



Prevalence, risk factors, and comorbidities of psychotic experiences in Afghanistan: a highly stressful environment

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Abstract

Objectives To estimate the prevalence and demographic, psychiatric, and trauma-focused correlates of psychotic experiences (PEs) in the Afghan general population.

Methods Data were drawn from a cross-sectional household survey implemented in eight regions of Afghanistan ($N=4445$). The CIDI structured instrument was administered to adults to assess psychiatric disorders and psychotic experiences; life events and PTSD were assessed using validated instruments. Weighted multivariate models integrated socio-demographics, regions, traumas as determinants of PE.

Results PEs were frequently reported in the Afghan population: 27.50% of the population reported a lifetime PE. PEs were more common among specific ethnic groups, and were associated with lower income in adjusted regression models. PEs were associated with mental health problems including major depressive disorders (OR = 3.43), PTSD (OR = 5.08), generalized anxiety (OR = 4.2); lifetime suicidal attempts (OR 6.04), lifetime suicidal thoughts (OR = 3.42), addiction (OR = 2.18); and psychological distress and impairment due to mental health (OR = 2.95 and 2.46, respectively).

Conclusion Psychotic experiences in the Afghan general population confirm general population findings in other countries, that psychotic experiences are common and associated with economic and social marginalization, and part of a continuum of mental health problems experienced in populations. Efforts to reduce and treat psychotic experiences within a broad array of psychiatric conditions are needed.

Keywords Psychotic experiences · Trauma · Afghanistan · Suicidal behavior · Transcultural

Background

Psychotic experiences in general populations are common; a meta-analysis based on 61 studies in very diverse countries worldwide reported a median lifetime prevalence in general populations of 7.2% [1]. This prevalence is substantially

higher than the lifetime risk for psychotic disorders, such as schizophrenia, and these experiences encompass both hallucinatory experiences (HEs) and delusional experiences (DEs) that do not rise to the level of clinical thought disorder diagnoses [1]. However, most studies describing the prevalence of PEs have been collected in high-income countries [1], which may represent variations in prevalence and correlates compared to low-income and conflict-associated countries, among which the majority of the world's population reside.

To fit that gap, a large survey of 256,445 participants from nationally representative samples of 52 low-income countries worldwide was launched by the World Health Organization: overall prevalence for specific PEs ranged from 4.80% for delusions of control to 8.37% for delusions of reference and persecution [2]. Prevalence figures varied greatly across countries from 0.8 to 31.4%. All psychotic symptoms were associated with a significant decline in health status after controlling for potential confounders;

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there was a clear difference in health between subjects not reporting any symptom and those reporting at least one such symptom.

Another consortium, the World Mental Health Surveys, coordinated a set of community epidemiologic surveys of the prevalence and correlates of mental disorders in representative household samples from 18 countries across the world, and included 31,261 adults (18 years and older), from a low- to high-income level groups, who were queried regarding lifetime and 12-month prevalence and frequency of 6 types of PEs (2 hallucinatory experiences and 4 delusional experiences) slightly different from the precedent surveys [3]. Mean lifetime prevalence of ever having a PE was 5.8%, with HE (5.2%) more common than delusional experiences (DE, 1.3%). More than two-thirds (72.0%) of respondents with lifetime PEs reported experiencing only 1 type of the listed PE. PEs lifetime prevalence estimates were significantly higher among respondents in middle- and high-income countries than among those in low-income countries: 7.2%, 6.8%, and 3.2%, respectively. However, inter-country differences were wide, from 14.9% in urban Brazilian samples and 10.8% in the Netherlands, to 1% in Romania, 1.2% in Iraq, and 1.9% in Lebanon. PE were more frequent among women than among men (6.6% vs 5.0%), and those who were unmarried, unemployed, and with lower household income level [3]. DE were more likely to be reported than HE by younger respondents, and migrants reported lower HE than non-migrants. Religiosity, defined as attributing importance of religious beliefs in daily life, in making decisions, seeking comfort when experiencing problems or importance of religion when growing up, was found to be positively associated with PE [4] and did not differ across the variety of religious affiliations.

Moreover, the wide range of countries allowed examination of cause and consequences of PE, confirming that PEs are linked to poor health and psychiatric comorbidity. PEs have been found to be associated independent of comorbid mental disorders with the subsequent onset of a wide range of medical conditions (arthritis, back or neck pain, frequent or severe headache, other chronic pain, heart disease, high blood pressure, diabetes, and peptic ulcer). Further, three medical conditions (frequent or severe headache, other chronic pain, and asthma) were significantly associated with subsequent onset of PEs [5]. The large WMH surveys mentioned above, confirmed the association between psychotic symptoms and physical symptoms independently of mental disorder diagnosis [6].

Co-occurrence of PEs and common mental health conditions has been demonstrated in ethnically diverse population samples [7]. PEs have also been found to be associated with suicidal thoughts and behaviors (STB): respondents with one or more PEs had twofold increased odds of subsequent STBs after adjusting for antecedent or intervening mental

disorders. There were significant dose–response relationships of number of PEs types with subsequent STBs that persisted after adjustment for mental disorders [8].

Temporal associations between mental health disorders and PEs have been found to be more complex and bidirectional [9]: while temporally primary PEs are associated with an elevated risk of several subsequent mental disorders, with odd ratios ranging from 1.3 for major depressive disorders to 2.0 for bipolar disorder, most mental disorders are associated with an elevated risk of subsequent PE ranging from 1.5 for childhood separation anxiety to 2.8 for anorexia nervosa.

