Prevalence of Methamphetamine (Mkpurummiri) use in south east Nigeria: a community-based cross-sectional study

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Abstract

Background Methamphetamine (MA) (Mkpurummiri) is seen as the most common, accessible and new drug of use/ abuse in south east Nigeria. Despite the overwhelming evidence of the dire consequences of this drug to the users, there is lack of empirical research to determine its prevalence in this area where use is assumed to be common. This study aimed to determine the prevalence of MA use, characteristics of the users and the control measures.

Methods A descriptive cross-sectional survey research design was conducted from May through November 2023 among adolescents/adults at the age bracket of 15-64 years in the five states of south east, Nigeria. Three hundred and seventy-one (371) respondents were recruited using purposive/convenience sampling methods. A semi struc-tured questionnaire was the instrument used. Data were analyzed using percentage, bivariate and multivariate logistics regression statistics. The Prevalence of MA was determined using percentages whereas the factors that are associated with MA use were expressed using multivariate logistics regression statistics AORs and 95%CIs. The level of significance was set at $P < 0.05$.

Results The prevalence of Methamphetamine (Mkpurummiri) was (21.8%). The most common reason for MA use was depression (86.5%), the most common route of administration was inhalation (64.9%). The most common characteristic of MA (Mkpurummiri) user was aggressive/violent behaviour (94.1%).The control measures were self-control (92.2%), parental monitoring (85.7%), drug education (83.1%) and legal control (80.8%). The multivariate logistics regression statistics AOR shows that off-campus were 3 times (AOR = 0.298; CI = 0.12–0.73 $P = 0.008$), family house 4 times (AOR = 0.241; CI = 0.09–0.65; $P = 0.005 \leq 0.05$) less likely than on-campus to predict MA use. Recently married were 3.25 times (aOR = 3.25; CI = 1.47–7.18), divorced 3.45 times (aOR = 3.45; CI = 1.23–9.58), polygamy 2.3 times (aOR = 2.3; CI = 1.08–4.90; $P = 0.031 \leq 0.05$), tradition 4.44 times (aOR = 4.44; CI = 1.77–11.15; $P = 0.001 \leq 0.05$), more likely than others to use MA.

Conclusions MA use prevalence was relatively high, and marital status, living arrangements, family type and reli-gion were the predictors. These findings underscore the need for concerted effort among the relevant government

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agencies, community stakeholders, families, religious bodies and school authorities to designing MA use policy/laws with special focus on adopting the punitive measure used in checking cocaine users. This may help to arrest and prosecute the manufacturers, distributors and users of MA.

Keywords Prevalence, Methamphetamine (Mkpurummiri), Use/abuse, Adolescents/adults, Characteristics of the users, Control measures, South Eastern Nigeria

Introduction

Hard drugs proliferations, accessibility and use particularly Methamphetamine (commonly called Mkpurummiri in South Eastern Nigeria) by adolescents/youths is an emerging public health threat and concerns globally [1–4]. Research has reported that hard drugs use/abuse is high across the world with the percentage of adolescents and youth topping the previous years [5]. For instance, in 2021, research has documented that one (1) in every seventeen (17) persons from the age of 15–64 years worldwide had used any illegal drugs in the past year [6]. It was also reported that the number of users had increased from 240 million in 2011 to 296 million in 2021, with 5.8 per cent estimate of the global population aged 15–64 [5]. The trend was as well recorded in several studies both in the year 2022 and 2023 globally [5, 7, 8]. In Nigeria, the prevalence of 20% to 65.7% of lifetime and current use of any illicit drug among adolescent/youth population has been documented [1, 9–12].

Studies have reported Methamphetamine (MA) as the most common illicit drug use by adolescents and adults [5, 13–15]. Adolescents and adults being at high risk of hard drugs use/abuse has been attributed to risk factors like increased adventurous tendencies, peer influences, curiosity, depression, anxiety, behavioural disorders and risk-taking behavior [10, 16]. Adolescence and adults has got various definitions [17–28]. However, for the purpose of the current study, UNODC classification of adolescents/adults drug users at age bracket of 15 to 64 is adopted to elicit information from MA users among the population [20, 28].

Prevalence of MA use by Adolescents and adults has been reported. For instance, research carried out among American adolescents reported that approximately 4.7 million (2.1% of the U.S. population) have used MA at some stages in their lives [21]. Another US National Survey conducted from 2015–2018, reported 6.6 per 1,000 rate of past-year MA use/ abuse among youth [22]. Further, the School-based drug surveys carried out in Ontario and Manitoba to determine MA use among adolescents students revealed prevalence of 2.7% and 3.3% within the past year preceding the survey [23, 24]. In the same vein, the study conducted in low and middle income countries on MA use among the students, revealed that both male and female abuse MA with an estimate of 1.6 million using the drug in the past year preceding the survey [25–27].

In Nigeria, there was little or no empirical studies conducted to determine the prevalence of MA use despite overwhelming evidence of MA production, availability and use in the country. However, a comprehensive nationwide general drug use survey carried out among people aged 15–64 years in Nigeria estimated the prevalence of psychoactive drug use [28]. According to the study, the last year prevalence of drug use/abuse from the southern region was at the range of 13.8 per cent to 22.4 per cent which was higher compared to the northern region with the prevalence ranging from 10 per cent to 13.6 per cent [1, 28]. The study further revealed that South-Eastern Nigeria, (Abia, Anambra, Ebonyi, Enugu and Imo States) had the prevalence of any drug use estimated at 13.8 per cent of the population or 1.5 million people aged 15–64 years [20, 28]. It was further observed that out of every 4 drug users/abusers, 1 is a woman in Nigeria. Moreover, the annual prevalence of men 21.8 per cent or 10.8 million men, and women 7.0 per cent or 3.4 million women were reported as drug users in the past-year [28]. The UNODC study focused on the general drug abuse in Nigeria not MA use/abuse in particular. Nevertheless, the general drug use survey included MA with an estimated prevalence of 0.06 per cent, this was perceived as very low [28].

