

Parenting Support: Mediation Pathways for Reduced Substance Use Among Parents and Their Children: A Randomized Controlled Trial

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Abstract

Background: Substance use is a major public health concern worldwide. Alcohol and drug use have risen over recent decades in many low and middle-income countries, with South Africa among the highest globally.

Despite effectiveness of family-based interventions on reducing substance use among adolescents, less is known about the effectiveness of family-based programs on substance use among parents and caregivers, in particular, among families in low- and middle-income countries (LMIC).

This study investigated mediators of change in a parenting programme (Parenting for Lifelong Health - PLH) on reduction of substance use among parents and their children through three potential mediators: parental depression, parenting stress and family poverty. In addition, the study examined the correlation between parental substance use and adolescent substance use.

Methods: The current study draws on a pragmatic cluster randomized controlled trial design; the total sample comprised 552 parents\caregiver and adolescent dyads (parents\caregivers M = 49.37; SD = 14.69 and adolescents M = 13.84; SD = 2.38) who were recruited from 40 communities in South Africa's Eastern Cape. Participants completed a structured confidential self-report questionnaire, at baseline and follow-up test (5–9 months following the intervention). Structural equation modeling (SEM) was conducted to investigate direct and indirect effects.

Results: Mediation analysis indicated that PLH intervention impact on parental substance use reduction among parents ran through one indirect pathway: Improvement in parental mental health (reduction in parental depression levels). There were no pathways from PLH intervention to parental substance use through parenting stress or family poverty. Furthermore, findings showed a significant positive correlation between parental substance use and adolescents' substance use.

Conclusions: The findings of the study highlight the fact that PLH parenting intervention has a significant effect on secondary outcomes, including substance use and depression among parents\caregivers in LMIC. These findings emphasize the need for creating supportive environments and systems for parents who suffer from emotional strain and mental health problems, in particular among families in adversity. Supporting parental mental health as part of a parenting programme serves as a significant pathway for reducing substance use among parents and their children.

Trial registration: Pan-African Clinical Trials Registry PACTR201507001119966. Registered on 27 April 2015. It can be found by searching for the key word 'Sinovuyo' on their website or via the following link:http://www.pactr.org/ATMWeb/appmanager/atm/atmregistry_nfpb=true&_windowLabel=

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Background

Substance use is a major public health concern worldwide [1, 2]. Previous studies have shown that substance use among adults and adolescents (including problematic alcohol, tobacco and drug use) is associated with physical, mental and social problems [3, 4]. Empirical studies have found that problematic alcohol use among adults plays a role in involvement in risky behaviors such as sexual behaviors [5].

Whilst there is a significant variation in substance use levels globally, alcohol and drug use has increased over recent decades in many low-income countries [1, 2, 6]. For instance, recent cross-sectional survey among 20,227 adolescents and youth (aged 10–23) in South Africa found that the prevalence of past month reported problematic alcohol use was 23% [7]. These findings emphasize the need for investigating the effectiveness of intervention programs that aim at reducing substance use (including problematic alcohol, tobacco and drug use) among vulnerable groups.

As substance use is influenced by familial risk factors, prevention programs that change family dynamics were found to be the most effective interventions [8]. A review of causal models of substance use and evidence-based practices in high-income countries have found family therapy interventions effective in reducing substance use among adolescents by addressing familial processes and dynamics [9]. However, less is known about the effectiveness of parenting-based programs on substance use among parents\caregivers, particularly within LMIC.

Findings of a randomized controlled trial conducted in South Africa have shown that the Parenting for Lifelong Health programme for adolescents and their parents (Sinovuyo Teen PLH) was associated with lower levels of substance use among parents\caregivers and adolescents [10]. The current study aims at investigating the mechanism of substance use reduction among parents\caregivers and their children by addressing potential mediators which could explain the reduction of substance use among parents\caregivers and their children who participated in the PLH intervention.

An understanding of factors related to substance use will assist our understanding of the mechanism of reducing substance use among parents\caregivers and adolescents. Therefore, the current study aims to investigate the impact of the PLH programme on substance use reduction among parents and adolescents through three potential mediators: parenting stress, parental depression and family poverty.

Previous studies have found a significant positive relationship between depressed mood and substance and alcohol use among adults [11–13]. Furthermore, a growing body of evidence highlights that substance use and heavy consumption of alcohol among adults has been associated with stressful life experiences ,as many may tend to consume excessive alcohol as act of coping with negative feelings [14, 15].

