substance users, change jobs frequently and file a 'workers' compensation claim.

Many problems are encountered at workplace due to the substance use pattern of the worker. Workers under the influence of psychoactive substances are more

likely to commit unsafe acts that cause damage to their own life, others' lives and the organization. There are safety risks from intoxication, negligence and impaired judgment. Problems with co-workers through increased workload on the non-substance user, disputes, grievances, intimidation and violence are common problems associated with substance use at the workplace. In India, a study was conducted among male industrial workers from Goa, which showed that 21% had hazardous levels of alcohol consumption [16]. Such levels of alcohol consumption were significantly associated with head injuries and hospitalization. The Central Sector Scheme of Assistance for prevention of Alcoholism and Substance (drugs) abuse and for Social Defence Services, Ministry of Social Justice and Empowerment, Government of India highlighted the need for interventions at the workplace. It encourages programs for prevention of alcoholism and drug abuse in the workplace. It provides financial assistance up to 25% of the expenditure for the setting up of a 15-bedded or 30-bedded Integrated Rehabilitation Centre for Addicts (IRCA) to the industry/enterprise having strength of at least 500 workers or more in a particular area [17].

1.2 Harmful substance use and screening

Screening aims to detect health problems or risk factors at an early stage before they have caused serious disease or other problems and is part of maintaining prevention practice activities in health care settings. Thus screening may be useful not only in the case of dependent but also for non-dependent users such as harmful or hazardous use [18, 19]. The limitations of using existing screening tests in primary care settings have been outlined, which are less useful for detecting harmful or hazardous use in non-dependent persons [20–22]. A large number of tools have been developed for identifying hazardous or harmful substance use. CAGE is a four-item validated questionnaire for identifying individuals with alcohol problems [23]. The Alcohol Use Disorders Identification Test (AUDIT) [24] is a screening tool for the identification of hazardous and harmful drinkers while the Fast Alcohol Screening Test (FAST) [25] is an abbreviated version of the AUDIT. There are many studies reporting success of AUDIT as screening and brief intervention (BI) in reducing alcohol-related problems in primary health care (PHC) settings [26]. However, it does not screen for other substances and related problems. This led to the development of ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) [27].

1.3 Alcohol, Smoking and Substance Involvement Screening Test

WHO developed ASSIST as a simple scale for rapid screening of substance users to stratify them into three levels of risk severity (low, moderate and high risk) [27]. It is the first international screening test and an 8-item questionnaire that covers the use of all psychoactive substances and associated problems over the last 3 months. WHO-ASSIST was developed by an international group of addiction researchers and clinicians in response to the overwhelming public health burden associated with psychoactive substance use worldwide. The ASSIST has undergone significant testing in three sequential phases (I, II and III) to ensure that it is a feasible, reliable, valid, flexible, comprehensive and cross-culturally relevant tool. ASSIST is currently in its fourth phase aimed at worldwide dissemination. It helps in early identification of substance use-related health risks and substance use disorders in PHS, general medical care and other settings. Gryczynski et al. [28] did a study on validation and performance of ASSIST among adolescent primary care patients as it has only been

validated with adults and concluded that it is a promising as a research and screening/brief assessment tool with adolescents, but revisions to clinical risk thresholds are warranted. In another study, in Mexico, to determine the psychometric properties of the self-administered ASSIST test in university undergraduate students (n = 1176), the authors concluded that it is a valid screening instrument to identify at-risk cases due to substance use in this population [29]. Silva et al., did an integrative review including 26 articles to systematize the knowledge and the learning of how the instrument ASSIST has been applied. They concluded that ASSIST focused on helping the identification and classification of psychoactive substance use and highlighted its importance in screening the involvement with alcohol and other drugs and is effective in PHC [30].

1.4 Brief interventions for harmful substance use

BI is a treatment strategy structured in nature, short duration (around 5–30 minutes) offered with the aim to assist an individual to cease or reduce the use of psychoactive substances [31]. It generally aims to moderate a person's substance consumption to sensible levels and to eliminate harmful drinking practices rather than to insist on complete abstinence from drinking—although abstinence may be encouraged, if appropriate. Brief interventions typically consist of one to four short counselling sessions with a trained interventionist (e.g., physician, psychologist and social worker) [31]. The specific stages of change include Pre-contemplation (not thinking about changing), Contemplation (thinking about change, weighing up the pros and cons and information/resource gathering) and Action (actually cutting down or stopping) [32]. But the technique of FRAMES (feedback, responsibility, advice, menu, empathy, self-efficacy) and motivational interviewing has been used in a large number of studies to facilitate a change in the behaviour [33, 34].