The UNODC estimate of MA use prevalence of 0.06 per cent may be very low due to the high rate of MA (Mkpurummiri) use/abuse in the region. Evidence from various Nigeria newspapers, magazines, grey literature, periodicals and article reviews reports [2, 29–31], suggest that use of MA is common. More so, the evidence of manufacturing MA in the region by drug merchants, accessibility with the number of seizures by NDLEA has affirmed its ubiquity and high rate of abuse in south east region [30, 32].

Research has revealed that MA was manufactured in some parts of Nigeria particularly in Igbo of South east and sold in the form of meth of crystalline powder, capsule or pressed tablet, and pill [13, 14, 33]. Due to the endemic nature of the drug in the region, the people of the area nicknamed the drug in a local parlance as "Mkpurummiri". The name comes from the appearance of MA in the form of ice, broken glass-like or crystalline

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rocks [2, 32]. MA (Mkpurummiri) has other street names as meth, crystal meth, crank, speed, and kryptonite [2, 34–36]. The routes of administration of MA (Mkpurummiri), as reported by other studies include smoking, injection, snorting, ingesting, inhaling, chewing, and rubbing on the skin [2, 34, 36].

Several reports have it on the pages of Nigerian newspapers, Magazines and periodicals that it was common to observe some adolescents/adults MA (Mkpurummiri) users on the streets of various communities of south eastern Nigeria. The MA users were observed due to the way they dressed, like some dressed naked or half naked walking around the streets without shame [2, 29–32]. Some of them were reported to have killed their parents, siblings, girlfriend, boyfriend, or burnt their houses. Some students among them have assaulted their teachers/lecturers leading to dropout from school and other consequences associated with MA use [2, 29–32].

Methamphetamine (MA) has been variously conceived as a potent and highly addictive psychoactive stimulant that excites and raises the level of nervous (brain and spinal cord) activities [14, 22, 37]. MA is regarded as a dangerous drug due to its effect on the brain, thus, the use of any minute quantity is regarded as an abuse. The primary mechanism of action to the MA users is on the brain dopamine (DA) system, leading to high rate of abuse [38, 39]. Moreover, the major effects of MA users include depression, antisocial behavior like risky sexual behaviors, sexual assault, rape, violent behavior, mental illness, movement disorders, cognitive impairments, insomnia, suicide and death [40–42].

UNIDOC has grouped the burden of the adolescents/adults psychoactive drug use/abuse including MA into four areas of international concern. This includes organized crime, illicit financial flows, corruption, and terrorism/insurgency [43]. Nigeria, especially South East region has been grasping with all these factors as grouped by UNIDOC like insecurity, organized crime, terrorism/insurgency, youth unemployment, increased violence, lawlessness, kidnapping, hostage-taking and cultism [44, 45]. There is also evidence of rising spate of people living in abject poverty and the rising rate of unemployment and underemployment among Nigerian youths [46–49]. Further, the current challenges of high cost of living and hardship associated with subsidy removal by the current administration in Nigeria, might be causing depression and fuelling the youths vulnerability to MA use/abuse [50]. This may be so as insecurity, gang formation leading to kidnapping for ransom and armed robbery as a means to earn a living is the order of the day in Nigeria [1, 32, 48, 49].

MA (Mkpurummiri) control measures have been observed among some community leaders, and stakeholders of some affected states. For instance, some community leaders have created local vigilante group who work in synergy with security operatives to identify and banish anyone found with MA including the manufacturers and peddlers. Individuals taking the drugs are publicly punished by flogging them at the village squares [2, 29, 32]. Some villagers and stakeholders have equally protested through the major roads to register their displeasure towards the phenomenon of MA (Mkpurummiri) abuse in the region [29, 31]. However, despite all these effort to curb the menace, MA use/abuse has continued to be rampant in the region. The production and sale by some drug merchants and peddlers have continue to grow assuming a more critical dimensions and causing public hysteria [2, 29, 51]. Moreover, public flogging as a physical punishment to MA users which has been adopted by vigilante groups and stakeholders of some communities has not yielded the desired result [31, 32]. The approach has also been seen as uncivilized, barbaric and not scientific [31, 32]. The worst still was the compromise reported among the police and vigilante group which is frustrating the war against MA use [52]. This has led to the palpable fear of unknown that the measure adopted might fall back on the community leaders, hence, the MA users might strategize, form a gang of cultists to fight back and attack the community and their leaders [32].

The mentioned scenarios have prompted the current researchers to find a scientific means towards curbing this menace, hence a step towards prevention of any drug abuse including MA is by establishing the prevalence, determining the characteristics of the users and its risk [1, 37]. Moreover, the global interventions for prevention of drug use/abuse in a population including its impact has recommended a widespread understanding of the prevalence of the drug, frequently implicated drugs, the affected population, sources of the drugs and the risk factors [1, 43]. However, due to lack of studies describing the prevalence and factors influencing the use of MA, the authors were inspired to lay this ground work to determine the prevalence of MA (Mkpurummiri) use, characteristics of the users and the control measures among the population. This is because, if prevalence and characteristics of MA users could be established, it is hoped that the government at all level in collaboration with NDLEA, law enforcement agencies and other relevant stake holders may be better equipped in designing MA use policy/laws with the punitive measures to curb the menace. The policymakers may use the findings of the study to determine the most affected group either adolescents or adults and devise a more stringent measures in combating MA use among the population.

Methods

Research design/setting

This is a descriptive cross-sectional survey research design conducted between May 2023 through November 2023, to determine the prevalence of methamphetamine (Mkpurummiri) use, characteristics of the users and the control measures among adolescents/adults of south-eastern Nigeria. South eastern Nigeria comprises of five states namely: Abia, Anambra, Ebonyi, Enugu, and Imo. This states have common boundaries with similar cultures and traditions. Due to this similar characteristics with the high rate of unemployment, increase in poverty level, low level of educational opportunities and high cost of living associated with socioeconomic implications of fuel subsidy removal in Nigeria, common sense would expect risky behaviours and social vices like, drug use/ abuse among the adolescents and adults. The scenarios have necessitated the current study in the South Eastern Nigeria.

