ORIGINAL ARTICLE

Assist-linked brief intervention to reduce risky pattern of substance use in male workers employed at a tertiary care hospital in India: A randomized controlled trial

Sambhu Prasad, Debasish Basu[1], Surendra K. Mattoo[1], Subodh B. N[1]
Department of Psychiatry, All India Institute of Medical Sciences (AIIMS), Patna, Bihar, [1]Department of Psychiatry, Drug De-addiction and Treatment Centre, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

ABSTRACT

Background: Substance use in workplace leads to adverse effects both on the employees and on the workplace. Existing research focuses on alcohol-related harm, while workplace use of other substances has been neglected. There are no randomized controlled studies of brief interventions in Indian hospital settings.
Aim: To evaluate the efficacy of World Health Organization (WHO) alcohol, smoking, and substance involvement screening test (ASSIST)-linked brief intervention (ALBI) for reducing risky patterns of substance use in male workers at a tertiary-care hospital in North India.
Material and Methods: The study was conducted in two phases. In Phase-I, a random list of 400 employees was generated from the entire pool of male hospital workers, of which 360 participated. Data on the ASSIST risk categories (mild, moderate, and high) were generated from Phase I. In Phase-II, moderate- or high-risk subjects ('ASSIST screen-positive') were randomized into intervention and control groups, with 35 screen-positive subjects in each group. The intervention group was provided a 15–30-min structured session per ALBI protocol, while the control group was given a 15–30-min general talk on health-related consequences associated with substance use. The subjects were compared on ASSIST score, WHO quality-of-life brief version (WHOQOL-BREF) and readiness to change questionnaire (RCQ) at baseline and at 3-month follow up.
Results: The prevalence of moderate-to-high-risk use of tobacco, alcohol, and cannabis in the total sample was 28.6%, 27.5%, and 6.9%, respectively. At 3-months postintervention follow-up of the randomized sample, recipients of ALBI had significant reduction of ASSIST scores for all substances compared to the control group ($p < 0.001$). More participants receiving ALBI were ready to change to RCQ action stage (p values for tobacco, alcohol, and cannabis <0.001, <0.001 and 0.007, respectively). WHOQOL-BREF scores significantly improved in ALBI group across all domains.
Conclusion: ALBI was effective in reducing risky substance use, increasing readiness to change and improving the QOL of the subjects at workplace setting.

Key words: ASSIST, brief intervention, hospital employees, male worker, psychoactive substances, randomized controlled trial, screening

Address for correspondence: Dr. Sambhu Prasad, Department of Psychiatry, All India Institute of Medical Sciences (AIIMS), Patna, Bihar, India.
E-mail: sambhu3011@gmail.com

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INTRODUCTION

Employees using psychoactive substances are more likely to be less productive, change jobs frequently, file workers' compensation claim, meet with accidents, and develop absenteeism.[1] Brief interventions (BIs) are considered effective in limiting substance use in various health and workplace settings. World Health Organization (WHO) developed a comprehensive package named WHO alcohol, smoking, and substance involvement screening test (ASSIST)-linked brief intervention (ALBI) to tackle such issues.[2] ALBI is based on components of BI from the feedback, responsibility, advice, menu of options, empathy, self-efficacy (FRAMES) model and motivational interviewing, and it has convincing research support for its efficacy.[3-10] Yet, empirical data on screening and BI in the workplace are limited, especially for ALBI.[11-14] Currently there is no randomized controlled trial from India using ALBI to reduce risky substance use (not only alcohol) in the workers employed in a tertiary care hospital.[12-16]

The present study was conducted to assess the efficacy of ALBI to reduce risky patterns of substance use in Class C male workers at a tertiary-care hospital setting, to enhance the progress of the participants through the stages of change, and to improve their QOL.

METHODS

Research design and setting

A randomized controlled trial (RCT) design was followed. Standards described in the consolidated standards of reporting trials (CONSORT) were followed, using CONSORT checklist and CONSORT flow diagram. The study was carried out in the workplace setting among Class C male workers. These workers are skilled and semi-skilled manual workers such as hospital and sanitary attendants, library attendants, cleaners, security guards, etc., employed at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India.