1.5 ASSIST-linked brief intervention for harmful substance use

While it is clear that brief interventions are effective in substance use, it appears that implementation within health settings may be hindered by a number of barriers. These include lack of time, lack of staff, knowledge and skills to conduct the screening and intervention [31]. To combat these identified limitations, ASSIST-linked BI was developed by the WHO [35]. It is a short but structured and less time-consuming intervention. It is linked to the score from the ASSIST screening questionnaire via the use of the ASSIST feedback report card, which records the participants' ASSIST scores and presents the risks associated with the participants' current pattern of substance use. Then a discussion to commence BI with the client in a non-confrontational way to change their substance use as per ASSIST score (moderate or high risk group). The ASSIST-linked BI is a short intervention lasting 5–15 minutes given to clients. It is a simple, less time-consuming, step-by-step approach to motivate clients to reduce their substance use and produces very little resistance or client defensiveness. It is based on components of BI from the FRAMES model and motivational interviewing [33, 34].

2. Review of literature

2.1 Screening and brief intervention in workplace settings

The workplace is an ideal setting for alcohol and drug user for health prevention and interventions as most of them are employed and spend a lot of time

there [36, 37]. Jenkins [38] in 1986 showed that there was a strong correlation between drinking and absence from work in a study of young civil service staff in Britain. In a study from Australia, workplace can be an effective setting to reduce substance-related problems [39]. Hermansson et al. [40], demonstrated the feasibility of screening and delivering a BI at the workplace in Sweden within a routine health check of employees conducted by the occupational health service. Studies show that regular occupational health check-up with screening the substance use at regular intervals is quite effective in early interventions [41, 42]. In the study conducted by Richmond et al. [43], found a significant reduction in the number of drinks consumed by the women in the intervention group in a matched group comparison. Watson et al. [44], found that there was scope within the workplace to promote initiatives in relation to reducing hazardous and harmful levels of alcohol consumption, which was cost-effectiveness, amenable to an assessment of lifestyle issues and promoting health and wellbeing. Hermansson et al. investigated the results of screening and BI in a large transport company (including 990 employees, mainly men, have found that 20% of those screened were drinking hazardously). The results at 12 months showed that the interventions were effective but screening itself acted positively in terms of reducing drinking [45]. The study conducted by Zibe-Piegel and Boerngen-Lacerda [46] recommended the routine practice of screening and BI in the workplace as it was found to be feasible and helpful in earlier detection and referral to treatment services for harmful substance use. Ito et al., conducted RCT on BI at the workplace for heavy drinkers among industrial workers in Japan. The alcohol-free days in the BI group significantly increased by 93.0% at 12 months. The authors concluded that BI at the workplace was effective in increasing the number of alcohol-free days. However, the effectiveness of decreasing alcohol consumption was unclear, which could be explained by alcohol screening itself causing a reduction in drinking [47].

2.2 Effectiveness of brief interventions in reducing alcohol use—meta analysis and systematic reviews

Convincing evidence exists about the effectiveness of BI for harmful alcohol users admitted to general hospital wards and in PHC settings. Wilk et al., studied 12 RTCs in which BI was given to heavy drinkers and found that heavy drinkers in the interventional group were twice as likely to moderate their drinking pattern after 6–12 months compared to the controlled group [48]. Ballesteros et al., did a study on efficacy of BIs on hazardous drinkers and included 13 studies. There was no clear evidence of a dose-effect relationship. Although indicating smaller effect sizes than previous meta-analyses, it does support the moderate efficacy of BIs [49]. Bertholet et al. [50], had a study on reduction of alcohol consumption by a brief intervention, which included 19 trials of 5639 individuals and it was found that that brief alcohol intervention was effective in reducing alcohol consumption at 6 and 12 months. McQueen et al. [51], did study on BIs for heavy alcohol users admitted to general hospital wards, which included 14 studies involving 4041 male participants and it was concluded that patients receiving BIs had a greater reduction in alcohol consumption compared to those in control groups at 6 and 9 months follow up, but it was not maintained at 1 year and had significantly fewer deaths. Sullivan et al. [52], did a study on meta-analysis of the efficacy of non-physician BIs for unhealthy alcohol use: implications for the patient-centred medical home including 13 studies and showed 1.7 times fewer standard drinks per week than control conditions. A meta-analysis on the effects on

mortality of BIs for problem drinking concluded that brief interventions may reduce mortality rates among problem drinkers by an estimated 23–26% [53].

