

## Adolescent self-harm with medicines: Intentional paracetamol overdose could be the commonest in Ghana

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### Abstract

This research note describes self-reported medicines used by adolescents for self-harm in Ghana and highlights some of the emerging evidence on access to the identified medicines. A secondary analysis of data drawn from a 2017 regionally representative survey on self-harm among in-school and street-connected adolescents in Ghana was performed. Frequencies and proportions were applied to data provided by an analytical sample of 56 adolescents (in-school = 40; street-connected = 16) who reported self-poisoning using medicines. More females ( $n = 46$ ) than males ( $n = 10$ ) reported using medicines for self-harm. Paracetamol was the most frequently used over-the-counter medicine, and sleeping pill was the commonly used prescription medicine. Most in-school adolescents accessed medicines at home and community pharmacies, while street-connected adolescents accessed medicines mainly on the black market. In-school adolescents had access to (grand)parents' prescribed medications and other random medicines at home. These initial exploratory findings are not aimed at providing representative descriptive evidence on self-poisoning with medicines among adolescents in Ghana. Although this research note recommends some preventive measures, broadly, the findings are intended to lay the groundwork for a systematic investigation of adolescent self-poisoning involving the use of medicines and the development of evidence-informed intervention and prevention strategies.

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## Introduction

Self-harm (intentional self-inflicted poisoning or injury, which may or may not have a fatal intent or outcome) remains the single most important risk factor for death by suicide across all age groups in the general population (Knipe et al., 2022; WHO, 2016a, 2016b). As at the end of 2019, suicide was the 3rd leading cause of death among girls aged 15–19 years (after maternal health conditions) but the 4th leading cause of death among boys (after tuberculosis) in the same age bracket.

Self-harm is in the top 12 causes of death among persons aged 10–24 years in sub-Saharan Africa (Naghavi & Global Burden of Disease Self-Harm Collaborators, 2019). Evidence from a recent systematic review suggests that Western sub-Saharan Africa records the highest (12-month prevalence) estimate of self-harm (median = 24.3%; interquartile range [IQR] = 16.9% – 27.9%), compared to the overall 12-month prevalence estimate across the sub-Saharan Africa region (median = 16.9%; IQR: 11.5% – 25.5%) (Quarshie et al., 2020).

Extant and recent clinic- and community-based studies across sub-Saharan Africa have reported various means and methods of self-injury (i.e., any injury that has been intentionally self-inflicted regardless of the intent or outcome). For example, (wrist) cutting with sharp objects, carving pictures, words or patterns into skin, head banging, rubbing skin with sandpaper, and burning skin with cigarette (Quarshie et al., 2020). Also, clinic-based studies from the sub-region continue to provide evidence on the means of self-poisoning among both adolescent and adult patients – for example, the ingestion of organophosphates and other highly hazardous pesticides and insecticides, alcohol, illicit drugs, caustic substances, prescription medication and over-the-counter medicines, and ingestion of other inedible substances (Ani et al., 2017; Louw et al., 2020; Quarshie et al., 2020).

Notably, intentional overdose of over-the-counter analgesics, particularly paracetamol, has been found to be common among young people in high-income countries (Daly et al., 2021). Thus, to prevent the often acute liver damage and suicide that result from paracetamol poisoning mainly in young people (Mund et al., 2015), several high-income countries have passed laws that reduce the maximum pack size of all non-effervescent capsules and tablets containing paracetamol or acetylsalicylic acid that can be sold or supplied over-the-counter from 25 to 16 tablets or capsules (Hawkins et al., 2007; Hawton et al., 2013).