Sample size calculation

Sample size estimation was based on ASSIST scores from a previously published pilot study from our center, which used a pre–post design but no control group.[15] The mean preintervention ASSIST score was 26.55 (SD = 6.54) and at 4-month follow up the mean postintervention ASSIST score was 20.06 (SD = 7.84). With these data, we calculated that 27 participants would be required in each of the intervention and the control group to achieve a significance level of 0.05 and power of 90%. Adjusting for an estimated 20% dropout at 3 months, the final intake samples in each group for the RCT were 35. Accordingly, the total screen positive sample size for RCT was 70. Our previous study found that approximately 25% of the Class C male workers screened with ASSIST were "screen-positive" (i.e., at moderate and severe risk for harmful alcohol use). Hence, the number of subjects from the population to be screened for obtaining 70 screen-positive subjects was four times; that is, 280 (rounded off to 300) Class C male employees were needed to be screened with ASSIST or till the requisite number of 70 was reached. The actual number of subjects screened were even more because some screen-positive subjects declined to undergo ASSIST screening or to provide informed consent even if found screen-positive. Hence, considering a 25% refusal rate, the final number of subjects from the population of Class C male hospital employees to be approached for screening came to 400. Thus, a list of 400 was generated from the entire population of Class C male hospital employees (both permanent and on contract) by computer-based random number generator. (Source for sample size calculation: http//:sampsize.sourceforge.net).

Participants

The participants were 20 to 60 years old male workers of PGIMER Chandigarh who were ASSIST screen positive and provided informed consent to participate in the study. Participants were excluded if they had severe communication difficulties (language problems, deafness), were intoxicated or in severe withdrawal at the time of assessment (however, these latter subjects were again approached later, and included if they were willing), were already undergoing treatment for substance use disorders, had comorbid severe physical or mental illness which could interfere with assessment, or were otherwise uncooperative or unwilling to participate in the study.

Procedure

The study was conducted in two phases. In Phase I, a list of 400 such employees was drawn from by computer-generated random numbers fulfilling the inclusion criteria. The sample was screened using the ASSIST V3.0,[17] and on the basis of their scores the participants were graded into three risk categories: low, moderate, and high level of risk. The moderate- and high-risk subjects ('ASSIST Screen Positive') for use of any substance, alone or in combination, constituted the study population for the Phase II of the study. In Phase II, 70 ASSIST Screen positive and consenting participants were randomly recruited from this ASSIST screen positive pool. This constituted the study sample for intervention. These ASSIST Screen-positive subjects were first administered the following research instruments: Socio-demographic performa, clinical performa (these two are routinely used in our department for assessment purpose), readiness to change questionnaire (RCQ)[18] and WHO quality-of-life scale, brief version (WHOQOL-BREF), Hindi version.[19] Next, they were randomized into an intervention group and a control group by permuted block randomization using a computer-generated procedure. After randomization, the intervention group was administered WHO ALBI package (single session of 15–30 min) as a structured and individualized therapy provided immediately after the

assessment. The assessments and the ALBI session was conducted by the principal author. The session consisted of discussing individualized harmful consequences of using substance, establishing clear link between substance consumption and the consequences, emphasizing the patient's personal responsibility to change, evaluation of high-risk situations, implementation of alternative highs, advice on coping strategies and facilitating self-efficacy and optimism. It also included advice for proper specialized consultation if needed.

In the control group, an individualized session of about 15–30 min was conducted by the same investigator immediately after the assessment. It included general health information, advice to cut down or stop substance use, take-home pamphlets on substance use and referral to specialized treatment centers if needed.

In the final stage, a follow-up assessment was done 3 months after the intervention by contacting all the participants at their workplace by the same investigator. The re-assessment included all the initial assessment tools (ASSIST, RCQ, and WHOQOL-BREF) in both the groups.

Statistical analysis

Analysis was done using the SPSS version 21.0 for windows (Chicago, Illinois, USA) by using descriptive and inferential statistics. Means, standard deviations and percentages were used for descriptive statistics. Bonferroni correction was done for multiple comparisons. For inferential statistics, two-way repeated-measures ANOVA using ASSIST Score as the variable was used to determine if the two groups differed from each other ("Main effects") as well as to study any interaction between group and time ("Interaction effect"). Any significant baseline intergroup differences were adjusted in the statistical model. Similar procedure was used to enhance the progress of the participants through the Stages of Change. Chi-square test was used for comparing the frequency of treatment seeking in the two groups.

RESULTS

Selection of sample

The study was conducted from July 2015 to December 2016. Confidentiality of the participants was ensured. The participants, interventions and flow details are summarized in the CONSORT flowchart depicted in Figure 1. Among the 400 workers, 360 participated in the study. Of these participants, 324 (90%) were ASSIST positive for any level of substance use involvement including low level of risky use. The prevalence of those with moderate or high-risk use (the ASSIST "Screen positive") was 112 (31.1%) for any substance [103 for tobacco (28.6%), 99 for alcohol (27.5%), and 25 for cannabis (6.9%)]. These were not exclusive numbers because many scored screen-positive for multiple substances [Table 1]. Out of these 112 ASSIST screen-positive participants, a total of 70 subjects who consented for the RCT were recruited for intervention. They were randomized into intervention and control groups, with 35 participants in each group.