Associations between PEs and substance use/substance use disorders (SU/SUDs) have also been found to often be bidirectional, but not all types of SU/SUDs are associated with PEs [10]. Those with prior alcohol use disorders, extra-medical prescription drug use, alcohol use, and tobacco use had increased odds of subsequent first onset of PEs. In contrast, those with temporally prior PEs had increased odds of subsequent onset of tobacco use, alcohol use, or cannabis use as well as of all substance use disorders. There was a dose–response relationship between both count and frequency of PEs and increased subsequent odds of selected SU/SUDs.

Ultimately, PEs have been found to be associated with disability measures in a dose–response relationship regardless of the presence of comorbid mental or general medical disorders [11]. Respondents with PEs were more likely to have top quartile scores on global disability than respondents without PEs: 19.1% vs. 7.5% as well as greater likelihood of cognitive, social, and role impairment. The association between PEs and aspects of health-related quality of life as measured by Health-related quality of life (HRQoL), a self-rated physical or mental health, was also investigated [12], with those with a history of PEs at increased odds of poor perceived mental and physical health after adjustment for the presence of any mental or general medical conditions.

In addition, the WMH surveys allowed the study of trans-nationally trauma and PEs. In assessing 29 traumatic experiences, respondents with any traumatic event had three times the odds of subsequent developing PEs, with variability in strength of association across traumatic event types. This association persisted after adjustment for mental disorders including PTSD [13]. The role of trauma in the risk of PEs has also been observed in the police victims in the USA [14].

Since the Afghan population has been subjected to significant trauma [15], as 48.76% of the population reported four or more events including witnessing war and conflict-related violence, it is then important to evaluate the presence and frequency of such PEs and their associations with physical and mental disorders in that context, given the heightened exposure to risk factors.

Therefore, we utilized a large nationally representative survey of the general population of Afghanistan to

evaluate (1) the detailed prevalence of PEs by type (HEs and DEs) and their respective frequency; (2) their main socio-demographic association including ethnic subgroups and locations/regions; (3) their associations with psychiatric disorders including major depressive episode, generalized anxiety, PTSD, addictions, and suicidal behaviors; (4) their relative associations with types of trauma; and (5) their associations with demographics, ethnicities, and income.

Methodology

Population

Data were drawn from a representative sample of the Afghan general population collected in 2017–2018. The methodology has been described previously [16] in a first paper on commune mental health disorders and trauma. A cross-sectional household survey was implemented in each of the eight regions of Afghanistan: (1) Eastern; (2) South-eastern; (3) Southern; (4) Western; (5) North-western; (6) North-eastern; (7) Central Kabul; and (8) Central Bamiyan; a multi-stage stratified cluster sampling method was applied. Households were randomly selected in each cluster and in each household an adult, that is a person 15 years or older, was randomly selected reaching a total of 4336 persons (Fig. 1).

A consent form was read aloud before completion allowing to exclude refusals. Participation rate was on average 90% for households plus 90% for selected individuals, for an 81% final individual response rate. Since the final sample slightly differs from the total expected Afghan population age composition, weights were calculated to redress the

sample. The number of individuals completed questionnaires was 4445 (4433 weighted).

As described in a previous publication [15] 52.62% of the sample completed no formal education and did not have any reading skills, 53.5% of the sample declared no income, (84.61% of women and 22.62% of men). Income was linked to the type of employment: those in agriculture, farming, or as laborer earned an average of 7200 AFS (100\$) per month; whereas, those in business earned 12,982 AFS (200\$). Female disadvantage persisted for the few who had an income: 42% in the lowest-income category versus 16% of men. 73.10% of the sample lived in rural areas; urban people belonged to higher income groups than rural people. Of the total weighted sample, 27.55% were Tajik, 47.82% were Pashtu, 11.4% Hazara, 6.58% Uzbek, and 6.65% another ethnicity. As expected, ethnicities differed across regions. The population of Afghanistan was highly exposed to traumatic events: 64.67% had personally experienced at least one traumatic event with or without witnessing somebody else’s trauma and 86.16% of the subjects had either personally experienced or witnessed at least one traumatic event in their life [15].

Instruments

Socio-demographic information was included in the adult individual questionnaire: such as gender, age, educational level, marital status, type of income, and ethnicity.

Two of the mental health subscales of the Short Form Health Survey (SF36) were used: MH5 which measures psychological distress and RE (Role Emotional) for impairment due to mental health problems [17] applying the recommended threshold [18].