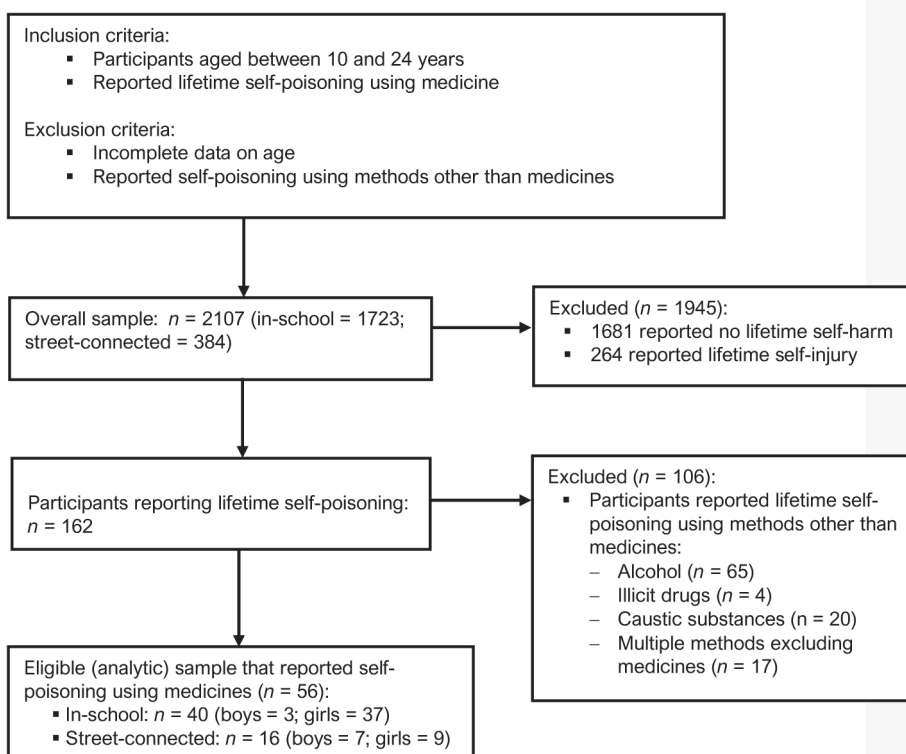
However, evidence on the means of self-poisoning, particularly self-poisoning with medicines among samples of both in-school and out-of-school young people in non-clinical contexts within sub-Saharan Africa are still lacking (Quarshie et al., 2020). Self-poisoning is taken in this research note to mean “the intentional self-administration of more than the prescribed [or generally recognised therapeutic] dose of any medication, whether or not there is evidence that the act was intended to result in death” (Hawton et al., 2003, p. 988).

This research note draws descriptive data from a regionally representative survey on self-harm among in-school and street-connected adolescents in Ghana to provide some emerging evidence on the medicines that adolescents use for self-harm and access to these medicines in the country. This brief paper is partly in response to the global call for context-relevant evidence to inform the development of means to self-harm and suicide restriction strategies (Nordentoft, 2007; Yip et al., 2012; Zalsman et al., 2016), particularly, the availability of medications for self-harm and eventual suicide. Ultimately, this study contributes evidence not only towards the realisation of target 3.4.2 of the United Nations Sustainable Development Goal to reduce suicide by one-third by the year 2030 (Patel et al., 2018; UN, 2016), but also provides a basis for more expansive studies on the means and methods used by adolescents in Ghana (and by implication in other sub-Saharan African countries) for self-harm. Adolescents, in this study, is considered in reference to persons aged 10–24 years (Sawyer et al., 2018).

## Methods

A detailed description of the methods used – including design, sample and sampling techniques and procedures for data collection – has been provided in an open access published larger survey (Quarshie et al., 2021). In brief, a community-based cross-sectional survey (using a structured self-report anonymous questionnaire) was conducted to identify the prevalence, methods, associations and reported reasons for self-harm among adolescents in the Greater Accra region of Ghana. The survey involved a regionally representative sample of 2107 adolescents, comprising 1723 in-school adolescents selected from 20 second cycle schools, and 384 street-connected adolescents drawn from 4 charity facilities and 10 street census enumeration areas. Data was collected between May and September 2017. The survey used a 4-section questionnaire with items developed by the research team and partly adopted from existing key scales.

Lifetime self-harm was assessed with a binarised response (“No” or “Yes”) question: “Have you actually ever intentionally harmed yourself (e.g., cutting, burning, or poisoning yourself, or tried to harm yourself in some other way, for example, hanging, jumping from height etc.)?” Besides reporting the means of self-poisoning, participants were also asked to indicate where they accessed the means of self-poisoning (e.g., home, school, community pharmacy, streets or black market). Participants also reported whether or not they were hospitalised or received any medical attention following the self-poisoning act. Across the sample, 162 participants reported lifetime self-poisoning; of this number, 56 reported that they used medicines in their self-poisoning acts. Figure 1 shows that eligibility criteria and the analytic sample selection.



**Figure 1:** Flow diagram of analytic sample selection process and eligibility criteria

In this paper, descriptive statistical analysis of the data using SPSS (version 26.0 for Windows) was performed. Frequencies and percentages were used to present the demographic characteristics of the participants and key descriptive details about the medicines used and where they were accessed by the participants. Given the relatively small sample size in this study ( $n = 56$ ), it is important for readers not to misconstrue the findings reported as epidemiological in nature.