Table 1: Risky use of substances at the workplace in the full sample (*n*=360)

Substance use	Tobacco *N* (%) ASSIST Score Mean±SD, Range & CI	Alcohol *N* (%) ASSIST Score Mean±SD, Range &CI	Cannabis *N* (%) ASSIST Score Mean±SD, Range& CI
No	36 (10%)	57 (15.9%)	328 (91.2%)
Yes	324 (90%)	303 (84.1%)	32 (8.8%)
Risk category			
Low	221 (61.4%) 1.86±1.06, 1-3, 0.87-2.85	204 (56.6%) 5.64±2.01, 1-9, 5.36-5.92	07 (1.9%) 1.86±1.06, 0-3, 0.87-2.85
Moderate	33 (9.1%) 10.29±10.07, 4-25, 0.96-19.61	26 (7.2%) 16.43±3.04,11-21, 13.61-19.25	11 (3.1%) 18.29±5.18, 10-23, 13.49-23.08
High	70 (19.5%) 30±1.41, 28-31, 28.69-31.31	73 (20.3%) 32.29±4.46, 27-38, 28.16-6.41	14 (3.8%) 33.14±2.26, 30-35, 31.05-35.24

Chi Square=34.06, Degrees of Freedom=4, *P*=0.000000724

Participant characteristics

Demographic profile of Intervention and Control groups shows that the mean age (±SD) of participants of control group was 36.69 (±9.44) years (range 25 to 56) and that of intervention group was 38.74 (±9.68) years (range 27 to 55). Baseline substance use related data are shown in Table 2. Risk level, RCQ scores and QOL of randomized groups at Baseline. Distribution of subjects according to their substance use profile at baseline in both control and intervention group are shown in Table 3. It show majority of the participants are consuming alcohol and tobacco in combination with small percentage were used either tobacco or alcohol along (none were using cannabis alone) However they did not differ significantly in distribution of substance using pattern (p=0.391; X2=4.112).

ASSIST-based risk stratification

Most of the participants scored high on ASSIST and were categorized at high-risk level (the numbers for tobacco, alcohol, and cannabis were 27, 26, and 6, respectively, in the control group, and 29, 30, and 6, respectively, in the intervention group; the remaining participants were in the moderate risk category).

Stage of change on the basis of RCQ at baseline

RCQ, applied to assess the current stage of change, showed that most of the participants were at precontemplation and contemplation stages. The numbers of participants in the precontemplation and contemplation stages in the intervention and control groups were 21, 13 and 19, 15, respectively, for tobacco use; 11, 12 and 19, 20, respectively for alcohol use, and 3 each in both the groups for cannabis use.