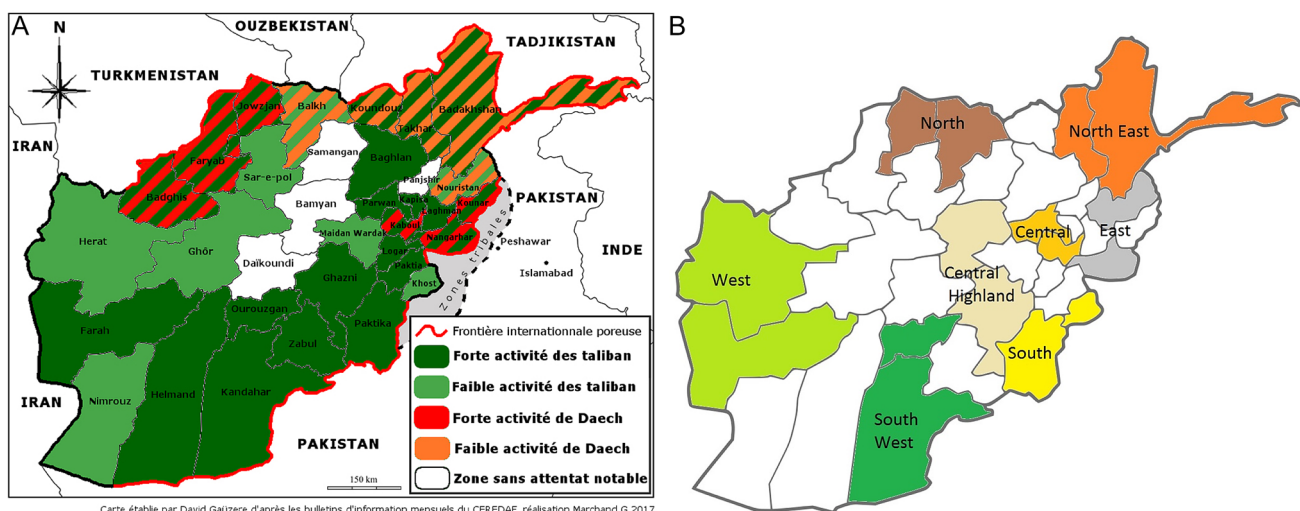


Fig. 1 **A** Levels of danger by province based upon Taliban and Daech terrorist activities in 2017 as recorded by the French NGO CEREDAF (“fort” = high, “faible” = low). **B** Map of Afghanistan showing the regions that were selected

The Life Event Checklist five (LEC-5) [19] was used together with the PTSD Checklist for DSM-5 [20, 21], which was used to reconstitute PTSD diagnostic. For comparison purposes, we clustered the prevalence of LEC-5 events as proposed by the WMH surveys into categories obtained by factor analysis [22].

The CIDI Short Form (CIDI SF) [21, 23, 24] allowed to evaluate major depressive episodes, with the addition of the Sheehan disability scales. The suicidal behavior CIDI questions were also included.

The CIDI psychosis module was part of the CIDI [25], a validated fully structured interview, allowing for inter countries comparisons [3], checked for 6 PE types: 2 related to HEs (visual and auditory hallucinations) and 4 related to DEs (2 bizarre delusional items [thought insertion and/or withdrawal and mind control and/or passivity] and 2 paranoid delusional items [ideas of reference and plot to harm and/or follow]). This question was followed by a probe question to determine whether the reported PEs ever occurred when the person was not “dreaming or half-asleep or under the influence of alcohol or drugs.” Only responses of the latter type are considered herein. Respondents who reported PEs were then asked about the presence of the PEs in the past 12 months and the frequency and/or occurrences of the PEs in their lifetime.

A five-day training was organized on the different survey methodological aspects: sampling method and questionnaire content. Each field’s team consisted of one male and one female to comply with local atmosphere. Interviews were given in Dari or Pashto following the individual aptitude declaration. Due to the high illiteracy level, questionnaires were read aloud to participants.

Ethics approval and consent to participate

The project was approved by the Afghanistan Institutional Review Board, National Public Health Institute, Ministry of Public health the 12/31/2016: IRB n° 3355421;

Informed consent was provided by all the participants in the study. All methods were performed in accordance with the relevant guidelines and regulations.

Statistics

Analyses were done with STATA 15.1. Tables are presented weighted on gender and age compositions, and logistic regressions allow evaluation of the main risk factors. Different models are presented: first a model with socio-demographic and geographical determinants on lifetime PE: any PE and the two categories: HE and DE; then the associations with PE, types and number with the main mental health disorders are presented by OR as well as the associations with the diverse traumas; the last models integrate the type of

trauma together with socio-demographic and geographical determinants without and with control of the role of mental health problems: PTSD and any mental health problem.

Results

PEs were frequent in the Afghan population: 27.50% of the population reported a PE in his or her life; women more frequent than men: 30.36% versus 24.76% ($p=0.0002$). 15.37% reported a PE in the last twelve months. The prevalence of seeing a vision was approximately like hearing voices: 20.97% vs 20.13%, and both were more frequent for women than men. Delusions were less frequently reported (15.15%) and mainly driven by “believing that there was an unjust plot going on to harm you or to have people follow you that your family and friends did not believe existed,” present in 12.88% of the sample: 11.53% reported three or more types of PEs and only 8.82% declared only one type; women had more types than men ($p=0.0005$) (Table 1).

Among those with a PE, 13.29% stated that it only happened once, the majority reporting PEs two–five times, and 1.36% reported > 100 times. Frequency was higher among those with three and more types of PE. Some of the DEs questions were reported at a very high frequency (> 100 times) by close to 3% of the respondents (Table 2).

In bivariate analyses, there was no significant difference for lifetime PEs across age categories. Education level was not significantly associated with lifetime PEs, but source of income was: people without source of income have the highest prevalence: 30.91% followed by those in agricultural sectors 24.75%, salaried or in business activities have the lowest prevalence: 22.08% ($p<0.00001$). This was consistent with the income categories: there was an inverse gradient from 30.91% for those without income (mainly women) to those in the highest category (> 10000 Afs): 22.57% (mainly men) ($p=0.0003$). Marital status was not associated with PEs. Ethnic status was also associated: the highest prevalence was found among Uzbek 30.97%, then Hazara 28.18%, Pashtun 28.15%, Tadjik 27.82%, and “other ethnicities” were the lowest: 18.36% ($p=0.0398$). These ethnic differences were paralleled by important regional differences ranging from West 50.55% to North 11.79% ($p<0.00001$); each, except South, was significantly different from Kabul/Central region.

Of the 867 persons who reported the date of onset of their first PEs: 32.53% stated they were children and 67.47% adults. For 22.72%, the PEs preceded the trauma; whereas for the remaining subjects, they followed. For the 534 subjects in that situation, the mean time span was 8.52 years (CI 95% 7.68–9.36).