2.3 BI and alcohol consumption in primary health care settings

There is substantial evidence of the benefits of screening and BI for alcohol problems in PHC settings. BI was found to be effective at PHC setting in reduction of alcohol consumption and it is cost-effectively related to various problems associated with substance use [54–56]. Moreover, BIs have been found to be effective in both primary and secondary care settings for hazardous or harmful alcohol use when delivered under research conditions [57, 58]. Brief interventions have been shown to be cost-effective for hazardous drinkers whose alcohol use put them at risk of alcohol-related problems, but who have few symptoms of alcohol dependence [24, 59]. Brief interventions have been used to encourage those with more serious dependence to engage or improve compliance with more intensive treatment [60]. Lock et al., had conducted a study on cluster RCT to test the effectiveness and cost-effectiveness of screening and BI for patients in PHC in which the intervention group was given 5–10-minute BI and standard advice was offered in the control group. However, ANOVA revealed no statistically significant difference between intervention and control patients at follow-up in alcohol use and economic benefits [61]. Chang et al., conducted an RCT to test the effectiveness of BI and the involvement of their partners in the PHC setting using T-ACE as screening tool and assessed the outcome measures in women with alcohol use, alcohol abstinence self-efficacy score andpartners' collateral report on the subjects' alcohol use. The intervention group received a 25-minute BI by either a nurse or doctor and the control group as usual care. It was found that alcohol use declined in both groups and BI was more effective in women group [62]. Ockene et al., made a study to compare the efficacy of BI in PHC setting with the control group. A 5–10 minutes patient-centred BI found significant reductions in alcohol consumption [63]. Similarly, Goodall et al. [64], reported that two brief sessions in the intervention group showed significantly greater reductions in the frequency of alcohol use variables.

In a community-based study in North India, a sample was followed for 3 months in which 90 male subjects (20—45 years) with an AUDIT score between 8 and 24 consented to participate and were allocated alternatively to the BI or simple advice (SA) protocols. The study showed significant differences across interventions, with a decrease in severity of dependence in the last 30 days, composite ASI (Addiction Severity Index) scores and improvement in physical and psychological quality of life. However, the result was not sustained for a longer duration and the author claimed that booster sessions were needed [65].

2.4 BI and Substance use in various settings

Gryczynski et al., assessed the effectiveness of BI at 6-month follow-up at a rural health care centre. The screening was done with AUDIT and yes/no questions about past year's use of any illegal drug. Outcome measures were recorded as changes in self-reported frequency of illicit drug use, alcohol use and alcohol intoxication. Study showed that there was a greater magnitude of change in drinking behaviours and reductions in illicit drug use. While substantial, it did not differ significantly based on service variables [66]. Bertha et al., conducted a study in which screening, brief interventions and referral to treatment (SBIRT) were used in a wide variety of medical settings. The screening was done with AUDIT and Drug Abuse Screening Test (DAST)

and compared illicit drug use at intake and 6 months after drug screening and interventions. Study has shown that the intervention was feasible to implement, and the self-reported status at 6 months indicated significant improvements over baseline for illicit drug use and heavy alcohol use and also in functional domains [67]. Mitchell et al., had done pre–post analysis to assess the effectiveness of screening, brief interventions and referral to treatment (SBIRT) at 6-month follow-up at a school-based program. The screening was done with CRAFFT. It examined the outcomes of SBIRT services and compared the extent of change in substance use based on the intensity of intervention received. Participants receiving any intervention reported significant reductions in frequency of drinking to intoxication ($p < 0.05$) and drug use ($p < 0.001$) [68]. In another study done by Beintrein et al., in whichan RCT was conducted in inner-city teaching hospital outpatient clinics. Interventional group was given a brief motivational intervention and compared with the control group at 3 and 6 months follow-up. The intervention group was more likely to be abstinent than the control group for cocaine as well as heroin use with a reduction of cocaine level in the hair [69]. Similarly, Saunders et al. [70], also found that BI delivered to opiate users attending a methadone program to be effective in increasing participants' compliance with treatment and motivation to quit drug use, as well as reducing the number of reported drug-related problems and rate of relapse. Although there is growing evidence in support of BIs for a range of illicit substances, some studies have failed to find significant effects [71]. In a systematic review done by Young et al., on effectiveness of brief interventions as part of the SBIRT model for reducing the nonmedical use of psychoactive substances that identified 8836 records. They concluded that insufficient evidence exists as to whether BIs, as part of SBIRT, were effective or ineffective for reducing the use of substance and harm related to it [72].