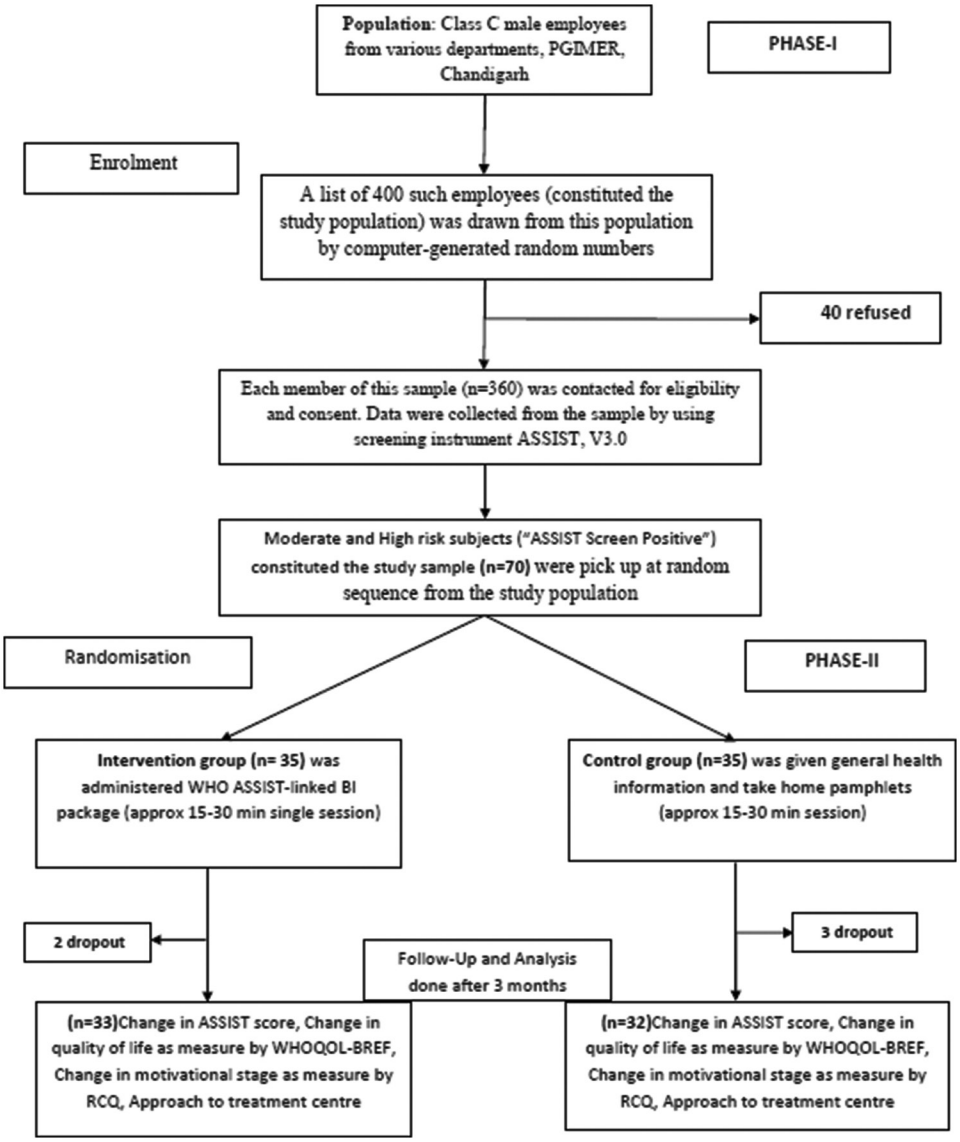

Figure 1: Flow chart of the study

Quality-of-Life of randomized groups at baseline

The mean total WHOQOL scores were 70.54 (±5.96) and 73.11 (±6.73) for the control and intervention groups, respectively. The mean scores for physical health domain were 20.04 (±2.26) and 20.74 (±2.22), for psychological health 14.82 (±2.58) and 15.14 (±2.14), for social relationship domain 9.35 (±1.15) and 9.82 (±1.33), for environmental domain 18.88 (±4.52) and 19.88 (±2.75), and for general health domain 7.64 (±0.34) and 7.82 (±0.17) in these two groups. The mean time ± SD (and range) spent on general talk and ALBI was 28.9 5 ± 1.4 (25–30) and 29.61 ± 0.83 (25.5–30) min in the control group and intervention groups respectively. ASSIST scores with risk level, RCQ and QOL of groups at 3-month follow-up after intervention.

ASSIST scores

ASSIST scores were compared at baseline and follow-up for both control and intervention groups, with the control group serving to control for the effects of time and to determine if there was a significant interaction effect. Two-way repeated measures ANOVA showed a significant reduction of mean tobacco ASSIST scores over time among the groups ($F = 218.95$, $P < 0.001$, observed power 100%), and a significant reduction in mean scores among the groups ($F = 31.40$, $P < 0.001$, observed power 100%).

Furthermore, there was a significant interaction effect in that the group receiving the BI at baseline which had significantly lower mean tobacco ASSIST scores at follow-up compared to the control group ($F = 104.34$, $P < 0.001$, observed power 100%). Similarly, there was a statistically significant reduction of mean alcohol and 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 99.8%, respectively). There was also a significant reduction in mean scores among the groups using alcohol and cannabis ($F = 48.3$,

$P < 0.001$, observed power 100% and $F = 30.26$, $P < 0.001$, observed power 99.3%, respectively). Additionally, there was a significant interaction effect and the group receiving the BI at baseline which had significantly lower mean alcohol and cannabis ASSIST scores ($F = 246.16$, $P < 0.001$, observed power 100% and $F = 25.11$, $P < 0.001$, observed power 99.3%, respectively) [Table 4 and Figures 2-4].

Stages of change

At 3-month follow up there was no subject at precontemplation stage in intervention group compared to control group for tobacco, alcohol, and cannabis use. Most of the subjects had progressed to action stage in the intervention group compared to the control group. The changes were statistically significant for risky tobacco, alcohol, and cannabis use when the groups were compared at follow-up with respect to their base line ($P < 0.001$; $P < 0.001$; $P = 0.007$), respectively [Table 5].