In a multivariable logistic regression on any PEs, gender differences were not significant, and income source remained significantly associated: to have any source of

Table 1 PE description

| | Male (%) | Female (%) | Average (%) | 95% CI (%) | | P M/F |
|--|--------------|--------------|--------------|------------|-------|--------|
| Seeing a vision | 18.72 | 23.25 | 20.97 | 19.71 | 22.28 | 0.0006 |
| Hearing voices | 16.77 | 23.52 | 20.13 | 18.91 | 21.41 | 0.0000 |
| Any hallucination | 23.56 | 27.98 | 25.75 | 24.39 | 27.16 | 0.0019 |
| Mysterious force was inserting many different strange thoughts | 8.12 | 8.55 | 8.34 | 7.50 | 9.26 | 0.6307 |
| Your mind had been taken over by strange forces | 5.58 | 6.04 | 5.81 | 5.11 | 6.59 | 0.5437 |
| Some strange force was trying to communicate | 4.21 | 5.57 | 4.89 | 4.27 | 5.61 | 0.0517 |
| Unjust plot going on to harm you | 12.13 | 13.64 | 12.88 | 11.84 | 14.00 | 0.1719 |
| Any delusion | 15.15 | 17.22 | 16.19 | 15.02 | 17.45 | 0.0970 |
| Any psychotic experience | 24.76 | 30.36 | 27.50 | 26.13 | 29.07 | 0.0002 |
| Any psychotic experience last 12 months | 15.37 | 16.63 | 15.99 | 14.83 | 17.23 | 0.3048 |
| Number of PE types | | | | | | |
| 1 | 9.07 | 8.56 | 8.82 | 7.95 | 9.77 | 0.0005 |
| 2 | 7.07 | 10.29 | 8.67 | 7.84 | 9.59 | |
| ≥ 3 | 10.60 | 12.48 | 11.53 | 10.57 | 12.57 | |

Bold means statistically significant $p \leq 0.05$

Table 2 Frequency and different type of lifetime PE among those who had at least on PE

| | N (no W)* | Frequency | | | | | P |
|--|-----------|--------------|--------------|--------------|--------------|-------------|--------|
| | | 1 (%) | 2–5 (%) | 6–10 (%) | 11–100 (%) | > 100 | |
| Seeing a vision | 934 | 11.40 | 44.35 | 20.77 | 22.42 | 1.06 | 0.0005 |
| Hearing voices | 926 | 12.47 | 46.85 | 18.67 | 20.29 | 1.71 | 0.0599 |
| Any hallucination | 1138 | 12.40 | 44.86 | 20.73 | 20.72 | 1.29 | 0.003 |
| Mysterious force was inserting many different strange thoughts | 365 | 9.36 | 45.86 | 19.92 | 22.25 | | 0.0095 |
| Your mind had been taken over by strange forces | 257 | 11.37 | 41.74 | 17.29 | 26.63 | 2.98 | 0.0097 |
| Some strange force was trying to communicate | 224 | 7.07 | 42.99 | 16.52 | 30.23 | 3.19 | 0.0003 |
| Unjust plot going on to harm you | 542 | 10.66 | 49.33 | 20.30 | 18.22 | 1.49 | 0.139 |
| Any delusion | 651 | 12.49 | 49.58 | 19.52 | 17.06 | 1.36 | 0.0536 |
| Any psychotic experience | 1122 | 13.29 | 45.71 | 19.92 | 19.96 | 1.12 | |
| Number of type | | | | | | | 0.0094 |
| 1 | 378 | 19.70 | 38.45 | 22.51 | 18.45 | 0.89 | |
| 2 | 403 | 13.21 | 50.31 | 17.39 | 19.09 | 0.00 | |
| 3 | 552 | 9.80 | 47.53 | 20.60 | 19.96 | 2.10 | |

Bold means statistically significant $p \leq 0.05$

*Numbers are provided not weighted; in addition around 100 questions on frequency were not exploitable each line corresponded to a total of 850 weighted

income either agricultural, salaried, or business linked was protective, respectively: OR = 0.72 (0.56–0.91), OR = 0.68 (0.52–0.89); to reside in a rural place versus urban increased the risk OR = 1.26 (1.02–1.56); ethnic status remained important: compared to Tadjik, Pashtun had higher rates OR 1.32 (1.01–1.71), as did Uzbek 1.48 (1.03–2.12). Region as an independent effect as compared to Kabul/central East had lower rate: OR = 0.42 (0.28–0.63), as did the North region OR = 0.41

(0.28–0.60); West has much higher rate OR = 3.09 (2.26–4.24) followed by Central High Land OR 1.64 (1.12–2.41).

These differences slightly changed once hallucinations and delusions were separately analyzed: Hazara had lower rates than Tadjik for hallucinations: OR = 0.61 (0.42–0.89); the oldest age category had more such PEs: OR = 1.33 (1.01–1.76) than younger categories; the other factors remained unchanged. Associations were much less present

for delusions as rural residence and regions were the only significantly related factors (Table 3).

The presence of PEs was associated with most mental health problems including major depressive disorders: OR = 3.43 (2.51–4.69), PTSD: OR = 5.08 (3.79–6.80), generalized anxiety OR = 4.2 (2.77–6.39); Also, lifetime suicidal attempts OR = 6.04 (4.08–8.93), and lifetime thoughts: OR = 3.42 (2.65–4.40), addiction OR = 2.18 (1.74–2.73); same for actual psychological distress and impairment due to mental health OR = 2.95 (2.52–3.46) and 2.46 (2.11–2.85), respectively. These associations applied to hallucinations as well as to delusions and the same associations were found with 12-month PEs (Table 4).

Each of the reported trauma and their number had a highly significant association with PE outcomes. ORs showed a gradient as compared to no such event from 1.28 for one event, 1.89 for two, 2.48 for three, 3.10 for four, and 4.88 for five or more events. A regression allows to

test a linear effect: each unit of event has a positive coefficient 0.63 (0.54–0.71) on PE (Table 5).