The population of the study

The population of the study comprises all adolescents and adults in the five states of South Eastern Nigeria, namely: Abia, Anambra, Ebonyi, Enugu and Imo with an estimated population of 1.5 million persons at the age bracket of 15-64 years [27]. Inclusion/exclusion criteria: All the adolescents/adults at the ages of 15 to 64yrs, residing at the South Eastern Nigeria and consented to participate in the study were recruited. Adolescents/adults who are below 15yrs and above 64years, and those who are sick or not available at the time of the study were excluded.
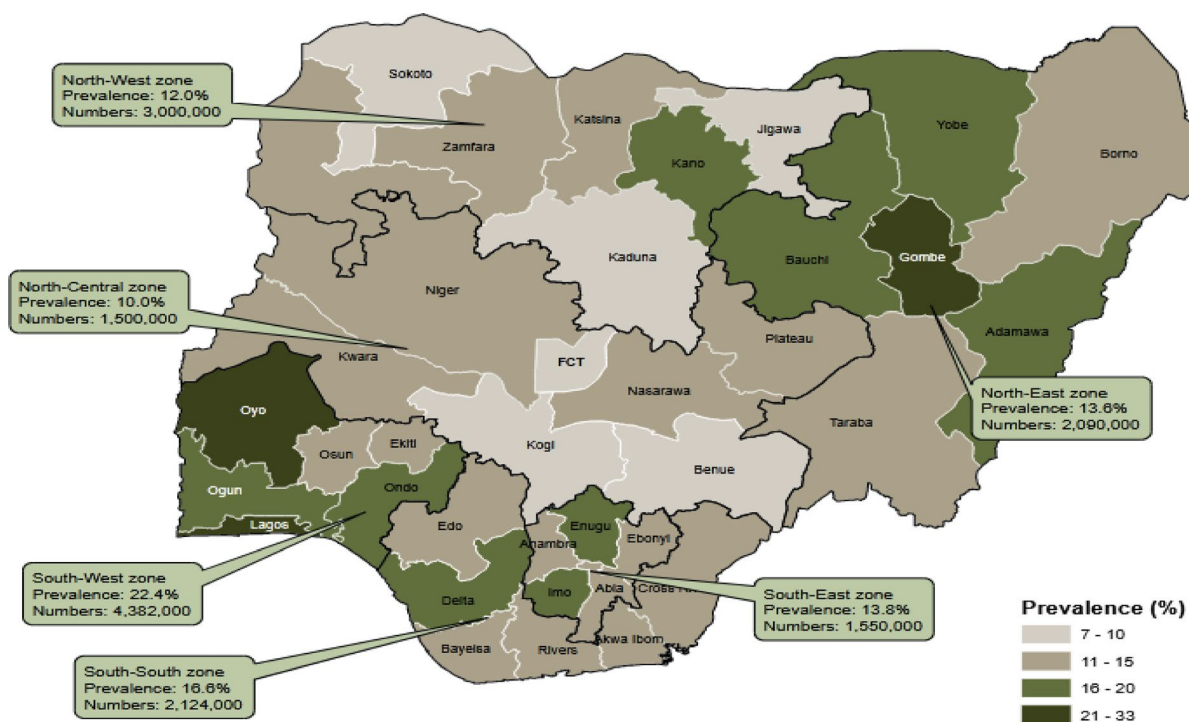
Prevalence of drug use in Nigeria by geopolitical zones and states, Adopted from: United Nations Office on Drugs and Crime (UNODC).2018/2019

Sample size determination

We calculated the sample size using the past year prevalence of drug abuse among adolescents/ adults in the South East Nigeria which was 13.8% with a population of 1.5million people aged 15 to 64 [20]. Thus;

$$n = N \times \frac{\frac{Z^2 \times p(1-p)}{e^2}}{\left[(N-1) + \frac{Z^2 \times p(1-p)}{e^2}\right]}$$

Where $N = 1,500,000$, e $= 0.04$, $P = 0.138$, Z $= 1.96$

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$$n = 1,500,000 \times \frac{\frac{1.96^2 \times 0.138(1-0.138)}{0.04^2}}{\left[(1,500,000-1) + \frac{1.96^2 \times 0.138(1-0.138)}{0.04^2}\right]}$$

$$= 1,500,000 \times \frac{\frac{1.96^2 \times 0.118956}{0.0016}}{\left[(1,500,000-1) + \frac{1.96^2 \times 0.118956}{0.0016}\right]}$$

$$= 1,500,000 \times \frac{285.613356}{[(1,500,000-1) + 285.613356]}$$

$$= 1,500,000 \times \frac{285.613356}{[1500284.613]}$$

$$= 1,500,000 \times 0.000190373$$

$$n = 285.5591734 \cong 286$$

Adding 20% attrition rate, the total sample is 371.

Sampling procedure

The procedure for sample selection involved multistages. In the first stage, the South East region was clustered into five states namely: Abia, Anambra, Ebonyi, Enugu and Imo States. In the second stage, three (3) states were selected from the five (5) states, using simple random sampling technique of balloting with replacement. The stage three involved the use of purposive/convenience sampling technique to draw 127 participants from each of the three (3) states selected in the second stage, namely: Ebonyi, Imo and Anambra. The researchers therefore administered three hundred and seventy-one copies of the questionnaire to the respondents in those states and at any point where they were accessible and convenient to fill the questionnaire. However, out of three hundred and Seventy-one (371) copies of questionnaire administered to the participants, three hundred and sixty-two (362) were properly filled and fit for data analysis. Nine (9) copies were excluded due to incomplete responses and insufficient demographic characteristics.

Research instrument

A semi structured questionnaire was used for data collection. This was developed by the researchers after thoroughly reviewing relevant literature and questionnaire of some related studies [1, 27, 37, 53, 54]. The questionnaire was entitled, "Prevalence of Methamphetamine Use among Adolescents/Adults Questionnaire (PMUAAQ). This consisted of four sections: A, B, C and D. Section A; contained Ten (10) items of demographic characteristics of the participants. Section B consisted items on prevalence of methamphetamine (Mkpurummiri) use and reasons for Use/Abuse among Adolescents/Adults. The respondents were requested to use a tick [√] on the Yes or No question. Section C consisted the items on routes of administration of MA. The respondents were requested to use tick (√) to indicate their best options on the checklist. Section D also contained a checklist for the characteristics of the users and the control measures. Respondents were required to use tick (√) to indicate their options from the list.