Quality-of-life

Two-way repeated measures ANOVA results showed a significant increase in total WHOQOL- BREF scores over time among the groups ($F = 172.93$, $P < 0.001$, observed power 100%), and there was a significant increase in scores among the groups ($F = 44.12$, $P < 0.001$, observed power 100%).

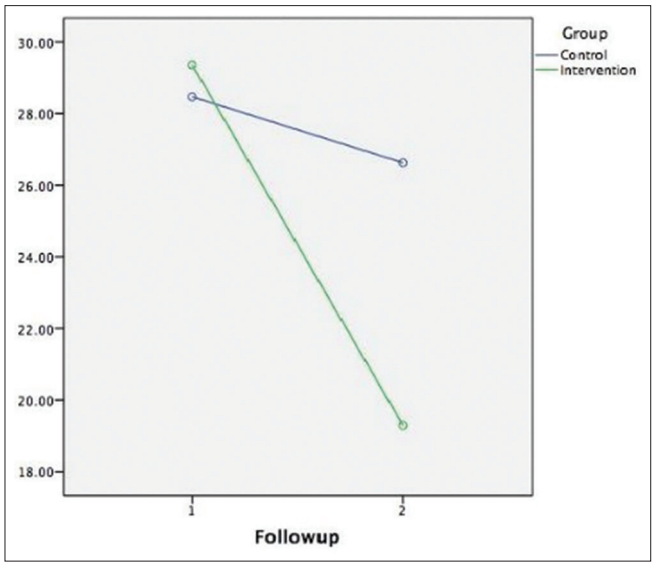

Figure 2: Change in total ASSIST score for risky tobacco use

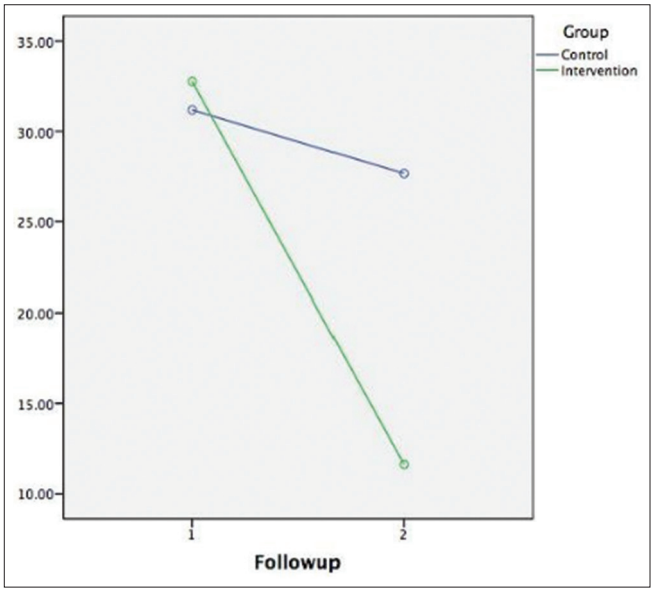

Figure 3: Change in total ASSIST score for risky alcohol use

Table 2: Substance use profile of randomized Intervention and Control groups (*N*=35 each)

Variables	Control Mean (SD) & range	Intervention Mean (SD) & range	(*t*/*U*=Mann-Whitney) *P*
Smoking			
Age of initiation (years)	18.18 (±4.04)[13-31]	17.72 (±3.57)[10-25]	(*t*=0.665) *P*=0.515
Duration of use (months)	232.59 (±119.12)[24-444]	148.89 (±145.35)[30-576]	(*t*=0.451) *P*=0.851
Duration of harmful use (months)	206.62 (±114.43)[30-432]	186.90 (±105.25)[24-402]	(*t*=0.454) *P*=0.810
Duration of abstinence (months)	9.40 (±4.75)[2-24]	10.62 (±5.63)[4-24]	(*t* = −0.485) *P*=0.629
Smokeless			
Age of initiation (years)	18.25 (±4.71)[15-25]	19.17 (±5.87)[14-30]	(*t*=−0.289) *P*=0.802
Duration of use (months)	169.25 (±155.30)[15-372]	122.57 (±126.59)[72-360]	(*U*=10) *P*=0.666
Duration of harmful use (months)	166.25 (±150.10)[108-192]	81.85 (±110.21)[144-300]	(*U*=11) *P*=0.828
Duration of abstinence (months)	10.00 (±2.82)[6-12]	9.17 (±2.40)[6-12)	(*t*=502) *P*=0.629
Alcohol (IMFL)			
Age of initiation (years)	31.87 (±4.79)[15-35]	29.13 (±44.52)[16-36]	(*U*=409) *P*=0.534
Duration of use (months)	160.76 (±93.29)[60-420]	221.6 (±119.32)[60-384]	(*t*=−0.934) *P*=0.062
Duration of harmful use (months)	62.93 (±71.92)[12-300]	100.60 (±111.32)[60-420]	(*U*=374) *P*=0.225
Duration of abstinence (months)	29.14 (±20.09)[0-84]	26.80 (±29.11)[0-72]	(*U*=280) *P*=0.280
Cannabis			
Age of initiation (years)	20.00 (±3.93)[15-25]	18.66 (±2.33)[15-22]	(*t*=0.981) *P*=0.350
Duration of use (months)	98.00 (±22.01)[72-120]	67.33 (±45.28)[24-120]	(*t*=0.981) *P*=0.167
Duration of harmful use (months)	74.00 (±35.15)[24-120]	54.16 (±33.55)[24-96]	(*t*=1.000) *P*=0.341
Duration of abstinence (months)	12.83 (±6.33)[6-24]	10.00 (±7.37)[4-24]	(*t*=0.714) *P*=0.492