Cannabis users generally had a low level of motivation to quit its use and have a concern about stigma to assess the treatment [73]. Despite all these the BIs have recently been developed for cannabis use in an attempt to address the gaps in treatment engagement, and a small number of studies have been conducted with promising results [74–77].

Stephens et al., in their first RCT, found two 90-minute individual sessions (comprising assessment, personalised feedback and advice) to be as effective as more extensive treatment and more effective than no treatment in reducing cannabis use and related problems [78]. Similarly, Walker et al., also found two sessions of motivational enhancement therapy delivered to adolescent cannabis users resulted in reduced cannabis use and fewer negative consequences at 12 months compared to a delayed-treatment control group [79].

In a simple single-group pre–post design, Denering and Spear [80] found screening and a brief 10–15 minute intervention delivered to college students resulted in reductions in the proportion of students reporting cannabis use at 6 months.

BIs for smoking cessation have also been found to be highly effective. A systematic review by Stead et al. [81], (included 42 clinical trials) conducted since 1972 found that brief advice to patients to quit smoking increased the likelihood of a cessation attempt, as well as abstinence at the 12-month follow-up with an additional benefit of more intensive advice on quit rates.

2.5 The ASSIST-linked brief intervention

Spear et al. [82], did a study on substance abuse screening and BI in a mental health clinic and concluded that administration of the ASSIST in a campus mental

health clinic was feasible and brought an opportunity for discussion related to substance use. Humeniuk et al., did an international RCT to evaluate the effectiveness of ASSIST-linked BI for illicit drugs (cannabis, cocaine, ATS and opioids). Participants were recruited from PHC settings in four countries (Australia, Brazil, India and the United States of America) and were randomly allocated to an intervention or waitlist control group at baseline and the groups were followed up after 3 months. A total of 731 participants were recruited from a variety of PHC settings for the international study (Australia n = 171; Brazil n = 165; India n = 177 and United States of America n = 218). Participants were aged between 16 and 62 years. It was concluded that the ASSIST-linked BI was effective in getting participants to reduce their substance use and risk as supported by feedback from at 3 months follow-up [83]. Zibe-Piegel and Boerngen-Lacerda did research work from city hall in a southern city of Brazil representative sample of employees (n = 1310), 144 individuals in risky use and 139 dependents on tobacco, alcohol and/or other substances where ASSIST-linked BI was used during 3-month follow-up. It showed a significant reduction in ASSIST scores and was feasible in workplace to prevent hazardous/ harmful substance use without prejudice or stigma, enabling earlier detection, intervention and treatment referral [46]. Assanangkornchai et al., demonstrated the implementation, acceptability and uptake of the screening and BI program based on the ASSIST to help decrease substance misuse in primary care in Thailand. Here 5931 patients were screened with the ASSIST. Of these, 29.6% and 3.4% were in the moderate and high-risk groups, respectively and were offered BI or other treatments. The ASSIST detected many substance users capable of benefiting from the intervention. The program was well received by patients and staff and suggested as a model for introducing similar procedures into developing countries [84]. Saitz et al., did a study to test the efficacy of two brief counselling interventions for unhealthy drug use (any illicit drug use or prescription drug misuse). A total of 528 adult primary care patients were randomised into three groups after screening with ASSIST scores greater than or equal to 4. A brief negotiated interview (10- to 15-minute structured interviews) and an adaptation of motivational interviewing (30- to 45-minute intervention based on motivational interviewing with a 20- to 30-minute booster) and compared with no brief intervention. There were no significant effects of brief negotiated interviews or an adaptation of motivational interviewing on self-reported measures of drug use and its consequences. These results did not support widespread implementation of illicit drug use and prescription drug misuse screening and brief intervention [85]. Loretta et al., provided preliminary evidence of the effectiveness of ASSIST-linked BI in a college mental health clinic where 453 students (ages 18–24) participated in the evaluation and completed baseline and 6-month follow-up interviews. Study showed a slight reduction in the rates and number of days (in the prior 30 days) of binge drinking and marijuana use and it was concluded that routine screening and BI procedures in a mental health setting may reduce problematic substance use among college students [86]. Pengpid et al., did RCT including screening and concurrent BI of conjoint hazardous or harmful alcohol and tobacco use in hospital outpatients in Thailand. Results of the interaction (group × time) effects indicated that there were statistically significant differences between the three study groups [tobacco only intervention, alcohol only intervention and the polydrug use (alcohol and tobacco) integrated intervention groups] over the 6-month follow-up on the ASSIST tobacco score and past week tobacco use abstinence. The result show reduction in scores in all six outcome parameters (Alcohol ASSIST score, low alcohol risk score, past week tobacco abstinence or low alcohol risk score and past week tobacco abstinence and