Validation and pre-test of research instrument

The instrument was face-validated through the verdict of five experts before the final data collection. Two experts from the department of Human Kinetics and health education, one from the department of psychology, one from the field of Epidemiology and one from the department of community medicine, all from the universities in the south east, Nigeria. The five experts were given drafted copies of PMUAAYQ accompanied with the study objectives and research questions. The experts' constructive criticisms, assessment of language, clarity and coverage of items, and appropriateness for the target group, viz-a-viz the specific objectives of the study were used to modify the instrument for data collection. The questionnaire was pretested among Forty (40) respondents from two other states (Enugu and Abia) that are not part of the study sample but were part of the study population. The reliability of the instrument was established with Cronbach Alpha statistics. The Cronbach's alpha internal consistency reliability index of r = 0.923 was obtained thus, considered highly reliable to be used for the general study.

Data collection methods/procedures

Data were collected from the participants in schools, village squares, streets, parks, playground, home environments, market places, churches, and other places convenient for the researchers until the desired sample size was reached. The researchers were many and hail from different states of the studied population. Therefore, we divided ourselves into groups based on the understanding of each community's dialect, tradition, and proximity and conversant to the various communities of each selected state. The administration and filling of the questionnaire survey lasted about seven months. The survey was strictly conducted without coercion but based on respondents' volition and consent. The respondents whose age fall within 15–16 years were regarded as minors thus, the consent to participate was obtained from their parents or legal guardians. We offered help to clarify instructions as well as assistance based interview using the questionnaire. This was to help some respondents who were unable to fill the questionnaire due to where they were located like a rave, eatery centers, view centers, lounge and restaurants. This was strictly for those who sought for it. The data were collected and crosschecked for completeness of information and responses.

Study variables and measurements
Measurement of main outcome variables
The dependent variable was the prevalence of methamphetamine (Mkpurummiri) use, while the independent variables (predictors) were the socio-demographic factors

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such as age which was categorized into two (adolescents 15-19 years and adults 20-64 years), sex (gender), marital status, level of education, residence/Living arrangements, family size, birth order, family type, family income status (Naira), and religious affiliations. These socio-demographic factors of the respondents were correlated with the prevalence of MA use among adolescents and adults using the multivariate logistics regression adjusted odds ratios (AOR).The prevalence of methamphetamine (Mkpurummiri) use was determined using the questions (Have you ever used Methamphetamine (Mkpurummiri) in the past one year?), and their reasons for use was assessed using the dichotomous response questions of Yes or No adapted from related studies [1, 27, 53, 54]. The routes of administration of MA (Mkpurummiri) by the respondents including the characteristics of the users and its control measures were determined using a checklist. The respondents were requested to use tick ($\sqrt{}$) to indicate their best options on the checklist.

Data analysis

Data generated and properly filled were analyzed using IBM SPSS version 25 (Statistical Package for Social Science). The serial number was assigned to each question for easy identification and for correct data entry and analysis. The analysis of the data was done using frequencies, percentages, bivariate and multivariate logistics regression statistics, as required by the research questions. The multivariate logistics regression analysis was employed to estimate the adjusted odds ratios (AORs) along with 95% confidence intervals (CIs) to identify the independent predictors of demographic characteristics of the adolescents/adults MA use and the degree of the relationship. The level of significance was set at $P < 0.05$. The percentages extracted were presented using tables and figures.

Results

Data from a total of three hundred and sixty-two (362) properly filled copies of the questionnaire were included for data analysis. The findings in Table 1 shows the age bracket of 15-19yrs which were classified as adolescents had the highest percentage (62.2%), whereas those at the age bracket of 20–64 years classified as adults had the percentage of 37.8%. On their sex (gender), the female had the majority (50.8%) whereas the male counterpart had 49.2%. On the marital status, those who were never married had 68%, married had 19.9% whereas formerly married (Divorce) had 12.2%. Regarding the level of education, those who were not in any school/dropout had 29.8%, those in primary school had 8.6%, secondary 10.5% and tertiary 29.8%. On the participant's residence/living arrangements, those living off-campus/streets had

Table 1 Socio-demographic characteristics of the adolescents/adults (*n* = *362*)

Characteristics	Frequency	Percentage (%)
Age category (years)		
Adolescents (15-19yrs)	225	62.2
Adults (20-64yrs)	137	37.8
Sex [gender]		
Male	178	49.2
Female	184	50.8
Marital status		
Never married	246	68.0
Married	72	19.9
Formerly married (Divorce)	44	12.2
Level of education		
Not in any school/dropout	108	29.8
Primary	31	8.6
Secondary	38	10.5
Tertiary	185	51.1
Residence/living arrangements		
On-campus hostel	78	21.5
Off –campus	162	44.8
Family house	122	33.7
Family size		
1–2	80	22.1
3–4	149	41.2
5–6	82	22.7
Over 7	51	14.1
Birth order		
First born	155	42.8
Middle born	118	32.6
Last born	89	24.6
Type of family		
Monogamous	195	53.9
Polygamous	96	26.5
Single-parent	71	19.6
Family income status (Naira)		
< 30,000	100	27.6
30,000–99,000	148	40.9
100,000 and above	114	31.5
Religion affiliation		
Christian	274	75.7
Muslim	26	7.2
Traditional	62	17.1

44.8%, and family house 33.7% whereas those on campus had 21.5%. On the family size, the participants whose family size is 1–2 had 22.1%, 3–4 had 41.2%, 5–6 had 22.7% and over 7 had 14.1%. Regarding family order of birth, majority of the participants are first born 42.8%, followed by middle born 32.6% and last born 24.6%

Table 2 Prevalence and reasons for use of Methamphetamine (Mkpurummiri) among the adolescents/ adults *(n = 362)*