## Ethics

The survey received ethical approval from two Institutional Review Boards: the School of Psychology Ethics Committee, University of Leeds, UK [Ref. N<sup>o</sup>: 16-0373] and the Ethics Committee for the Humanities, University of Ghana, Accra, Ghana [Ref. N<sup>o</sup>: ECH078/16-17]. Additionally, institutional permissions (from the Ghana Education Service, the Department of Social Welfare – Ghana, and the participating schools and charity facilities) were also obtained. The participants provided a signed written consent before responding to the survey. Written consent of the parents/guardians of in-school adolescents aged 13–17 years was sought, while the underage adolescents assented to participate. Written consent to participate in the study was obtained from the

management of charity facilities and street social workers on behalf of street-connected adolescents aged 13–17 years (Quarshie et al., 2021).

## Results

### Sample characteristics

Table 1 shows the socio-demographic characteristics of participants in this study. Overall, the participants were aged 13–21 years (mean = 17.0; *SD* = 1.3), comprising 46 females (82.1%) and 10 males (17.9%). Most of the participants (60.7%) self-identified as belonging to polygamous families, where their father had more than one wife. Half of the participants were living with one or both parents at the time of the survey.

**Table 1:** Demographics characteristics of participants reporting self-poisoning using medicines

Characteristic	Overall sample	In-school adolescents	Street-connected adolescents
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
<b>Adolescent group</b>	40 (71.4)	40 (100)	–
In-school	16 (28.6)	–	16 (100)
Street-connected			
<b>Sex</b>			
Male	10 (17.9)	3 (7.5)	7 (43.7)
Female	46 (82.1)	37 (92.5)	9 (56.3)
<b>Age</b>			
13-15	7 (12.5)	3 (7.5)	4 (25.0)
16-17	29 (51.8)	21 (52.5)	8 (50.0)
18-21	20 (35.7)	16 (40.0)	4 (25.0)
<b>Family structure</b>			
Father has 1 wife	22 (39.3)	19 (47.5)	3 (18.7)
Father has > 1 wife	34 (60.7)	21 (52.5)	13 (81.3)
<b>Sibling size</b>			
≤ 4	31 (55.4)	28 (70.0)	3 (18.7)
> 4	25 (44.6)	12 (30)	13 (81.3)
<b>Living arrangement</b>			
One or both parents	28 (50.0)	25 (62.5)	3 (18.7)
Other relation	19 (33.9)	10 (25.0)	9 (56.3)
Alone/with another person	9 (16.1)	5 (12.5)	4 (25.0)
<b>Religious group</b>			
Christian	46 (85.2)	38 (95.0)	8 (57.1)
Muslim	8 (14.8)	2 (5.0)	6 (42.9)
<b>In romantic relationship</b>			
No	29 (51.8)	21 (52.5)	8 (50.0)
Yes	27 (48.2)	19 (47.5)	8 (50.0)

NB: Categories that do not add up to the total sample ( $n = 56$ ) are due to missing data

### Medicines used for self-poisoning

Overall, over-the-counter medicines ( $n = 30$ ; 53.6%) were the most frequently used, relative to prescription medications ( $n = 21$ ; 37.5%) and medicines that participants reported as 'random medicine at home' ( $n = 5$ ; 8.9%). As shown in Table 2, compared to other reported over-the-counter medicines (aspirin, anti-malarial, and multivitamin and food supplements), paracetamol was the most used by the participants ( $n = 23$ ; 41.1%). Among the prescription medications, sleeping pill was the most frequently reported ( $n = 6$ ; 10.7%).

Relatedly, tramadol was the second frequently reported prescription medicine used, but notably, tramadol was reported only among street-connected adolescents. Similarly, amphetamine, eye drop, parent's/grandparent's prescribed medication (for treating stomach ulcer, diabetes, hypertension, or arthritis), and random medicine at home (where participant did not read label of medicine) were reported by only the in-school adolescent participants. Generally, while both adolescent groups reported having used both over-the-counter and prescription medicines, street-connected adolescents appear to have frequently used prescription than over-the-counter medicines (see Table 2).