We estimated three logistic regression models taking in account the demographics together with the different categories of trauma: one on any PEs, one controlling for PTSD, and one controlling for any MH problems.

In the first model, women had higher risk: OR = 1.29 (1.03–1.61) compared to men; Uzbek had higher frequency than Tajik: OR = 1.57(1.08–2.29), persons living in rural areas more than those in urban areas: OR = 1.27 (1.02–1.58), those having an income from any activity type less than those without any income linked activity: agricultural OR = 0.71 (0.55–0.91), salaried, or business OR = 0.68 (0.51–0.89)); any type of trauma except accidental trauma or injury has higher rates of PE, with the highest rates for exposure to sexual violence OR = 1.97 (1.36–2.85) and interpersonal violence: OR = 1.91 (1.59–2.30), followed by “cause or witness serious harm

Table 3 Lifetime PE demographics association (OR regression; AOR logistic regression)

| | Any PE | | | | Hallucinations | | | | Delusions | | | |
|-----------------------------------|-------------|-----------|-------------|-----------|----------------|------------------|-------------|------------------|-----------|--------|--|--|
| | OR | 95% CI | AOR | 95% CI | AOR | 95% CI | AOR | 95% CI | AOR | 95% CI | | |
| Gender F/M | 1.32 | 1.14 1.54 | 1.01 | 0.81 1.25 | 1.03 | 0.83 1.27 | 0.91 | 0.70 1.19 | | | | |
| Ethnicity ref Tajik | | | | | | | | | | | | |
| Pashtun | 1.02 | 0.85 1.21 | 1.32 | 1.01 1.71 | 1.18 | 0.92 1.51 | 1.00 | 0.74 1.36 | | | | |
| Hazara | 1.02 | 0.79 1.32 | 0.82 | 0.56 1.18 | 0.61 | 0.42 0.89 | 1.09 | 0.71 1.67 | | | | |
| Uzbek | 1.16 | 0.86 1.58 | 1.48 | 1.03 2.12 | 1.21 | 0.86 1.72 | <i>1.58</i> | <i>0.99 2.54</i> | | | | |
| Other | 0.58 | 0.40 0.86 | 0.91 | 0.59 1.40 | 0.85 | 0.56 1.28 | 1.08 | 0.64 1.83 | | | | |
| Education ref none | | | | | | | | | | | | |
| Prim or second | 0.89 | 0.71 1.12 | 0.89 | 0.69 1.16 | 0.87 | 0.67 1.12 | 0.99 | 0.73 1.33 | | | | |
| High or univ | 0.82 | 0.68 0.98 | 0.98 | 0.77 1.23 | 0.94 | 0.75 1.19 | 0.94 | 0.71 1.25 | | | | |
| Age ref 15–24 years | | | | | | | | | | | | |
| 25–34 | 0.92 | 0.75 1.13 | 1.00 | 0.76 1.30 | 1.08 | 0.83 1.40 | 0.96 | 0.70 1.32 | | | | |
| 35–44 | 1.04 | 0.85 1.27 | 1.18 | 0.89 1.57 | 1.28 | 0.97 1.70 | 1.08 | 0.77 1.52 | | | | |
| 45–95 | 0.95 | 0.78 1.15 | 1.10 | 0.83 1.47 | 1.33 | 1.01 1.76 | 1.11 | 0.79 1.55 | | | | |
| Income type ref None | | | | | | | | | | | | |
| Agricultural | 0.74 | 0.62 0.88 | 0.72 | 0.56 0.91 | 0.80 | 0.63 1.01 | 0.78 | 0.58 1.04 | | | | |
| Salaried business | 0.63 | 0.51 0.79 | 0.68 | 0.52 0.89 | 0.69 | 0.53 0.90 | 0.81 | 0.59 1.13 | | | | |
| Rural/Urban ref | 1.33 | 1.12 1.58 | 1.26 | 1.02 1.56 | 1.32 | 1.06 1.64 | 1.52 | 1.16 1.99 | | | | |
| Marital statute ref Never Married | | | | | | | | | | | | |
| Married | 0.99 | 0.83 1.19 | 1.01 | 0.77 1.34 | 0.95 | 0.72 1.25 | 0.99 | 0.72 1.37 | | | | |
| Div Sepa Widowed | 1.41 | 0.97 2.04 | 1.28 | 0.80 2.04 | 1.05 | 0.67 1.66 | 1.48 | 0.87 2.52 | | | | |
| Region ref Kabul | | | | | | | | | | | | |
| South | 1.21 | 0.89 1.66 | 0.88 | 0.61 1.28 | 0.91 | 0.64 1.31 | 1.01 | 0.65 1.57 | | | | |
| East | 0.56 | 0.39 0.79 | 0.42 | 0.28 0.63 | 0.43 | 0.29 0.64 | 0.48 | 0.29 0.80 | | | | |
| South West | 1.40 | 1.04 1.88 | 1.02 | 0.73 1.43 | 1.08 | 0.77 1.50 | 1.00 | 0.66 1.51 | | | | |
| West | 3.43 | 2.56 4.61 | 3.09 | 2.26 4.24 | 2.81 | 2.06 3.82 | 3.54 | 2.46 5.10 | | | | |
| North | 0.45 | 0.32 0.64 | 0.41 | 0.28 0.60 | 0.52 | 0.36 0.75 | 0.30 | 0.18 0.50 | | | | |
| Central High Land | 1.61 | 1.19 2.18 | 1.64 | 1.12 2.41 | 1.84 | 1.27 2.68 | 1.30 | 0.80 2.09 | | | | |
| North East | 1.59 | 1.18 2.14 | 1.32 | 0.90 1.94 | 1.54 | 1.06 2.3 | 0.81 | 0.50 1.32 | | | | |