S/N	Prevalence of Methamphetamine (Mkpurummiri) Use	Yes (%)	No (%)
1	Ever used Methamphetamine (Mkpurummiri) in the past one year	74 (21.8)	288 (79.6)
	Reasons for Methamphetamine (Mkpurummiri) Use/Abuse		
2	Once for Curiosity	41 (55.4)	33 (44.6)
3	Peer pressure	60 (81.1)	14 (18.9)
4	To overcome stress/depression	64 (86.5)	10 (13.5)
5	Calm down worries	61 (82.4)	13 (17.6)
6	Low self confidence	60 (81.1)	14 (18.9)
7	Eliminate shyness	61 (82.4)	13 (17.6)
8	Performance improvement	54 (73.0)	20 (27.1)

respectively. As for the family type/structure, majority are from monogamous family with the percentage 53.9%, followed by Polygamous 26.5%, and Single parent 19.6% respectively. Family income status (Naira), those earning less than #30000 had 27.6%, from #30,000-#99,000 had 40.9% and those earning #100,000 and above had 31.5%. On the religion, majority of the participants are Christians 75.7%, followed by Traditional religion 17.1% and Muslim 7.2% respectively (Table 1).

Data in Table 2 shows that out of 362 of the respondents, 74 (21.8%) have used Methamphetamine (Mkpurummiri), while 288 (79.6%) have not. Therefore, the overall prevalence of Methamphetamine (Mkpurummiri) use in the past year was 21.8%. The commonest reasons for consuming Methamphetamine (Mkpurummiri) include: To overcome stress/depression (86.5%), Calm down worries (82.4%), Eliminate shyness (82.4%), Peer pressure (81.1%), low self-confidence (81.1%), performance improvement (73.0%) and Curiosity (55.4%) (Table 2).

The most common routes of administration of Methamphetamine (Mkpurummiri) were through the Inhalation (64.9%), Sniffing (51.4%). Swallow/cook with food (50.0%), Injection (48.6%), Smoking Ice (43.2%), and other routes of administration not specified shows (48.6%) (Table 3).

The characteristics of MA (Mkpurummiri) use among adolescents/adults were determined using checklist, percentage and frequency and presented in the graph in

Table 3 Methamphetamine (Mkpurummiri) routes of administration

Drug routs of administration	Yes (%)	No (%)
Injected	36 (48.6)	38 (51.4)
Sniffed	38 (51.4)	36 (48.6)
Inhaled	48 (64.9)	26 (33.8)
Smoked Ice	32 (43.2)	42 (55.8)
Swallowed/cooked with food	37 (50.0)	37 (50.0)
Other routes not specify	36 (48.6)	38 (51.4)

Fig. 1. The findings show that the greater percentage of youth who use methamphetamine (mkpurummiri) were highly aggressive/violent (94.1%), followed by suicide (88.3), Depression (87.3%), Relationship problems (86%), Psychological distress (85.3%), School dropout (84%), absenteeism (83.1), Peer group influence (82.1%), Poor academic performance (81.4%), Anxiety/panic(80.8%), Risky sexual behavior (80.1%), Financial problems(79.2), Parental deprivation (77.5%), Sensation seeking (72%), Unemployment (70%), respectively (Fig. 1).

The Data in the Fig. 2 represented the perceived control measures of MA (Mkpurummiri) use. The findings indicated that the best way to protect and avoid the use of MA (Mkpurummiri) by adolescents and adults is by self-control with the highest percentage of 92.2% followed by parental monitoring (85.7%), drug education (83.1%), legal control (80.8%), punitive measures by the concerned stakeholders (80.1%), strong neighborhood attachment (76.5) and by school based intervention mechanisms (70%) (Fig. 2).