low alcohol risk score) [87]. Lasebikan and Ola did a study to determine whether screening, BI and referral for treatment (RT) can reduce the prevalence of tobacco use in rural and semi-rural settings in Nigeria. Participants received a single ASSIST-linked BI and RT at entry, and a booster ASSIST BI and RT at 3 months. It shows that BI with booster sessions at 3 months had a significant effect on tobacco use in people living in community and suggested the need for promotion of such program [88].

2.6 The ASSIST-linked brief intervention at the workplace

There are few published international studies about the implementation of a screening-linked BI using WHO's ASSIST screening scale in the workplace settings. There is a single published study from India conducted by Joseph et al. [89], on the feasibility of conducting the ASSIST-linked screening and BI from a tertiary hospital in north India (from this same institute). The study showed that it was feasible to use ASSIST for screening at the workplace to identify risk level substance use and to use ASSIST-BI for their brief intervention [90]. Joseph et al. [90], also studied the effect of ASSIST-linked BI and compared the mean pre and post-alcohol ASSIST scores in workplace settings for harmful drinking among class C employees of a tertiary hospital in north India. A sample of 39 workers with moderate and high-risk levels of alcohol use was identified by randomly screening 162 employees with ASSIST. Employees who were identified as moderate and high-risk drinkers by the ASSIST were given the BI as per WHO ASSIST-linked BI [90]. A significant difference over 4 months ($p < 0.001$) was noticed where the mean ASSIST score reduced from 26.55 (pre-intervention) to 20.06 (post-intervention). There were also improvements in other variables like alcohol consumption, strong desire to use alcohol and health, social and legal problems due

ASSIST score	Group	Baseline		3-Month follow up		*F* value	*p*-Value	Power
		Mean	SD	Mean	SD			
Tobacco	Control	28.46	2.42	26.62	2.57	104.34	<0.001	100%
	Intervention	29.35	2.82	19.29	3.26			
	Interaction effect					218.95	<0.001	100%
	Main effect					31.40	<0.001	100%
Alcohol	Control	31.18	4.49	27.66	4.03	246.16	<0.001	100%
	Intervention	32.75	2.72	11.62	5.87			
	Interaction effect					482.06	<0.001	100%
	Main effect					48.03	<0.001	100%
Cannabis	Control	33.40	2.07	26.40	1.94	25.11	<0.001	99.3%
	Intervention	31.66	5.42	9.50	3.83			
	Interaction effect					92.87	<0.001	100%
	Main effect					30.26	<0.001	99.8%

ASSIST: Alcohol, Smoking and Substance Involvement Screening Test. Bonferroni correction is done to counteract the problem of multiple comparisons. Adjusted alpha (α) = α/k (number of comparison). (0.05/3 = 0.016).

Table 1.
Comparison of groups at baseline and follow-up on the basis of ASSIST using two-way repeated measure ANOVA.