Bold means statistically significant $p \leq 0.05$

Table 4 Risk for having the disorder for those who have lifetime psychotic experiences

| MH disorder | Any PE | | | ≥ 3 types | | | Hallucinations | | | Delusions | | | 12 month PE | | |
|--------------------------------|-------------|--------|-------|--------------|--------|-------|----------------|--------|-------|-------------|--------|-------|-------------------------|-------------------|--------------------|
| | OR | 95% CI | | OR | 95% CI | | OR | 95% CI | | OR | 95% CI | | OR | 95% CI | |
| Major depressive episode | 3.43 | 2.51 | 4.69 | 5.58 | 3.97 | 7.84 | 3.46 | 2.57 | 4.66 | 3.68 | 2.66 | 5.09 | 4.90 | 3.59 | 6.69 |
| Mania | 7.26 | 2.75 | 19.18 | 14.86 | 5.79 | 38.19 | 6.55 | 2.76 | 15.55 | 8.94 | 3.73 | 21.42 | 18.26 | 7.31 | 45.61 |
| PTSD | 5.08 | 3.79 | 6.80 | 6.60 | 4.79 | 9.10 | 4.55 | 3.09 | 6.71 | 4.86 | 3.21 | 7.36 | 4.54 | 3.40 | 6.06 |
| Generalized anxiety | 4.20 | 2.77 | 6.39 | 7.61 | 4.99 | 11.62 | 5.46 | 4.13 | 7.20 | 3.73 | 2.77 | 5.04 | 5.94 | 4.02 | 8.77 |
| Any addiction | 2.18 | 1.74 | 2.73 | 4.12 | 3.21 | 5.29 | 2.51 | 2.04 | 3.10 | 2.63 | 2.05 | 3.37 | 3.47 | 2.75 | 4.38 |
| Any addiction except sedatives | 3.02 | 2.17 | 4.23 | 5.25 | 3.71 | 7.44 | 3.38 | 2.49 | 4.59 | 3.22 | 2.27 | 4.56 | 4.09 | 2.97 | 5.65 |
| Suicidal attempts LT | 6.04 | 4.08 | 8.93 | 10.44 | 6.92 | 15.76 | 6.00 | 4.17 | 8.63 | 6.12 | 4.24 | 8.83 | | | |
| Suicidal thoughts LT | 3.42 | 2.65 | 4.40 | 5.25 | 3.99 | 6.92 | 3.42 | 2.70 | 4.34 | 4.02 | 3.10 | 5.22 | 8.48^a | 5.35 ^a | 13.44 ^a |
| Psychological distress | 2.95 | 2.52 | 3.46 | 5.16 | 4.04 | 6.59 | 3.14 | 2.68 | 3.67 | 3.51 | 2.86 | 4.30 | 2.62 | 2.16 | 3.18 |
| Impairment on role for MH (RE) | 2.46 | 2.11 | 2.85 | | 3.74 | 5.81 | 2.51 | 2.17 | 2.91 | 3.39 | 2.80 | 4.09 | 2.94 | 2.44 | 3.54 |

Bold means statistically significant $p \leq 0.05$

^a12-month suicidal thoughts

Table 5 Lifetime PE and trauma type

| | % no PE | % PE | Total (%) | OR | P | CI 95% | |
|--|---------|-------|-----------|-------------|----------|--------|------|
| Natural disaster (for example, flood, earthquake) | 37.25 | 46.62 | 39.83 | 1.47 | <0.00001 | 1.27 | 1.71 |
| Fire or explosion | 7.97 | 17.62 | 10.63 | 2.47 | <0.00001 | 1.99 | 3.06 |
| Transportation accident (for example, car accident, plane crash) | 10.88 | 20.12 | 13.43 | 2.06 | <0.00001 | 1.68 | 2.53 |
| Serious accident at work, home, or during any activity | 5.77 | 8.73 | 6.59 | 1.56 | 0.002 | 1.17 | 2.08 |
| Exposure to toxic substance (for example, mercury, benzene) | 1.41 | 3.97 | 2.12 | 2.90 | <0.00001 | 1.82 | 4.60 |
| Physical assault (for example, being attacked, hit, slapped, kicked, beaten up) self | 19.25 | 39.68 | 24.85 | 2.76 | <0.00001 | 2.34 | 3.25 |
| Physical assault (for example, being attacked, hit, slapped, kicked, beaten up) witness | 28.76 | 45.98 | 33.48 | 2.11 | <0.00001 | 1.81 | 2.46 |
| Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb) | 3.89 | 8.58 | 5.19 | 2.32 | <0.00001 | 1.70 | 3.15 |
| Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm) | 0.34 | 1.22 | 0.58 | 3.60 | 0.002 | 1.63 | 7.93 |
| Other unwanted or uncomfortable sexual experience (for example, doing sex during ministrations, doing sex without your permission with your partner) | 0.92 | 2.68 | 1.40 | 2.98 | <0.00001 | 1.83 | 4.85 |
| Combat or exposure to a war-zone (in the military or as a civilian) | 14.22 | 21.29 | 16.17 | 1.63 | <0.00001 | 1.35 | 1.97 |
| Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war) | 4.52 | 7.54 | 5.36 | 1.72 | <0.00001 | 1.28 | 2.31 |
| Life-threatening illness or injury self | 4.34 | 6.76 | 5.01 | 1.60 | 0.004 | 1.17 | 2.19 |
| Life-threatening illness or injury witness | 11.61 | 18.22 | 13.44 | 1.70 | <0.00001 | 1.38 | 2.09 |
| Sudden violent death (for example, homicide, suicide) | 10.16 | 17.09 | 12.07 | 1.82 | <0.00001 | 1.48 | 2.25 |
| Sudden accidental death | 15.23 | 21.04 | 16.83 | 1.48 | <0.00001 | 1.23 | 1.79 |
| Serious injury, harm, or death you caused to someone else | 0.72 | 1.93 | 1.06 | 2.70 | 0.005 | 1.36 | 5.37 |

Bold means statistically significant $p \leq 0.05$

or injury”: OR = 1.43 (1.13–1.82) and collective violence: OR = 1.32 (1.08–1.61).