Regarding the effect of poverty on substance use, there is mixed support for the claimed association between economic status and increased substance use. Several studies in HIC have shown that high socio-economic status is significantly and positively correlated with substance use among young adults [16]. This finding does not concur with other studies which have shown that low socio-economic populations suffer from greater levels of substance use [17, 18].

Empirical research evidence suggests that parental substance use (including drinking problem and drug use) can directly affect the substance use of their children [19, 20], and that children of parents with alcohol or drug use face a higher risk of drug involvement than others [21]. For example, if youth are aware of, or witness, their parent's use, a modeling effect might occur. Furthermore, parental substance use may increase the availability of that substance to their adolescent [22, 23].

We can understand this approach based on social learning theories [24] of human development that suggest that human behaviors are learned within a social context and are influenced by bonding with primary source of socialization, such as the family system. Theorists assert that adolescence is a particularly crucial time for learning norms at the highest level [25]. In addition, substance use negatively affects parental skills, and it can compromise parents' ability to be consistent, warm and emotionally responsive to their children [26, 27]. Therefore, lack of parental involvement during adolescence could be a risk factor for adolescents' involvement in substance use.

The current study investigates the mechanism of a parenting programme (PLH) on reduction of substance among parents\caregivers and their children through three potential mediators: parenting stress, parental depression and family poverty. Based on the model shown in Fig. 1, we hypothesized that: (1) PLH intervention would reduce substance use among parents\caregivers and adolescents, (2) PLH intervention would reduce parenting stress, parental depression and family poverty, (3) parenting stress, parental depression and family poverty would mediate the association between PLH intervention and reduction of substance use among parents\caregivers and children, and (4) substance use among parents\caregivers would predict substance use among their children.

Methods

Study design and sample

In this pragmatic cluster randomized controlled trial, the total sample comprised 552 dyads of adolescents and their parents\caregivers (parents\caregivers $M = 49.37$; $SD = 14.69$ and adolescents $M = 13.84$; $SD = 2.38$) who were recruited from 40 communities (located in 34 rural villages and three large peri-urban townships) in South Africa's Eastern Cape. Due to high levels of orphaning and fostering in South Africa, there were no requirements for a biological relationship between adolescent and primary caregiver but they had to reside in the same dwelling for at least four nights per week. Further information about the study design and sample and inclusion, exclusion criteria is available in Cluver et al. [10].

Randomization was stratified by urban location and conducted after baseline using a random number generator by an independent, blinded statistician (CL). Complete randomization within strata used a ratio of 1:1 intervention: control. The sample included 270 families in the intervention arm and 282 families in the control arm (M = 14 families per cluster, SD = 1.9). Blinding of participants and program providers was not feasible for parenting programs.

Ethical approval was given by the University of Oxford (SSD/CUREC2/11–40), University of Cape Town (PSY2014-001), and government Departments of Social Development and Education.

Procedure and data collection

Parents\caregivers and adolescents completed a structured self-report questionnaire at three points in time: pre-test (Baseline), 1 month post-intervention (with a limited sub-set of items) and 5–9 months post-intervention. The analyses of the current study were conducted based on the data at baseline and follow-up tests.

Intervention group

Dyads (parent\caregiver and adolescent) in the intervention group received a 14-session parenting programme called “Parenting for Lifelong Health/Sinovuyo Teen”. Each session lasted for 1–1:30 hours a week. All sessions took place in public and community places such as churches, community halls, schools and under trees.

Based on Social Learning Theory [28], the programme involves parenting principles, such as praising each other, managing anger and stress, joint problem-solving, non-violent discipline, rules and routines, keeping adolescents safe in the community, and responding to crises. In addition, the programme includes economic strengthening components of family budgeting and saving sessions. Sessions included songs, collaborative problem-solving techniques (not didactic methods) and traditional stories, role-play, modelling and stress reduction activities. The programme was designed for low-resource settings with no technology (such as video) or literacy requirements.

Participants were encouraged to engage in home practice in the week following each session. For participants unable to attend sessions due to illness or disability, catch-up meetings were arranged to give brief session content at home or in the hospital. A simple lunch was included at the beginning of each session as many participants found difficulty in concentrating due to hunger. The programme was delivered by local community members, who were trained by a local NGO, Clowns Without Borders South Africa, and supported through weekly supervision.