In Table 4, we used multivariable/multivariate logistic regression to evaluate the respondents' socio-demographic characteristics that were associated with MA use. Due to the dichotomous nature of our dependent variable in the past year MA use. The following socio-demographic characteristics of the respondents such as age, gender, marital status, educational level, residence/living arrangements, family size, order of birth, family type, family income, and religious affiliation were plugged in the multivariate logistic regression. The findings from the adjusted odd ratios shows that being recently married were 3.25 times (AOR = 3.25; CI = 1.47–7.18; $P = 0.003 \leq 0.05$), and being "formerly married (divorced) 3.45 times (AOR = 3.45; CI = 1.23–9.58; $P = 0.017 \leq 0.05$) respectively more likely than never married to use Ma in the past year. On the residence/living arrangements, students living off-campus were 3 times (AOR = 0.298; CI = 0.12–0.73 $P = 0.008$), and family house 4 times (AOR = 0.241; CI = 0.09–0.65; $P = 0.005 \leq 0.05$) less than on-campus hostel youths to use Ma in the past year. On the family type, being from a "polygamous family were 2.3 times (AOR = 2.301; CI = 1.08–4.90; $P = 0.031 \leq 0.05$)
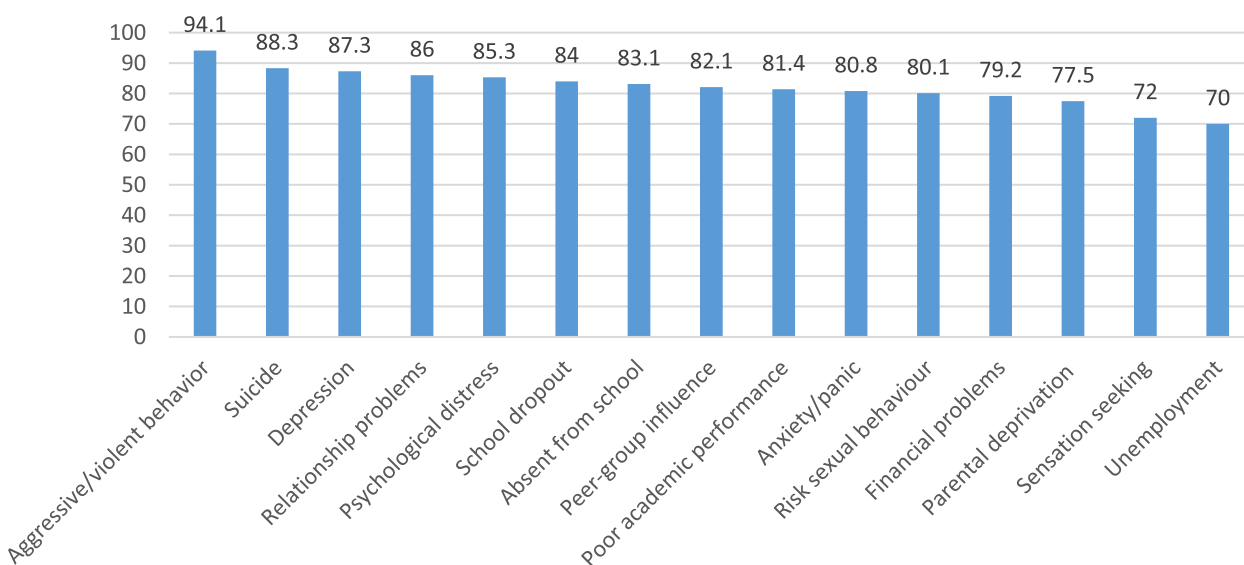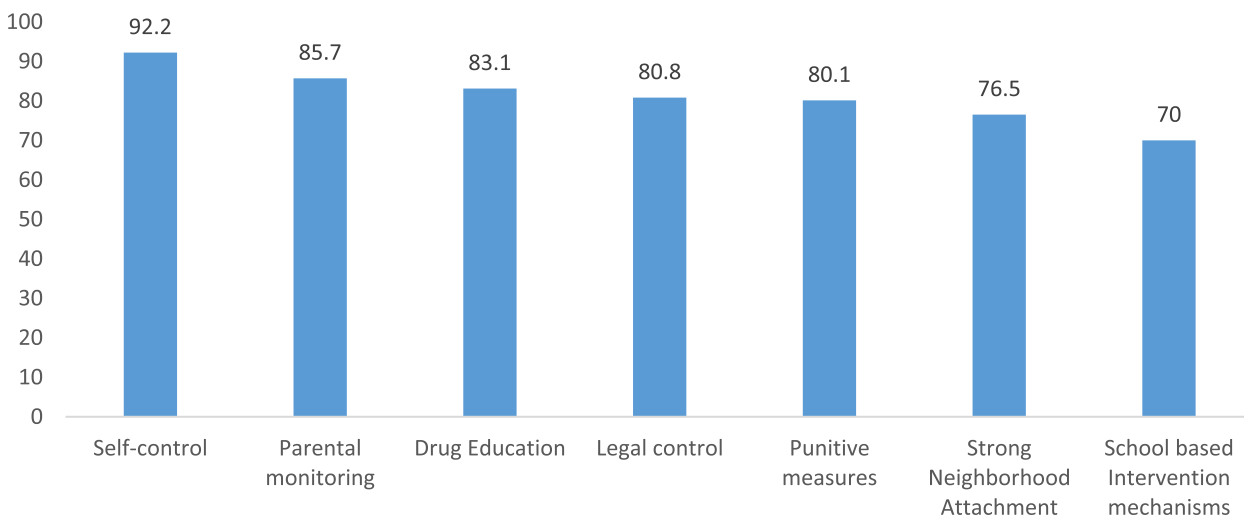
Fig. 1 Characteristics of MA (Mkpurumiri) users, *n = 362*

more likely than being from monogamous family to use Ma in the past year. Being from single parent (AOR=0.518; CI=0.16–1.67; *P*=0.269 > 0.05) has no statistically significant association with the prevalence of Ma use. On the religious affiliation: Being traditional religion were 4.44 times (AOR=4.44; CI=1.77–11.15; *P*=0.001 ≤ 0.05) more likely than being Christian religion to use Ma in the past year. Being Muslim (AOR=1.606; CI=0.58–4.45; *P*=0.363 > 0.05) has no statistically significant association with Ma use in the past year (Table 4).

Discussion

This study was among the first to examine the prevalence of MA (Mkpurummiri) use, characteristics of the users and the control measures among adolescents/adults of south-eastern Nigeria. The finding of the study revealed the overall prevalence of 21.8% MA (Mkpurummiri) use in the past year. The finding was anticipated and consequently not a surprise, though the prevalence was below expectations due to the several reports of MA use from Nigeria newspapers, Magazines, grey literature, periodicals and article reviews. These reports indicated MA increased production, availability, accessibility, pervasiveness and endemic among adolescents/adults of South Eastern Nigeria [2, 29, 32]. It was also reported that it is common to observe Methamphetamine (Mkpurummiri) users on the streets of various communities walking naked or half naked without shame [2, 29, 31, 32]. Some students among them have assaulted their teachers/lecturers leading to dropout from school [2, 29, 32].

Fig. 2 Respondents' perspectives on control measures of MA (Mkpurumiri) Use, *n = 362*

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Table 4 Multivariate logistics regression of the relationship between prevalence of Methamphetamine (Mkpurumiri) abuse and socio-demographic characteristics of South Eastern Youth, *n* = 362