**Table 2:** Distribution of medicines used [stratified by adolescent group]

Medicines	Overall sample	In-school adolescents	Street-connected adolescents
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
<b>Over-the-counter:</b>	<b>30 (53.6)</b>	<b>26 (86.7)</b>	<b>4 (13.3)</b>
Paracetamol	23 (41.1)	20 (87.0)	3 (13.0)
Aspirin	2 (3.6)	1 (50.0)	1 (50.0)
Anti-malarial	4 (7.1)	4 (100)	0
Multivitamin and food supplement tablets (Folic acids, Zincovit)	1 (1.8)	1 (100)	0
<b>Prescription Medication:</b>	<b>21 (37.5)</b>	<b>9 (42.9)</b>	<b>12 (57.1)</b>
Sleeping pill (Diazepam, Valium)	6 (10.7)	2 (33.3)	4 (66.7)
Tramadol	4 (7.1)	0	4 (100)
Other analgesics (Ibuprofen, Codeine, Gebedol)	3 (5.4)	1 (33.3)	2 (66.7)
Antibiotic capsules (Amoxicillin, Cloxacillin)	3 (5.4)	1 (33.3)	2 (66.7)
Amphetamine	1 (1.8)	1 (100)	0
Eye drop	1 (1.8)	1 (100)	0
Parent's/grandparent's prescribed medication (for treating stomach ulcer, diabetes, hypertension, or arthritis)	3 (5.4)	3 (100)	0
<b>Random medicine at home/did not read label of medicine</b>	<b>5 (8.9)</b>	<b>5 (100)</b>	<b>0</b>

### **Access to medicine and medical treatment following self-poisoning**

Table 3 presents the distribution of medicines, stratified by access and medical treatment following self-poisoning. Most over-the-counter medicines were accessed at home while the majority of the prescription medicines were obtained from the black market, but many over-the-counter medicines were also accessed from community pharmacies. Most in-school adolescents accessed medicines at home ( $n = 31$ ; 77.5%) and at community pharmacy ( $n = 9$ ; 22.5%). However, most street-connected adolescents accessed medicines on the black market ( $n = 14$ ; 87.5%).

Whereas no street-connected adolescent reported accessing medicine from the home environment, no in-school adolescent reported accessing medicine from the black market. Even though most over-the-counter and prescription medicines did not result in hospitalisation, many prescription medicines led up to medical treatment of overdose (Table 3), most likely indicating ingestion of high dosage and severity of the intentional overdose act.

### **Discussion**

To the best of the author's knowledge, this is the first study, specifically, from Ghana and, broadly, from sub-Saharan Africa to provide evidence from a non-clinical, community-based cross-sectional survey on adolescent self-poisoning using medicines – with data provided simultaneously by in-school and street-connected adolescents. This study has shown that more females than males report using medicines for self-poisoning – a finding that is consistent with the literature from high-income countries (Daly et al., 2021; Zullig et al., 2015). This evidence could be pointing in part to a possibility that the rates of intentional overdose of medicines may be higher among female adolescents, while adolescent males may be using illicit drugs and other substances (including alcohol and marijuana) for self-harm (Quarshie et al., 2021; Quarshie et al., 2020). However, further research is needed to explicate this finding, including differences in age-specific trend between and across adolescent females and males.

Beyond the gender difference in the use of medicines for self-harm, this secondary analysis has shown three key findings: 1] Paracetamol is the most frequently used over-the-counter medicine, while sleeping pill is the commonly used prescription medicine for self-harm; 2]. Most in-school adolescents access medicines at home and at community pharmacy, while most street-connected adolescents access medicines on the black market; and 3] In-school adolescents have access to parents' and grandparents' prescribed medications (for treating stomach ulcer, diabetes, hypertension, or arthritis) and other random medicines within the home environment, but the use of tramadol for self-harm is reported by street-connected adolescents only. Although these key findings generally support clinical evidence from other sub-Saharan African countries (Ani et al., 2017; Louw et al., 2020; Quarshie et al., 2020) and high-income contexts (Daly et al., 2021), they could be broadly understood and explicated from the lens of access and policy.