Control group

Dyads in the control group received a one session (five hours) of hygiene programme called “SinoSoap”. This programme was implemented by the NGO “Clown without Borders” in South Africa, and involved drama-based skills-building on safe water conservation and hand washing for children. The session was

delivered through performance and activities. All children received a soap which – when used – had a small toy inside.

Measurements

Parents\caregivers and adolescents completed self-report questionnaires, using tablets at baseline, 1 month post-intervention and 5–9 months following the intervention. All questionnaires were pre-piloted with local adolescents and parents\caregivers. All measurements were translated into isiXhosa, one of the 11 official languages spoken in South Africa, and back-translated.

Alcohol and substance use among parents\caregivers was assessed by using the adapted version of the WHO Alcohol Use Disorders Identification Test (AUDIT) [29] and the WHO Global School-based Health Survey. This variable was reported by parents\caregivers (4 items; $\alpha = .529$; e.g., “In the past month, have you had a drink?”; “Did you take any drugs to help you relax?”). Responses were: 0 = No and 1 = Yes. One overall score was derived by computing the sum of the items.

Alcohol and substance use among adolescents was measured by using three items from the Child Behavior Checklist Scale [30]. This variable was reported by adolescents (3 items; $\alpha = .547$; e.g., “During the past month, I drank alcohol without the permission of my caregivers’ approval”; “I smoke cigarettes”; “I use drugs like dagga (marijuana) or other drugs”). Responses ranged from 0 = Not true to 2 = Very true.

Parenting stress was measured using 18 items ($\alpha = .770$; e.g., “I am happy in my role as a parent”; “Caring for my children sometimes takes more time and energy than I have to give”) from the Parental Stress Scale [31]. Items were measured on a five-point Likert type scale, ranging from 0 (Strongly disagree) to 4 (Strongly agree). One overall score was derived by computing the sum of the items.

Parental depression was assessed by using 20 items ($\alpha = .876$; e.g., “I felt very sad even with help from my family and friends”; “I didn’t feel like eating”; “My appetite was poor”) from the Centre for Epidemiological Studies Depression Scale [32]. Responses ranged from 0 (Not at all) to 4 (Less than even day). One overall score was derived by computing the sum of the items. Items were measured on a five-point Likert type scale, ranging from 0 (Strongly disagree) to 4 (Strongly agree).

Family poverty was measured as monthly consistent access to necessities including food, electricity, communication, and transport [33]. This variable was assessed by using 9 items ($\alpha = .683$; e.g., “Afford 3 meals a day”; “Afford the costs of the school”; “Afford enough warm clothes”). Responses were: 0 = No and 1 = Yes. One overall score was derived by computing the sum of the items.

All variables were measured at baseline and 5–9 months follow-up after the intervention was completed.

Data analyses

Analyses used intention-to-treat (ITT) for all clusters and families irrespective of intervention uptake and included families who were no longer living together at follow-up ($n = 53$). Independent sample t-tests

were conducted to compare means of outcomes and mediator differences at baseline and follow-up between intervention and control groups.

A linear Structural Equation Modeling (SEM) was used with AMOS21 statistics program. The SEM procedure combined measurement modeling (Confirmatory Factor Analyses – CFA) and structural equation modeling. Items that were theoretically and empirically perceived as describing the variable were used in the measurement model.

Goodness of fit for the final model was assessed using the Comparative Fit Index (CFI) and the Root Mean Standard Error of Approximation (RMSEA). We also report χ^2 fit statistics but acknowledge that the test is inflated by sample size of the study.

Results

Descriptive statistics

T-test results for baseline and follow-up outcomes and mediating variables (intervention and control group) are shown in Table 1.

Table 1
Baseline and follow-up characteristics, for intervention and control groups

Variable	Baseline		Follow-Up	
	Treatment	Control	Treatment	Control
Parental substance use	15.69* (16.11)	14.14 (14.55)	7.28* (10.85)	8.27 (10.05)
Adolescent's substance use	9.61 (18.59)	11.83 (18.47)	29.00* (18.08)	15.64 (18.99)
Parental depression	33.18* (16.56)	31.98 (15.66)	24.44* (14.44)	24.15 (14.75)
Parenting stress	23.13 (11.78)	24.90 (12.09)	11.30* (9.78)	16.82 (11.13)
Family poverty	0.04 (1.68)	-.004 (1.64)	0.29 (1.60)	-0.28 (1.49)
N	270	282	264	278

Note: *P < .05 statistically significant differences in means between the groups.