Variable	Yes (%)	No (%)	cOR [95% CI]	*P*-value	aOR [95% CI]	*P*-value
Age						
15 – 25 years	34 (45.9)	191 (66.3)	Ref		Ref	
26 and above	40 (54.1)	97 (33.7)	2.317 (1.38–3.89)	0.001	1.393 (0.70–2.77)	0.345
Gender						
Male	37 (50.0)	141 (49.0)	Ref		Ref	
Female	37 (50.0)	147 (51.0)	0.959 (0.58–1.60)	0.873	0.817 (0.44–1.54)	0.531
Marital status						
Never married	33 (44.6)	213 (74.0)	Ref		Ref	
Recently married	24 (32.4)	48 (16.7)	0.310 (0.17–0.57)	0.000	3.252 (1.47–7.18)*	0.003
Formerly married (Divorce)	17 (23.0)	27 (9.4)	0.246 (0.12–0.50)	0.000	3.453 (1.23–9.58)*	0.017
Level of education						
Not in any school/Dropout	15 (20.3)	93 (32.3)	Ref		Ref	
Primary	13 (17.6)	25 (8.7)	0.716 (0.37–1.39)	0.322	1.373 (0.57–3.31)	0.481
Secondary	12 (16.2)	19 (6.6)	0.255 (0.10–0.63)	0.003	2.381 (0.70–8.07)	0.163
Tertiary	34 (45.9)	151 (52.4)	0.310 (0.13–0.74)	0.008	1.884 (0.52–6.79)	0.332
Residence/living arrangements						
On-campus hostel	22 (29.7)	56 (19.4)	Ref		Ref	
Off-campus	23 (31.1)	139 (48.3)	2.374 (1.23–4.60)	0.010	0.298 (0.12–0.73)*	0.008
Family house	29 (39.2)	93 (32.3)	1.260 (0.66–2.40)	0.483	0.241 (0.09–0.65)*	0.005
How many are you in your family						
1 – 2	15 (20.3)	65 (22.6)	Ref		Ref	
3 – 4	21 (28.4)	128 (44.4)	1.407 (0.68–2.91)	0.358	0.633 (0.25–1.62)	0.339
5 – 6	21 (28.4)	61 (21.2)	0.670 (0.32–1.42)	0.295	1.053 (0.39–2.86)	0.920
Over 7	17 (23.0)	34 (11.8)	0.462 (0.21–1.04)	0.061	1.413 (0.43–4.62)	0.567
What is the order of your birth						
First born	26 (35.1)	129 (44.8)	Ref		Ref	
Middle born	28 (37.8)	90 (31.3)	0.648 (0.36–1.18)	0.155	1.187 (0.55–2.56)	0.664
Last born	20 (27.0)	69 (24.0)	0.695 (0.36–1.34)	0.275	1.401 (0.49–4.05)	0.531
What type is your family						
Monogamous	26 (35.1)	169 (58.7)	Ref		Ref	
Polygamous	31 (41.9)	65 (22.6)	0.323 (0.18–0.59)	0.000	2.301 (1.08–4.90)*	0.031
Single-parent	17 (23.0)	54 (18.8)	0.489 (0.25–0.97)	0.040	0.518 (0.16–1.67)	0.269
Family income (Nigeria Naria)						
≤ 18,000	26 (35.1)	74 (25.7)	Ref		Ref	
30,000 – 99,000	26 (35.1)	122 (42.4)	1.649 (0.89–3.05)	0.111	0.521 (0.25–1.09)	0.084
100,000 and above	22 (29.7)	92 (31.9)	1.469 (0.77–2.80)	0.242	0.492 (0.20–1.21)	0.123
Religious affiliation						
Christian	41 (55.4)	233 (80.9)	Ref		Ref	
Muslim	10 (13.5	16 (5.6)	0.282 (0.12–0.66)	0.004	1.606 (0.58–4.45)	0.363
Traditional	23 (31.1)	39 (13.5)	0.298 (0.16–0.55)	0.000	4.443 (1.77–11.15)*	0.001

* Significant at *p* ≤ .05

However, the current findings were somewhat higher though agreed with the study which reported prevalence of 12.7% of methamphetamine abuse in south western Iran [55]. The present study also revealed a higher prevalence more than other studies conducted among secondary school students MA and other drugs of use/abuse in the past year [56, 57]. Nevertheless, the prevalence of the current study was somewhat lower than the prevalence 45.38% of MA use in the study conducted in 2015 among youths in China [58], although the prevalence rate of various studies varies. Thus, the high prevalence of the current study could be attributed to the available

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evidence on the recent discoveries by NDLEA on illegal laboratories where methamphetamine is manufactured by drug barons and their foreign counterparts including drug traffickers who made it available to the users [48]. All these have largely contributed to the rampant use of MA in the region [2, 31, 32].

The reasons commonly attributed to MA use were to overcome stress/depression and to calm down worries. These findings may not be unconnected with the high rate of unemployment, increase in poverty level, lack of educational opportunities, and high cost of living among other socioeconomic implications of fuel subsidy removal in Nigeria currently. All these factors may be fuelling the adolescents/adults vulnerability to drug use/abuse including MA leading to the formation of drug users gang, insecurity, kidnapping, armed robbery, cultism and the high rate of mental illness of the youths in the south eastern Nigeria [44, 45]. The current findings alluded to the study which revealed poverty rate of about 50% of people living in abject poverty in Nigeria [46], and the rising rate of unemployment (23.1%) [47], including the challenges of high cost of living associated with the recent fuel subsidy removal in the country [50]. All these may be fuelling youth vulnerability to drugs to enable them cope and work harder to earn a living or to ward off the stress and frustration of daily living in hardship [1]. The findings of this study are in line with other studies which consistently reported depression, anxiety, frustration, unemployment, and predominantly socio-economic problems of the country as reasons for drug use/abuse [1, 7, 59].

The most common routes of administration of MA by users as identified in the study were inhalation, sniffing, swallowing/cooking with food among others. The findings were consistent with other studies which reported the mode of MA intake to include smoking, injection, snorting, ingestion, inhalation, chewing and rubbing on the skin [34, 36].

The common characteristics of MA (Mkpurummiri) use in this study were aggressive/violent behavior, suicide, relationship problems, school dropout, absenteeism, poor academic performance, financial problems. The outcome of the study is not a surprise thus, in recent years, Nigeria as a country has simultaneously faced numerous challenges ranging from COVID-19 outbreak, high rate of inflation, unemployment and increase in poverty rates. Currently these challenges seem to be worse due to another level of hardship associated with the decision to remove petroleum subsidy which has a high significant impact on the cost of living especially among the youths. The current findings were in line with other studies which associated the characteristics of MA users such as violent behaviour, hopelessness, suicide, high rate of unemployment, relationship problems, school dropout,

absenteeism, poor academic performance, financial problems and parental deprivation to adolescents/youths [1, 44, 60–62]. The findings further support the reports by WHO which revealed that persistent sadness, loss of interest in activities that are normally enjoyed, including inability to carry out daily activities are as a result of high cost of living that enhances illegal drug use/abuse [19].