Duration of harmful use*: As per International classification of Disease (ICD-10) harmful use is defined as a pattern of psychoactive substance use that is causing damage to health. The damage may be physical (Sub mucous fibrosis due to long term use of Tobacco) or mental (e.g., episodes of depressive disorder secondary to heavy consumption of alcohol)

Further, there was a significant interaction effect and the group receiving the BI at baseline had significantly higher mean total WHOQOL-BREF scores at follow-up compared to the control group ($F = 25.66$, $P < 0.001$, observed power 99.9%) [Table 5]. Similarly, significant increase in scores in physical health, psychological health, social relationship, environmental and general health domains of WHOQOL-BREF was recorded over time among the groups ($F = 65.38$, $P < 0.001$, observed power 100%; $F = 98.84$, $P < 0.001$, observed power 100.

%; $F = 78.92$, $P < 0.001$, observed power 100%; $F = 112.09$, $P < 0.001$, observed power 100%; $F = 29.56$, $P < 0.001$, observed power 100%, respectively). There was also a significant increase in scores in all domains of the WHOQOL-BREF among the groups. Additionally, there was a significant interaction effect and the group receiving the BI at baseline had significant increase in scores in all the domains of WHOQOL-BREF ($F = 4.50$, $P < 0.038$, observed power 55.1%; $F = 21.35$, $P < 0.001$, observed power 95.5%; $F = 8.67$, $P < 0.005$, observed power 82.6%; $F = 34.04$, $P < 0.001$, observed power 100%; $F = 10.52$, $P < 0.002$, observed power 89.2%, respectively) [Table 6].

Efficacy of ASSIST-linked BI in motivating the subjects to seek treatment and its comparison with control group

In the control group only 4 (11.4%) out of 35 screen-positive subjects were motivated to seek treatment whereas in the intervention group 12 (34.35%) out of 35 screen-positive subjects were motivated to seek treatment ($P = 0.023$).

DISCUSSION

This RCT showed that a single-session ALBI improved the risk scores for alcohol, tobacco, and cannabis use in male employees working in a health care setting, propelled more participants to an action stage of change and seeking help, and enhanced their QOL in all domains, compared to nonspecific general intervention, over a 3-month period. Although our study screened for many substances of use by the workers (illicit and licit) as listed in ASSIST, only tobacco, alcohol, and cannabis were reported. Tobacco and alcohol are legal substances (with certain regulations of use) and, hence, they do not come under the provisions of the Narcotic Drugs and Psychotropic Substances (NDPS) Acts 1985, Government

Table 3: Distribution of subjects according to their substance use profile at baseline

Substances	Control *N*=35 (%)	Intervention *N*=35	(χ^2= Chi square) *P*
Tobacco	5 (14.28%)	3 (8.57%)	χ^2=4.112
Tobacco and alcohol	23 (65.71%)	24 (68.57%)	(*P*=0.391)
Tobacco and cannabis	0	1 (2.85%)	
Tobacco, alcohol, and cannabis	6 (17.14%)	6 (17.14%)	
Alcohol	1 (2.85%)	1 (2.85%)	
Alcohol and cannabis	0	0	
Cannabis	0	0	