Direct and indirect effects

We examined mediators of PLH intervention on reduction of substance use among parents\caregivers and their children, through three potential mediators: parenting stress, parental depression, and family poverty, at follow-up test (5–9 months following the intervention).

Table 2 shows total, direct and indirect effect of each mediator on the outcome of the study. At the first step of the analyses, each mediator was tested individually. At the second step, all mediators were tested in a Structural Equation Model (SEM) simultaneously.

Table 2
Total, direct and indirect effects of mediators on the outcomes of the study (substance use among parents and teens)

Mediators	Parental substance use			Teen substance use		
	Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect
(1) Parental depression	-.246 [-.39,-.10]	-.201 [-.35,-.05]	-.044 [-.11,-.01]	-.138 [-.24,-.03]	-.149 [-.25,-.04]	-.011 [-.01,.03]
(2) Family poverty	-.205 [-.33,-.07]	-.208 [-.39,-.09]	.001 [-.03,.03]	-.138 [-.24,-.03]	-.139 [-.24,-.03]	.000 [-.02,.02]
(3) Parenting stress	-.250 [-.40,-.09]	-.217 [-.37,-.06]	-.033 [-.07,-.00]	-.120 [-.22,-.02]	-.083 [-.18,.01]	-.037 [-.06,-.01]

The results of the measurement fit model were $\chi^2 = 284.89$, $df = 142$, $P < .000$, as the values of CFI = .931 and RMSEA = .043 showed a good model fit. Structural equation modeling was also used to test the direct and indirect (mediation) effects of the PLH intervention and the potential mediators on substance use among parents\caregivers and their children. The model shown in Fig. 1 represents the model fit for all the variables of the study. The results of the theoretical model were $\chi^2 = 369.28$, $df = 159$, $P < .000$, as the values of the CFI = .904 and RMSEA = .049 showed a good model fit.

The results of the SEM have shown that PLH intervention has a significant effect on reducing parental substance use ($\beta = -.167$, $P = .000$) and adolescent substance use ($\beta = -.090$, $P = .043$) at follow-up test (5–9 months). In addition, findings showed that PLH intervention has a significant effect on reducing parental depression ($\beta = -.255$, $P = .000$), parenting stress ($\beta = -.151$, $P = .002$) and family poverty ($\beta = -.288$, $P = .000$), at follow-up test.

Mediation analyses was examined using Bootstrap in AMOS. The results presented in Fig. 1 indicate that the PLH intervention effect on parental substance use reduction among parents\caregivers ran through one indirect pathway: reduction in parental depression. At follow-up test (5–9 months) PLH intervention had contributed to reduction in parental depression ($\beta = -.255$, $P < .001$). There was no pathway from PLH intervention to parental substance use through parenting stress or family poverty. In other words, parenting stress and family poverty do not serve as mediators in the association between PLH

intervention and reduced parental substance use. Furthermore, there were no pathways from PLH intervention to adolescent substance use through parenting stress, parental depression or family poverty. However, findings showed a significant positive correlation between parental substance use and adolescent substance use ($\beta = .174, P = .006$). The higher the levels of substance use among parents, the higher the levels of substance use among their children.

Discussion

The current study investigated the role of parental depression, parenting stress and family poverty as potential mediators of a parenting programme (PLH) on reduction of substance use among parents\caregivers and their children in South Africa. The findings of the study help us to understand the mechanism behind the reduction of substance use among parents by showing that reduction in parental depression serves as a mediator between PLH intervention effect and parental substance use. In other words, improving parental mental health – reducing depression – leads to reduction in substance use among parents\caregivers. We can understand this mediation process in light of The General Strain Theory of Agnew [34]. According to this theory, substance use among adults is a coping mechanism to relieve negative feelings, such as stress, frustration and depression. With limited support and skills, parents may resort to substance use to escape their pain, negative feelings and cope with the problems they face. These findings suggest that PLH intervention provides parents with skills and support that help them to cope in effective ways and avoid ineffective coping mechanisms, such as problematic alcohol use and drug use. In addition, the PLH intervention serves as a supportive environment for vulnerable parents, which contributes positively to their mental health by providing emotional and instrumental support as part of the intervention (such as stress reduction activities). Consistent with the results of previous studies [19, 20], the findings of the study indicated that parental substance use is positively and significantly correlated with substance use among their children. Based on Social Learning Theory [28], children who are exposed to parental substance use are more likely to be involved in substance use themselves. In light of these findings, we identify a critical role of evidence-based parenting interventions in reducing risk behaviors among adolescents (such as substance use), by improving parental mental health and reducing risk behaviors among parents. However, the findings of the study showed that parenting stress, parental depression and family poverty did not serve as mediators of PLH intervention on reduction in substance use among adolescents. It is recommended that future studies investigate potential pathways for the reduction in substance use among adolescents.