Once controlled for PTSD, highly associated with PEs: OR = 4.00 (2.77–5.78), the gender difference diminished as well as the effect on living in a rural area. Effects of the various categories of trauma remained identical except the category cause or witness serious harm which slightly declined. Controlling for any mental health problem has

the same effect except for decreasing the role of this last trauma category.

The same models were estimated for hallucinations and delusions separately; the main differences concerned hallucinations which were increased in the age category of 45 years and older: OR = 1.29 (1.04–1.60), and the difference by ethnic status is also considerable: Hazara had a lower frequency: OR = 0.65 (0.44–0.94), whereas Uzbek was

not statistically significantly different from Tadjik. The findings were consistent once controlling for PTSD; in addition, hallucinations remained more frequent in women: OR = 1.27 (1.02–1.59) and in rural population: OR = 1.33 (1.07–1.67). Controlling for any mental health disorders had identical effects (Table 6).

Discussion

In the general population of Afghanistan, the lifetime and 12-month prevalence of PEs were frequent, especially when compared to other countries [3]. In the WMH surveys, the highest rate was observed in the Brazilian urban sample: 14.9% lifetime (5.6% 12 months) followed by the Netherlands 10.8% lifetime (3% 12 months) which are far below the Afghan rate of 27.50% lifetime, 15.99% 12 months. The WHO data [2], which contained more low-income countries, showed only one higher rate: 32.03% for hallucinations in Nepal, higher than Afghanistan but was considered as an outlier in that sample; all remaining countries were, by far, much lower.

Such large differences are hard to interpret, as culture shapes the meaning and expression of PEs [26]. A review on the relationships between culture and hallucinations [26],

demonstrated how culture affected what was identified as a hallucination, how hallucinations could be culturally determined and interpreted, and moreover whether hallucinations were perceived as negative or positive. Non-Western societies may have higher hallucinations rates than Western as they may make fewer rigid distinctions between observable reality and unobservable experiences. In addition, some cultures may condition people to experience hallucinations, with or without substances or other techniques. Consequently, the ability of people to report hallucinations should not be interpreted as a proxy to psychoses, and indeed the prevalence of psychoses is much lower than the PEs [26].

Survey results from Nepal and in Brazil suggested higher rates of reporting feeling of plots against them, a rate much higher than we observed in the Afghanistan sample. The Afghan frequency for hallucinations was very high but inversely proportional to the rate for delusions, which was close to what had been found in quite a few developing countries. Curiously, the Afghan rates of hallucinations were far more elevated than in Pakistan which were expected to be close given their proximity.

In addition, Afghan persons had a very high number of PEs symptoms: 11.53% have three or more PEs symptoms, which is like Nepal, India, Brazil, and some African countries in the WHO set of developing countries. In contrast, the

Table 6 3 models of logistic regression (AOR) for PE demographics and trauma

| N = 3809 | Any LT PE | | | Controlled for PTSD | | | Controlled for any MHPB | | |
|-------------------------------|-------------|-------------|-------------|---------------------|------|------|-------------------------|------|------|
| | | | | | | | | | |
| Gender F/M | 1.29 | 1.03 | 1.61 | 1.22 | 0.98 | 1.53 | 1.17 | 0.93 | 1.48 |
| Age ref 15–24 years | | | | | | | | | |
| 25–34 | 0.97 | 0.78 | 1.22 | 0.94 | 0.75 | 1.18 | 0.90 | 0.71 | 1.13 |
| 35–44 | 1.12 | 0.89 | 1.41 | 1.06 | 0.84 | 1.34 | 1.03 | 0.81 | 1.31 |
| 45–95 | 1.08 | 0.87 | 1.35 | 1.04 | 0.83 | 1.30 | 1.01 | 0.80 | 1.27 |
| Ethnicity ref Tadjik | | | | | | | | | |
| Pashtun | 1.24 | 0.95 | 1.63 | 1.24 | 0.94 | 1.62 | 1.20 | 0.91 | 1.58 |
| Hazara | 0.87 | 0.60 | 1.26 | 0.89 | 0.61 | 1.30 | 0.89 | 0.60 | 1.30 |
| Uzbek | 1.57 | 1.08 | 2.29 | 1.53 | 1.05 | 2.23 | 1.56 | 1.06 | 2.29 |
| Other | 1.03 | 0.66 | 1.60 | 1.03 | 0.67 | 1.60 | 0.96 | 0.61 | 1.49 |
| Residence: Rural/Urban | 1.27 | 1.02 | 1.58 | 1.25 | 1.00 | 1.56 | 1.25 | 1.00 | 1.57 |
| Income type ref None | | | | | | | | | |
| Agricultural | 0.71 | 0.55 | 0.91 | 0.71 | 0.55 | 0.92 | 0.70 | 0.54 | 0.91 |
| Salaried business | 0.68 | 0.51 | 0.89 | 0.70 | 0.53 | 0.92 | 0.66 | 0.50 | 0.88 |
| Type of trauma present/absent | | | | | | | | | |
| Collective violence | 1.32 | 1.08 | 1.61 | 1.27 | 1.04 | 1.56 | 1.26 | 1.02 | 1.55 |
| Cause or witness harm | 1.43 | 1.13 | 1.82 | 1.25 | 0.98 | 1.59 | 1.29 | 1.01 | 1.64 |
| Interpersonal violence | 1.91 | 1.59 | 2.30 | 1.91 | 1.58 | 2.30 | 1.88 | 1.55 | 2.27 |
| Sex violence | 1.97 | 1.36 | 2.85 | 1.80 | 1.24 | 2.62 | 1.75 | 1.20 | 2.56 |
| Accident Injury | 1.18 | 0.94 | 1.49 | 1.15 | 0.92 | 1.45 | 1.11 | 0.88 | 1.41 |