**Table 3:** Distribution of medicines used [stratified by access and medical treatment following ingestion]

Medicines	Access			Received medical treatment for overdose	
	Home	Community pharmacy	Black market	No	Yes
	n (%)	n (%)	n (%)	n (%)	n (%)
<b>Over-the-counter:</b>	<b>17 (56.7)</b>	<b>10 (33.3)</b>	<b>3 (10.0)</b>	<b>23 (76.7)</b>	<b>7 (23.3)</b>
Paracetamol	13 (56.5)	7 (30.4)	3 (13.0)	17 (73.9)	6 (26.1)
Aspirin	1 (50.0)	1 (50.0)	0	2 (100)	0
Anti-malarial	3 (75.0)	1 (25.0)	0	3 (75.0)	1 (25.0)
Multivitamin and food supplement tablets (Folic acids, Zincovit)	0	1 (100)	0	1 (100)	0
<b>Prescription Medication:</b>	<b>8 (38.1)</b>	<b>2 (9.5)</b>	<b>11 (52.4)</b>	<b>15 (71.4)</b>	<b>6 (28.6)</b>
Sleeping pill (Diazepam, Valium)	2 (33.3)	0	4 (66.7)	4 (66.7)	2 (33.3)
Tramadol	0	0	4 (100)	2 (50.0)	2 (50.0)
Other analgesics (Ibuprofen, Codeine, Gebedol)	1 (33.3)	1 (33.3)	1 (33.3)	2 (66.7)	1 (33.3)
Antibiotic capsules (Amoxicillin, Cloxacillin)	1 (33.3)	0	2 (66.7)	3 (100)	0
Amphetamine	1 (100)	0	0	1 (100)	0
Eye drop	1 (100)	0	0	1 (100)	0
Parent's/grandparent's prescribed medication (for treating stomach ulcer, diabetes, hypertension, or arthritis)	3 (100)	0	0	2 (66.7)	1 (33.3)
<b>Random medicine at home/did not read label of medicine Adolescent group:</b>	<b>5 (100)</b>	<b>0</b>	<b>0</b>	<b>3 (60.0)</b>	<b>2 (40.0)</b>
In-school	31 (77.5)	9 (22.5)	0	28 (70.0)	12 (30.0)
Street-connected	0	2 (12.5)	14 (87.5)	13 (81.3)	3 (18.8)

Even though many high-income countries have legislations restricting the maximum pack size of paracetamol (and over-the-counter analgesics in general) that can be sold in pharmacies and non-pharmacy stores (Mund et al., 2015), across the world, most countries allow prescription-free sales of paracetamol in pharmacies and non-pharmacy outlets. In Ghana and across sub-Saharan Africa, customers of these over-the-counter



medicines include children (Kawuma et al., 2021). This seeming unfettered access makes paracetamol the most common medicine used for self-harm, and it is responsible for an increasing number of fatal overdoses in young people (Daly et al., 2021; Louw et al., 2020; Mund et al., 2015; Quarshie et al., 2020; Zullig et al., 2015). Besides considering confining the sale of paracetamol to only pharmacies (and banning non-pharmacy outlets from selling the medicine), perhaps, the Government of Ghana could also consider introducing a context-relevant sales legislation that restricts the maximum pack size of paracetamol. Evidence indicates that ingesting 15 or more paracetamol tablets – of 500 mg – in a single dose (7.5g) equates to an acute toxic dosage for an adolescent, and a dosage of 200 mg/kg of body weight can be toxic for a child (Mund et al., 2015). Statutory legislations introduced in some high-income countries have yielded varying degrees of success – towards restricting young people from accessing high quantities of paracetamol and reducing paracetamol-related self-poisoning in young people (Bateman et al., 2006; Hawton et al., 2013).

It is not entirely surprising that most in-school adolescents access medicines at home and community pharmacies. Most in-school adolescents live with their families, where access to first-aid boxes and containers of medicines are often not restricted in the home environment. Young people are sent on errand by significant other adult family members to buy (prescribed and over-the-counter) medicines from both hospital/clinic-affiliated pharmacies and community pharmacies. It is even more concerning that in-school adolescents living with their families have access to parents' and grandparents' prescribed medication (for treating stomach ulcer, diabetes, hypertension, or arthritis) and other medicines randomly found within the home environment. This evidence points to a need for families to store medicines safely and, where possible, lock medicines away from the sight and reach of distressed young people.