The perceived control measures of MA (Mkpurummiri) use as identified in this study include self-control, parental monitoring, drug education, legal control, punitive measures, strong neighborhood attachment, and school based intervention mechanisms. This finding is in line with the study which reported parental monitoring, quality education, provision of employment opportunities, and inclusion of drug education in school as the most effective control measures for MA use [63]. Regarding self-control and parental monitoring identified in the current study, it affirmed other studies which reported parental support as a preventive/control measures for multiple outcomes including an individual self-control over illicit drug use/abuse [63, 64]. Further, there should be more stringent measures by government at all levels and other relevant authorities to uphold the preventive/control measures of MA use as identified in this study and to checkmate and eliminate the process of MA production, trading networks, circulation and the sale in the region [58].

The findings from the adjusted odd ratios show that being recently married as well as being formerly married (divorced) were more likely than never married to use Ma in the past one year. These findings might not be out of place hence the users of MA have reported increased sexual activities, duration of sex, quality and quantity of sexual pleasure including sexual performance [65]. Therefore, recently married may be using MA during honey moon for sexual pleasures and to enable them satisfy their partners sexually. On the other hand, those who are divorced or formally married may be using MA due to loneliness, decreased level of happiness, change in economic status and emotional/psychological problems and depression associated with divorce among couples. The findings are in line with the study which reported divorce as a potent risk factor from onset of drug abuse, thus, the prevalence of drug abuse is higher among divorced individuals than married couple [66, 67]. The finding also supports the study which revealed common drug use/ abuse particularly MA among recently married and divorced family [68, 69].

Residence/living arrangements indicated that students living in "off-campus" and those living in "family house" were less likely than those living "on-campus hostel" to use MA in the past year. This finding was not expected because those living off-campus hostel may be

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living amidst different group of people like hooligans, school dropout and perhaps might be prone to MA use. However, the finding was not deceitful as it is consistent with studies which reported that students who reside on-campus were more associated with heavier drinking and other drug use/abuse than those living off-campus and peers at home with parents [70, 71]. The finding disagrees with the study which reported that students living off-campus without parents are more frequent and heavier drinkers including other drugs with greater consequences than students living on-campus [72]. This agreement and disagreement with reference to the findings could be attributed to varied geographical locations, subject composition and other demographic factors associated with the studies.

Family type shows that being from polygamous family were more likely than others to use Ma in the past year. The finding was not deceitful thus, it is in consonance with the study which attributed psychoactive substance use including MA to family type [73]. More so, the finding further supports the study which reported family factors like polygamous family as the most important predictor of Methamphetamine use/abuse [74]. The finding was at variant with studies which reported single-parent families as important predictors for future MA use and other delinquent behaviours [75, 76].

On the religious affiliation, belonging to traditional religion were more likely than being an adherent of Christian religion to predict Ma use in the past year. However, being Muslim has no statistically significant association with Ma use in the past year. The outcome of this finding may be attributed to some traditional religious activities associated with the people of the area like traditional wrestling, traditional dances, masquerade cult, new yam festival and other festivals which when ongoing, predispose the people of the area especially the youth to be more vulnerable to excessive drug use and abuse including MA [77]. The Christian religion and Muslim religion which are known as custodians of public morality might be preaching against this menace to strengthen the religious faith and dissuade the people from the use of MA and other illicit drugs. However, the findings of the current study are in consonance with the study which revealed religion ($P = 0.009$), as a predictor of psychoactive drug use including Ma [51]. It was also consistent with the study which revealed that the rate of drug abuse was higher among traditional religion than those of Christianity, Islam and other religions [73, 78]. The finding further alluded to the study which reported that frequent attendance to religious fellowships was a high significant factor that reduces adolescents, youths and adults likelihood of anti-social activities including drug use/abuse [79].

Strengths and weaknesses of the study

The major strength was that this study on prevalence of methamphetamine (Mkpurummiri) use/ abuse was among the first in the south eastern Nigeria. This is because despite the availability of MA and its rampant use in the region, there was little or no empirical study to establish its prevalence. This necessitated the current study.

The weakness may be that we used prevalence of MA (Mkpurummiri) use/abuse in the past year because MA was assumed to be a new drug of abuse by adolescents/youths at the time of the study. Hence, we did not include the prevalence of life time and current MA use during data collection. Additionally, the method of data collection was quantitative that used closed ended questions which may not have captured all the predictors of MA use. The study suggested the use of mixed study or qualitative data collection like in-depth interview and/or Focus Group Discussion. Hence, in-depth interview and FGDs have the potential to facilitate group interaction which would help to understand other factors predicting MA use.

Conclusions

Our study provided the first data on the prevalence of MA (Mkpurummiri) use, characteristics of the users and the control measures among adolescents/adults of south-eastern Nigeria. The study revealed that the prevalence of MA use was relatively high thus requiring an urgent response to halt the spread and use/abuse of this dangerous drug in the region. The relevant government agencies, in collaboration with stakeholders in various communities, families, religious bodies and school managements/authorities should as a matter of urgency design and implement effective MA use policy/law and its consequences same with cocaine and other illicit drug users. This will help to arrest and prosecute the manufacturers, distributors, promoters and users of this dangerous drug. Other measures are to rehabilitate the MA users by providing employment opportunities and upholding the control measures of MA use among adolescents/adults as indicated in this study.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-024-19921-9.

Supplementary Material 1.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from Ebonyi State University Research Ethics committee (EBSU/DRIC/UREC/vol.7/05223). The approval letter introduced the researchers to the relevant stakeholders of various communities and respondents stating the objectives of the study. This helped the researchers to gain access to and cooperation from the respondents and the stakeholders of the study population. Before the commencement of the study, a written informed consent was obtained from all the participants. Regarding the minors, which refers to individuals below the age of 16 years, informed consent to take part in the study was obtained from their parents or legal guardians. In the consent letter, they were fully assured of confidentiality and anonymity of the data. All procedures were strictly performed in accordance with the Declaration of Helsinki ethical standards in 1964 and its amendments.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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