To the best of our knowledge, the current study is among the first to investigate mediation pathways for reduction in substance use among parents and their children in LMIC. Findings indicate that parenting intervention has a significant effect on high risk behaviors (substance use) among parents and their children and parental mental health, despite working with vulnerable families. Strengths of the study include the pragmatic randomized trial method which provides high external validity. Furthermore, standardized measurement and intention-to-treat were used.

However, limitations also need to be acknowledged. First, mediation analyses were conducted at one time point only (5–9 months follow-up). A longer-term follow-up with multiple post-intervention assessments would have enabled us to examine potential effects and potential reverse causality between parental depression and reduction of parental substance use. Hence, future studies should conduct mediation analyses at more than one point in time, which would enable the hypothesized mediator to be measured before the outcome. Second, based on the findings of the study, causal inferences of intervention components cannot be made. The findings of the study have shown that improvement in parental mental health (less depression) mediates parental substance use. However, we cannot recognize which intervention components are responsible for this mediation effect. Therefore, it is recommended that future studies use other methods of identifying essential components, such as relaxation and coping skills with negative feelings, which might provide further insight into active core ingredients for parenting programs. This includes evidence from randomized micro-trials on the efficacy of discrete parenting techniques [35], and factorial experiment trials that test different components in relation to each other [36].

Lastly, this study makes an important contribution to the literature regarding the effectiveness of parenting programs at improving parental behavior (reducing substance use) through improving parental mental health (reducing parental depression) among families at high risk settings. Previous studies have shown that parenting interventions were effective in improving maternal mental health in high-income countries, such as reducing maternal stress, anxiety and depression among mothers of children with special needs [37]. However, little is known about the effectiveness of parenting programs in LMIC. The current study contributes by filling the gap regarding the pathways to effects of parenting intervention in reducing high risk behaviors among parents for adolescents in vulnerable communities. Nevertheless, we recommend that future researches examine the mechanism of reducing substance use among parents\caregivers in other settings in LMIC.

Conclusion

The findings of the current study emphasize the importance of understanding the challenges that vulnerable families face which negatively affect their mental health and increase the likelihood of involvement in high-risk behaviors, such as substance use. These findings highlight the fact that we need to create supportive environments and systems for parents who suffer from emotional strain and mental health problems. Professionals need to adopt an empathic approach toward vulnerable families which would contribute towards better understanding for their needs and challenges. An empathic approach would contribute to building effective psycho-social interventions and prevention programs that target families at risk.

Abbreviations

LMIC, low- and middle-income country, PLH, Parenting for Lifelong Health; RCT, randomised controlled trial.

Declarations

Ethics approval and consent to participate

Ethical protocols were approved by the Faculty of Humanities Ethics Review Committee, University of Cape Town (PSY2014-001) and the Social Sciences and Humanities Inter-divisional Research Ethics Committee, University of Oxford (SSD/CUREC2/11-40), the European Research Council (ERC-2012-StG 313421-PACCASA) and South African provincial Departments of Social Development and Basic Education. The study and all methods were performed in accordance with the declaration of Helsinki. Consent for participation was obtained. Written voluntary informed consent was obtained from all participants (parents and adolescents) and consent procedures are read aloud for those with limited literacy. Confidentiality is maintained, except if participants are at risk of significant harm or request assistance.

Availability of data and materials

Sinovuyo Teen manuals and programme materials will be made freely available online, and UNICEF has sponsored free printed versions. All research materials (i.e. questionnaires, study process materials and qualitative toolkit) will be made freely available on UNICEF and WHO websites. The study data will be made available on open-access websites such as the South African Data Archive and the European Clinical Trials database. Further information about the protocol study is available at Cluver et al., 2016. DOI 10.1186/s13063-016-1452-8.