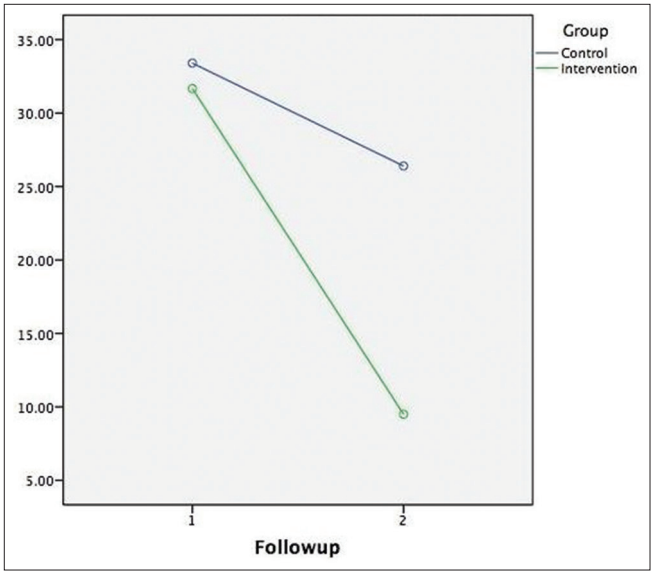

Figure 4: Change in total ASSIST score for risky cannabis use

Table 4: Comparison of groups at baseline and follow up on the basis of ASSIST using two-way repeated measure ANOVA

ASSIST score	Group	Baseline		3- Month Follow up		*F*	*P*	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)

of India. NDPS Act banned the production and sale of cannabis resin and flowers, but permitted the use of the leaves and seed, allowing the states to regulate the latter.[20]

The prevalence of moderate-to-high-risk use of tobacco, alcohol, and cannabis in the total sample was 28.6%, 27.5%, and 6.9% respectively. These figures raise serious concern, but are in line with the two available studies in the workplace settings from India, one of which found 21% industrial workers with hazardous drinking,[21] and another study found about 27% industrial workers using any substance.[22]

Table 5: Comparison of groups on Stage of Change at baseline and follow-up

RCQ	Stage of Change	GROUP		χ^2=Chi square & *P*
		Control	Intervention	
Tobacco baseline	Pre contemplation	19	21	χ^2=2.914, *P*=0.233
	contemplation	15	13	
	Action	0	0	
Tobacco follow- up	Pre contemplation	8	0	χ^2=52.46, *P*<0.001
	Contemplation	24	4	
	Action	0	28	
Alcohol baseline	Pre contemplation	19	20	χ^2=0.259, *P*=0.879
	Contemplation	11	12	
	Action	0	0	
Alcohol follow up	Pre contemplation	2	0	χ^2=56.28, *P*<0.001
	Contemplation	25	0	
	Action	0	29	
Cannabis baseline	Pre contemplation	3	3	χ^2=0.160, *P*=0.750
	Contemplation	3	3	
	Action	0	0	
Cannabis follow- up	Pre contemplation	0	0	χ^2=11.017, *P*=0.004
	Contemplation	5	0	
	Action	0	6	

RCQ: Readiness to Change Questionnaire; Bonferroni correction is done to counteract the problem of multiple comparisons. Adjusted alpha (α) = α/*k* (number of comparison). (0.05/6=0.008)

Maximum participants used tobacco in combination with alcohol [67 (59.8%) among ASSIST "screened positive" subjects]. This finding was in line with several studies which stated that there exists a strong association between tobacco use and alcohol and illicit substance use sharing common identifiable risk factors.[23,24]

The feasibility and active involvement in the sessions were similar to that in another study which used face-to-face interview in workplace.[16] It suggests that the workplace is amenable to screening and active participation for BI using face-to-face intervention.

Only 7.14% of our subjects dropping out (3 out of 35 in control group and 2 out of 35 in intervention group after the 3-month interval) was in line with another study in a community-based sample from north India.[25] The low attrition in our study could be due to the same investigator conducting the study at the work place, and in a short-time span of 3 months.

Two-way repeated measure ANOVA indicated statistically significant differences between the groups over the

Table 6: Comparison of groups at baseline and follow up on the basis of WHOQOL- BREF using two-way repeated measure ANOVA