Substance	**Control (N = 34) Mean and SD**	**Intervention (N = 33) Mean and SD**	**(t-Value/U = Mann Whitney/$\chi 2$ = Chi square) p-value**
Tobacco			
ASSIST score	28.32 (±2.38) Range [22–31]	29.27 (±2.75) Range [22–36]	(t = −1.181) p = 0.242
Risk level	Moderate (n = 7) Severe (n = 27)	Moderate (n = 4) Severe (n = 29)	($\chi 2$ = 0.875) p = 0.350
Alcohol			
ASSIST score	31.20 (±3.4) Range [24–38]	32.67 (±2.65) [26–37]	(t =−1.610) p = 0.113
Risk level	Moderate (n = 4) High (n = 26)	Moderate (n = 1) Severe (n = 30)	($\chi 2$ = 2.070) p = 0.150
Cannabis			
ASSIST score	32.83 (±2.31) Range [30–35]	31.85 (±4.98) Range [22–37]	(t = 0.120) p = 0.639
Risk level	Moderate (n = 0) High (n = 6)	Moderate (n = 1) High (n = 6)	($\chi 2$ = 1.091) p = 0.296

Risky use of substances was assessed with an application of ASSIST and thus subjects were categorised into different risk levels on the pattern of substance use. As per Table 2, the mean ASSIST score of tobacco users at baseline in the control group was 28.32 (±2.38) and ranged between 22 and 31. Most of the subjects were at high levels of risky use of tobacco (high level, n = 27 and moderate level, n = 3). In the intervention group, the mean ASSIST score was 29.27 (±2.75) and ranged between 22 and 36. Most of the subjects were at high levels of risky use of tobacco (high level, n = 29 and moderate level, n = 4). However, both the groups did not differ statistically on basis of ASSIST score and severity (p = 0.242), (p = 0.350), respectively.

In the same Table 2, the mean ASSIST score of alcohol users at baseline in the control group was 31.20 (±−3.4) and ranged between 24 and 38. Most of the subjects were at high levels of risky use of alcohol (high level, n = 26 and moderate level, n = 4]. In the intervention group, the mean ASSIST score was 32.67 (±2.65) and ranged between 26 and 37. Most of the subjects were at high levels of risky use of alcohol [high level, n = 30 and moderate level, n = 1]. However, both the groups did not differ statistically on basis of ASSIST score and risk level (p = 0.113), (p = 0.150), respectively.

In the same Table 2, the mean ASSIST score of cannabis users at baseline in the control group was 32.83 (±2.31) and ranged between 30 and 35. All the cannabis users were at high levels of risky use (high level, n = 6 and moderate level, n = 0). In the intervention group, the mean ASSIST score was 31.85 (±4.98) and ranged between 22 and 37. Here also most of the subjects were at high levels of risky use of cannabis (high level, n = 6 and moderate level, n = 1). However, both the groups did not differ statistically on basis of ASSIST score and risk level (p = 0.639), (p = 0.296), respectively.

Table 2.
ASSIST score and risk level of randomised groups at baseline.

to alcohol at follow-up ($p < 0.001$) [90]. In a recent study using randomised controlled trial design, to study the efficacy of ASSIST-linked BI where major objectives were to reduce risky substance use among class C male workers, enhance the progress of subjects through the stages of change and motivate the subjects to seek treatment [91]. The inferential analysis showed that participants receiving BI had a significant reduction of ASSIST scores for all risky use of substances compared with Control. Thus there was a significant reduction in the risk level of all categories of substance use in the intervention group compared with the control group.

The interaction effects in the stage of change indicate that the participants in the intervention group who were using tobacco had significantly changed their stage to action stage more than that of the control group. Similar significant changes were also noticed in the risky alcohol users of the intervention group compared with that of the control group. However, in the risky users of cannabis, the interaction effects indicate

that there was no significant change in the contemplation stage in both groups but significant changes were noticed in precontemplation and action stages in the intervention group compared with the control group.

The interaction effect on quality of life shows that the participants receiving BI had significantly increased scores for all the domains of WHOQOL-BREF compared with that of the control group. Participants receiving BI were significantly more motivated to seek treatment compared to the control group.

2.7 Effect of the ASSIST BI on specific substance involvement score

Two-way repeated measures ANOVA results show that there was a significant reduction of mean tobacco ASSIST scores over time among groups (F = 218.95, p < 0.001 and observed power 100%). There was also a significant reduction in mean scores among the groups. Moreover, there was a significant interaction effect and the