Competing interests

LC and JML are co-developers of the PLH for Adolescents programs, which are licensed under a Creative Commons 4.0 Non-commercial No Derivatives license. JML is also the Executive Director of Clowns without Borders South Africa, a non-profit institution responsible for the dissemination of the program. JML also receives occasional fees for providing training and supervision to facilitators and coaches. JML and LC have participated (and are participating) in a number of research studies involving the programme, as investigators, and the Universities of Oxford, Glasgow and Cape Town receive research funding for these. Conflict is avoided by declaring this potential conflict of interests; and by conducting and disseminating rigorous, transparent and impartial evaluation research on both this and other similar parenting programs. AM, FM, JD, YS and OG have no competing interests or other interests that might be perceived to influence the results of the study.

No profit or financial gain will be made from this programme.

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Authors' contribution

AM contributed to the conception, design, statistical analyses and drafted the manuscript for publication. LC contributed for revising critically for important intellectual content of the manuscript. LC, YS, JML, FM contributed towards conceptualizing, designing and implementation of the experiment. All authors provided feedback and approved the final manuscript.

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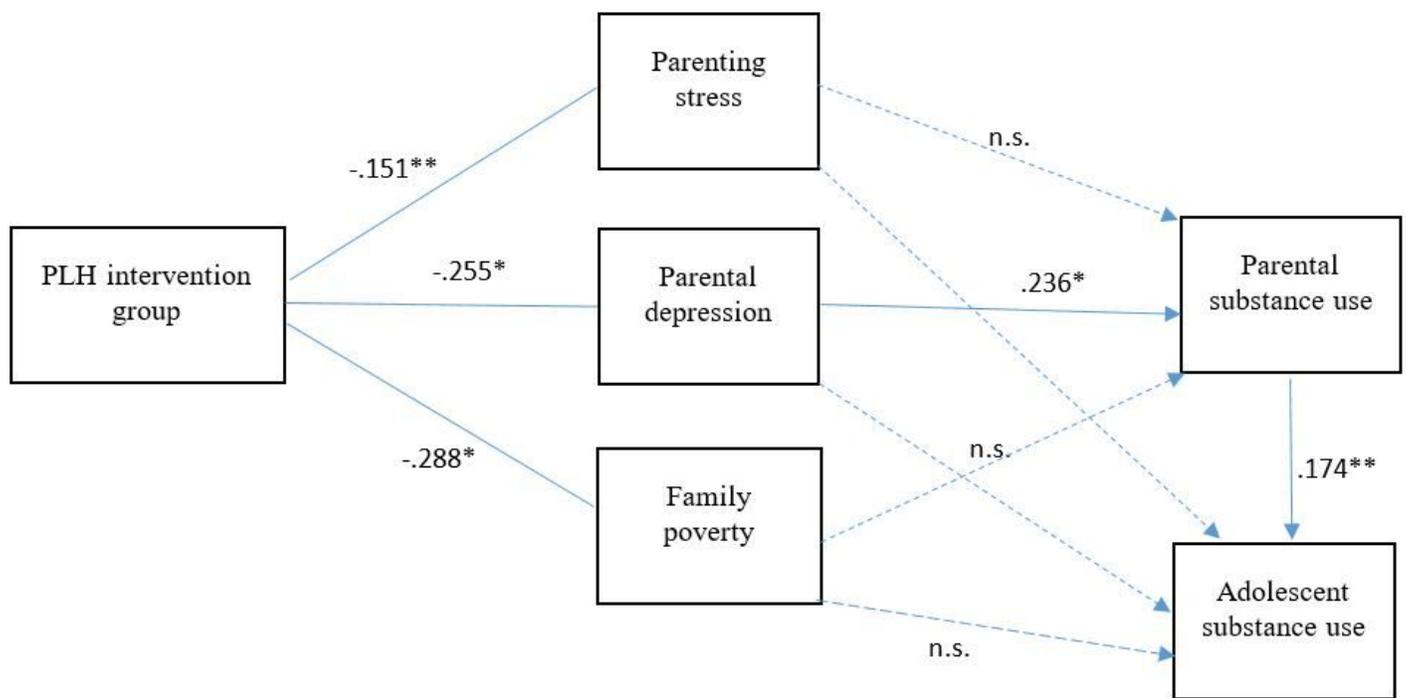
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Figures



* $P < .000$; ** $P < .05$

Figure 1

Study model and structural equation model results Note: All the paths were predicted; those represented by a dotted line were statistically insignificant. $\chi^2 = 396.28$, $df = 159$, $P < .000$; $CFI = .904$, and $RMSEA = .049$.