WHOQOL- BREF	Group	Baseline		Follow up		*F*	*P*	power
		mean	SD	mean	SD			
TOTAL	Control	69.68	5.43	77.21	6.54	25.66	<0.001	99.9%
	Intervention	73.00	6.81	89.96	5.69			
	Interaction effect					172.93	<0.001	100%
	Main effect					44.12	<0.001	100%
Physical health	Control	20.00	2.42	21.59	2.19	4.50	0.038	55.1%
	Intervention	20.72	2.28	23.45	2.07			
	Interaction effect					65.38	<0.001	100%
	Main effect					6.69	0.010	73.8%
Psychological health	Control	14.81	2.63	16.75	2.96	21.35	<0.001	99.5%
	Intervention	15.21	2.45	20.51	1.92			
	Interaction effect					98.84	<0.001	100%
	Main effect					16.71	<0.001	98.1%
Social relationship	Control	9.25	1.10	10.40	1.49	8.67	0.005	82.6%
	Intervention	9.78	1.36	12.09	1.72			
	Interaction effect					78.92	<0.001	100%
	Main effect					13.71	<0.001	95.4%
Environmental health	Control	19.12	3.10	20.56	3.53	34.06	<0.001	100%
	Intervention	19.78	2.78	24.75	3.02			
	Interaction effect					112.09	<0.001	100%
	Main effect					11.48	<0.001	91.6%
General health	Control	7.56	1.68	7.93	1.41	10.52	0.002	89.2%
	Intervention	7.78	1.51	9.27	0.94			
	Interaction effect					29.56	<0.001	100%
	Main effect					19.78	0.013	70.9%

Bonferroni correction is done to counteract the problem of multiple comparisons. Adjusted alpha (α) = α/k (number of comparison). (0.05/5=0.01)

3-month follow-up on the mean total ASSIST tobacco, alcohol, and cannabis scores. Compared to the controls, the ALBI participants had significantly reduced scores for all measures, indicating that ALBI was more effective than the general talk in getting the participants to reduce their risky substance use. This concurs with many other studies done at workplace and other setups in India and elsewhere.[12,15,16,25-29] Interaction effects at risk level indicate that as compared to the controls the ALBI group had significant reduction of risk level of tobacco, alcohol, and cannabis use. The reason may be that in our study we delivered ALBI directly after screening. This was in keeping with the recommendation that the time gap between screening and intervention should be minimal, and that time being a "teachable moment" when patients have heightened receptivity to recommendations for reducing substance use.[30] Intervention effects on stage of change as per the RCQ indicate that significantly more ALBI group subjects had moved on to action stage than the control group subjects. Possibly the structured ALBI helps them to appreciate their tobacco and alcohol use related problems and motivates them to change their thinking and behavior more than that achieved by a general talk. This is in line with an earlier similar study, where a 1-hour motivational intervention produced a more positive shift in a stage of change than in the educational group.[31] However, in the people who use cannabis in risky pattern in our study, the interaction effects indicated no significant change in the contemplation stage in both groups but significant changes in pre contemplation and action stages in the intervention group compared with control group. This could be due to the small number of subjects using cannabis at risky level. Interaction effects showed statistically significant differences between the groups over the 3-month follow-up on the mean total as well as all the domains of WHOQOL-BREF scores. The ALBI participants had significantly better scores in all the domains compared to control group participants, indicating that the structured BI was more effective compared to general talk given to control group in improving their QOL; this was in line with the previous community based study form north India.[25,32,33]

More participants in the intervention group (12 vs. 4) sought treatment for substance use disorders at our center. This may be due to higher motivation (action vs. precontemplation or contemplation stage) in the intervention group compared to the control group. Earlier studies indicate that participants in action stage were over twice more likely than contemplative class members to be in drug treatment network.[34]

This study has several limitations. One and the important foremost bias is difficult to implement a double blind. As the same investigator was involved in the application of the session and assessment part. However, this could be considering the prototype of the study which incorporate the screening with ASSIST and BI at the work up. The result also highlighted the feasibility and favorable outcome to reduce the risky pattern of substance use in work place setting. The short duration of study limits drawing conclusions over a longer period of time. There was no laboratory corroboration of the participants' substance use, which was entirely based on self-report. Finally, only male hospital employees were recruited for this study as there was no published study which highlighted the prevalence of substance use in female employees at workplace in Indian context. 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.[35] Thus, the prevalence of substance use is much less in females as compared to males in India. However, we believe that these limitations do not invalidate the main findings of this study within the constraints of generalizability.

In conclusion, this study demonstrates that ASSIST-based screening for risky substance use, and ASSIST-linked brief intervention is feasible in the workplace settings in developing countries such as India, and that this brief intervention is effective in reducing risk scores for use of several substances (alcohol, tobacco, and cannabis), progression in the readiness to change to an action stage, improving the QOL in all domains, and fostering help-seeking when needed.

Informed consent

The study protocol was approved by the Institutional Ethics Committee (INT/IEC/2015/739 dated 10.20.2015) and was registered with the Clinical Trials Registry of India [(http://ctri.nic.in) CTRI/2015/11/006365 dated 11.17.2016]. It followed the ethical standards of the responsible committee on human experimentations with informed consent of all the participants.

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Conflicts of interest

There are no conflicts of interest.

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