Bold means statistically significant $p \leq 0.05$

Controlled for region

number of PE symptoms was much higher than the WMH set of countries which was mainly composed of developed countries: on average 0.4% only had three symptoms or more.

In WMH surveys as in WHO studies, PEs were very different across countries as we found here across regions, which corresponded at different ethnicities. Indeed, the cultural effect is quite important: in bivariate analysis, the ethnic group “other” than the main ethnic groups had lower risk but once controlled for main socio-demographics, differences appeared. As compared to Tadjik, Pashtun and Uzbek had higher rates of PE; this had to be nuanced by the lower OR of Hazara for hallucination PE type. This may be due to lower religiosity in this ethnic group as religiosity has been associated with PEs [4]. Hazara are different in terms of religion and mostly belong to Shia Islam, while other Afghan ethnic groups are mostly Sunni, more religious, and conservative. Such differences may be explained by data from patient samples; for example, a comparison of the content of hallucinations of patients from Saudi Arabia versus UK had showed more religious content in the Saudi patients [27].

Despite the fact that most PEs should not be considered as pathological and labeled as psychoses [28], comorbidity of PEs with other mental health disorders was very high, was also related to any other PEs, and to higher number of types of PEs. This replicated what was reported by pooling the different WMH surveys [9]. We were unable to date the respective occurrence of the PEs and the mental health disorders as they did, but at least we could document their co-occurrence in a twelve-month period. PEs were very much associated with suicidal thoughts and behaviors, as WMH countries have reported [8]. Noteworthy the association of PE and last year suicidal thoughts was very high, in coherence with the reported increased risk of suicidal ideation, suicide attempts, and suicide death for people reporting psychotic experiences [29]. This recent review found these associations so strong that they consider psychotic experiences as clinical markers of risk for future suicidal behavior.

We found, like WMH surveys, that PEs were associated with addictions (tobacco, sedatives, cannabis, opioids, narcotics), despite a quasi-absence of alcohol addiction [10].

We also replicated the impairment caused by PEs, both for any PE as well as number of PEs [11]. As previously found, the association of PE lifetime and 12-month impairment in roles persisted once we controlled for demographics and after controlling for the presence of any MH disorders.

The role of traumas was also very important in the Afghan population, and as in the WMH studies [13], each trauma carried a risk for PEs. Associations between traumatic experiences and PEs persisted after controlling for PTSD or for any mental health problem. This applied to each type of event except the accident/injuries category for

which we did not find significant OR, once controlled for demographics, PTSD and any MHPB, contrary to other studies. The prevalence of such events was identical in WMH countries and in our sample, the differences could be due to the relative importance given to such events in countries where they are the main disruptive event as compared to what happens in a country with war where many other violent events are occurring. We also found a sort of gradient of number of events on PEs in accordance with the number of events carrying PTSD risk as found by Karam in the WMH set of surveys [30].

Limits

The first limit is certainly the cross-sectional design which allow to present associations, ignoring their relative order over time and restricting any causality. Another limit are the psychotic experience questions, despite a large transcultural usage of these questions, their translations into the main two languages (Pashtu and Dari), and their understanding by the population could be questioned. Despite back translation and training of the interviewers, they may be some misunderstanding, specially, in the context of war where everybody may easily be suspicious, inflating prevalence, but the scale has been used in similar context in WMH surveys including Iraq [3] as in the WHO low-income countries study [2]. In addition, although the consumption of drugs was explicitly mentioned as excluding a positive answer, this specification may not have been fully understood and followed again inflating prevalence; however, a previous paper addictions rate was not so high [31]. Representativity does not seem too much an issue since the participation rate was quite high but could not be entirely ruled out.

Conclusions

This study adds to the corpus of knowledge on relationships between traumatic events, their nature and numbers, and psychotic experiences. In a population highly exposed to trauma, such as the Afghan population, it documents that PEs are very much associated with any mental health problems. It also documents the role of social factors such as lack of income, often present in Afghan women, and the role of the culture appurtenance, as Afghanistan is a multicultural country. This brings elements for a better knowledge of PEs nature and their relationships with traumas, mental health disorders, and culture. Given that the population of Afghanistan continues to be exposed to conflicts, the findings presented here have central implications for the health of the Afghan population.

Our results support the notion that PEs can manifest outside the clinical range (i.e., in the absence of a clinical

psychotic disorder), but confirm their close associations with negative mental health indicating a high level of suffering in the Afghan population. This message should help local primary care workers and mental health specialists in their way to consider such symptoms and the need to investigate associated mental health problems without considering these patients as psychotic. This could be important in a context where efforts to organize access to care for mental health problems all around the country were implemented with a lot of difficulties and some results [32], which may be reversed now with the change in the political situation.

Author contributions VK-M designed the study, analyzed the results, and prepared the draft AS co-designed the study and collected the data KK participated to the analyses and to the draft EK participated to the draft and analyses All authors reviewed the manuscript.

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Availability of data and materials Authors elected to not share data.

Declarations

Conflict of interest The authors declared to have no conflicts of interest.

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