The evidence related to accessing paracetamol and other over-the-counter medicines from community pharmacies could be highlighting a recent call by the WHO (WHO, 2016b, 2021) and other leading scholars (Gorton, 2019; Michail et al., 2020; Mughal et al., 2021) for the enlistment of community pharmacists, allied health professionals, social care staff and other frontline health professionals in (youth) self-harm and suicide intervention and prevention at the primary care level. Emerging research suggests that although community pharmacy professionals have potentially useful roles to play in a system level response to self-harm and suicide prevention and in the provision of mental health first-aid, they remain insufficiently engaged (Gorton et al., 2019; Witry et al., 2020). Having realised the critical roles of community pharmacy staff, some high-income countries – e.g., Canada, UK and USA – have implemented measures to motivate pharmacists to undertake training in self-harm and suicide prevention (Gorton, 2019; Graves et al., 2018; Mughal et al., 2021). Adopting and adapting a context-relevant approach to engage community pharmacy staff may prove useful for self-harm and suicide prevention in Ghana. Community pharmacy staff frequently interact with

patients seeking help of pharmacists directly and care for patients at risk of suicide; they often show supportive and empathic attitudes to people who die by suicide and are less likely to stigmatise patients presenting with self-harm. Specifically, community pharmacists' roles in self-harm and suicide prevention include gatekeeping medication supply, triage and referrals, assessing the validity of suicidal tendencies, and collaborating with others to offer support and continued care to persons experiencing self-harm and suicide crises (Murphy et al., 2018; Murphy et al., 2019).

The Government of Ghana – through the Ghana Food and Drugs Authority – should enforce fully the regulations and policies covering the sale and distribution of medicines in the country; in particular, restricting the sale of paracetamol (and other over-the-counter analgesics) to persons aged 18 years and above only. There is evidence to suggest that limiting the sale of paracetamol to adults aged 18 years or above contributes to significant reductions in the rates of intentional paracetamol overdose in children and other underage persons (Steege et al., 2020). Cracking down on untrained and unlicensed persons and outlets that distribute and sell medicines, particularly, in the streets, marketplaces and rural communities in Ghana would also be helpful.

The evidence that most street-connected adolescents access medicines on the black market is also to be expected, as it is common knowledge in Ghana that medicines are still sold by untrained and unauthorized dealers within markets and streets of cities and rural communities across the country (Bekoe et al., 2020). A common danger with this situation is that sometimes fake and expired medicines are sold to unsuspecting buyers. Another concern is the unrestricted access, distribution and availability of prescription medicines, particularly tramadol, in the black market. Recent evidence suggests that some young people in Ghana, especially, street-connected youth and other young unskilled manual workers having to do hard labour, ingest tramadol for its stimulating effects (Fuseini et al., 2019; Salm-Reifferscheidt, 2018). However, it appears some street-connected adolescents in the current study intentionally overdose on tramadol.

Sparse data was acute in the current secondary analysis, and that did not facilitate the exploration of reasons (whether planned or opportunistic) for the choice of medicines and the motives for self-harm, based on the choice of medicines used by the participants. For example, intentional overdose of sleeping pills could be informed by a suicidal motive (to die in their sleep), but other young people experiencing self-harm crises may also ingest an overdose of sleeping pills for a non-suicidal function, such as, to sleep in order to help forget about their problems for a while (Edmondson et al., 2016). This lack of clarity of motive also covers other prescription medicines identified in this study (e.g., tramadol). Future research could examine the motives for the medicine choices among these young populations, to inform targeted intervention and prevention efforts.

These initial exploratory findings are not aimed at providing representative descriptive evidence on self-poisoning with medicines among adolescents in Ghana. Rather, the findings lay the groundwork for future research on adolescent self-poisoning involving

the use of medicines, and the development of evidence-informed intervention and prevention strategies. In particular, future qualitative studies on adolescent self-poisoning exploring the first-hand accounts of young people would be potentially informative in mapping out the motives for the choice of specific medicines and details about access to medicines. Potentially, school-based and street-based functional mental health literacy and education programmes could benefit from the strands of evidence from such future studies to help young people who (may be at risk of) self-harm by intentional overdose of medicines. The general implication of the main findings of this study relates to the need to improve child and adolescent mental health care and treatment in Ghana, and a need to encourage help-seeking behaviour for emotional problems in young people.

A critical limitation of this secondary analysis must be noted. Besides the possibility of social desirability bias due to the criminalised, highly stigmatised and socially proscribed status of self-harm and suicidal behaviours in Ghana, the small sample size and acute sparse data made it impossible to apply robust statistical modelling techniques to the data, thereby limiting the generalisability of the findings.

## Conclusion

The key evidence of the current study points to a need to optimise adolescent mental health services, improve families' safe storage of medications and restrict distressed young peoples' access to medications at home; and the government needs to consider context-sensitive pack size reduction policies for paracetamol and other over-the-counter medications, enforcing laws banning the sale and distribution of medicines by untrained and unlicensed persons and outlets, and limiting the sale of medicines by community pharmacies to clients aged 18 years and above.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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