Substance	**Control (N = 32)**	**Intervention (N = 31)**	**(t-Value/$\chi 2$ = Chi square) p-value**
	Mean and SD	**Mean and SD**	
Tobacco use			
ASSIST score	26.62 (±2.57) Range [22–31]	19.29 (±3.26) Range [11–25]	(t = 9.913) p < 0.001
Risk level	Moderate (n = 9) High (n = 23)	Moderate (n = 31) High (n = 0)	($\chi 2$ = 35.093) p < 0.001
Alcohol use			
ASSIST score	27.66 (±4.03) Range [24–38]	11.62 (±5.87) [5–24]	(t = 11.831) p < 0.001
Risk level	Low (n = 0) Moderate (n = 8) High (n = 19)	Low (n = 17) Moderate (n = 12) High (n = 0)	($\chi 2$ = 36.775) p < 0.001
Cannabis use			
ASSIST score	26.40 (±1.94) Range [23–28]	9.52 (±3.83) Range [5–21]	(t = 8.805) p < 0.001
Risk level	Moderate (n = 2) High (n = 3)	Moderate (n = 6) High (n = 0)	($\chi 2$ = 4.950) p = 0.026

ASSIST score was re-assessed after 3 months of follow-up. The mean ASSIST score of tobacco in the control group was 26.62 (±2.57) and ranged between 22 and 31 whereas in the intervention group it was19.29 (±3.26) and it was statistically significant (t = 9.913; p < 0.001). It means that most of the subjects from the intervention group were at a moderate level and none were at high level of risky use of tobacco (moderate risk, n = 31 and high risk, n = 0), and it was statistically significant as compared with the control group (moderate, n = 9 and high level, n = 23) [$\chi 2$ = 35.093; p < 0.001] (Table 3).

The mean ASSIST score of alcohol users in the control group was 27.66 (±4.03) whereas in the intervention group was 11.62 (5.87) and it was statistically significant [t = 11.831; p < 0.001]. It means that most of the subjects from the intervention group were at low and moderate levels and none were at high level of risky alcohol use (moderate risk, n = 12 and low risk, n = 17), and it was statistically significant as compared to the control group (moderate, n = 8 and high level, n = 19) [$\chi 2$ = 36.775; p < 0.001] (Table 3).

Similarly, none of the subjects were at a high-risk level of cannabis use in the intervention group as compared with the control group. Further, there was a statistically significant difference in risky use of cannabis in the intervention group as compared with the control group with respect to the mean ASSIST score and mean risk level of cannabis used [(t = 8.805; p < 0.001), ($\chi 2$ = 4.950; p = 0.026)], respectively (Table 3).

Table 3.
ASSIST score and risk level of randomised groups at follow-up.

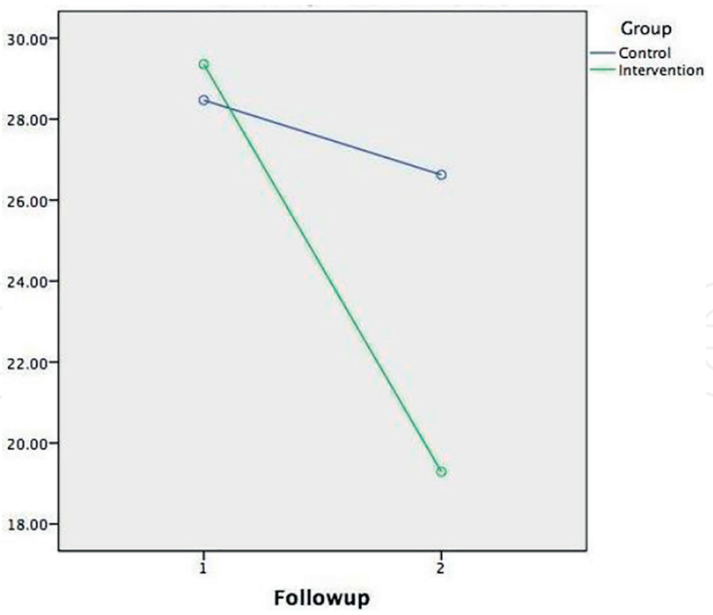

Figure 1.
Change in total ASSIST score for risky tobacco use.

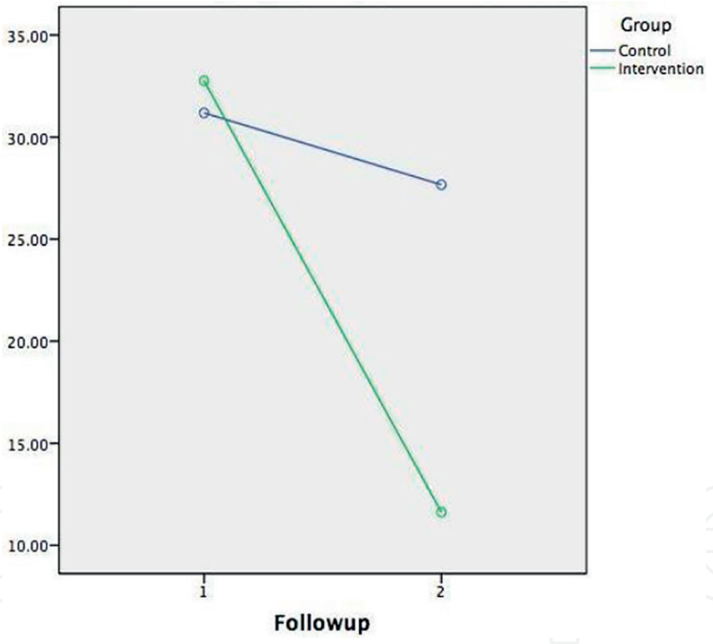

Figure 2.
Change in total ASSIST score for risky alcohol use.

group receiving the BI at baseline had significantly lower mean tobacco ASSIST scores at follow-up compared with the control group ($F = 104.34$, $p < 0.001$ and observed power 100%) (**Tables 1–3**). The result is shown graphically in **Figure 1**.

Similarly, statistical significance reduction of mean alcohol as well as cannabis ASSIST scores over time among the groups ($F = 482.06$, $p < 0.001$, observed power 100% and $F = 92.87$ $p = 0.001$, observed power 100%, respectively). There was also a significant reduction in mean scores among the groups using alcohol and cannabis. Moreover, there was a significant interaction effect and the group receiving the BI at baseline had significantly lower mean alcohol as well as cannabis ASSIST

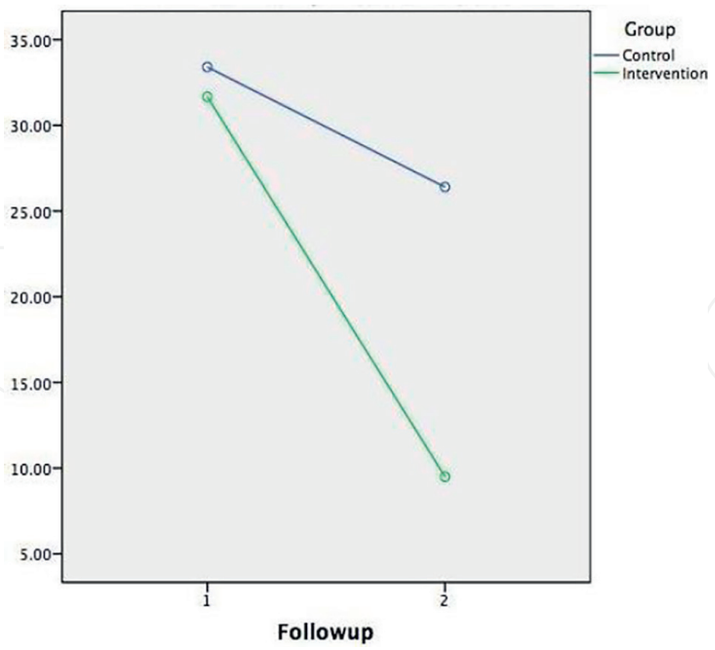

Figure 3.
Change in total ASSIST score for risky cannabis use.

scores (F = 246.16, p < 0.001, observed power 100% and F = 25.11, p < 0.001, observed power 99.3%, respectively) (**Tables 1–3**). Results are shown graphically in **Figures 2** and **3**.

3. Conclusion

BI has clear scientific principles in harm reduction, stage of change, motivational interview, simple to deliver and cost-effectiveness. It can use even in opportunistic setting by non-specialist professionals. It can be an extended service for an individual who needs help but not seeking treatment from specialised centres. Thus BI could be considered as part of clinician's responsibility, in addition as such prescribing medicine, ordering test, performing surgical procedures, filling medical forms, etc. It has favourable outcome as evidences show reduction and prevention of various substance-related consequences.

Author details

Sambhu Prasad[1*] and Sweta Gupta[2]

1 Department of Psychiatry, All India Institute of Medical Sciences (AIIMS) Patna, India

2 Department of Orthodontics, Patna Dental College and Hospital, Patna, India

*Address all correspondence to: sambhu3011@gmail.com

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