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FEATURES OF ISOLATED SLEEP PARALYSIS AMONG NIGERIANS

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ABSTRACT

Background: There is paucity of studies on isolated sleep paralysis (ISP).

Objectives: To explore the relationship of variables for ISP sufferers, and clarify factors predictive of ISP health behaviour (IHB - doing something to prevent further attacks).

Design: Cross-sectional study.

Setting: General population.

Measurement: 24-item ISP questionnaire completed by respondents.

Subjects: One hundred and ten (38.2% m, aged 30.9 years).

Results: Mean ISP frequency in the lifetime, past year and past month, were respectively, 6.7, 2.02, and 0.5; average duration of episodes was four minutes, and 63.6% experienced it while awakening from sleep. Using ICD criteria, 2.7% had severe experience (i.e. at least once per week), 18.2% moderately severe (once per month) and 75.5% mildly severe (less than once per month), with no significant demographic associations. 56.4% were afraid of the experience, 76.4% had little/no worries that something was seriously wrong with their bodies; 39.1% cited supernatural causes, 35.5% cited physiological/psychosocial causes; and 44.5% described a hallucinatory experience. 1.8% took medical measures, and 7.3% consulted a faith healer; 44.5% resorted to prayers and 41.8% did nothing to prevent further attacks. The primary determinant of IHB was being afraid of ISP.

Conclusion: These findings have public mental health education, treatment and research implications.

INTRODUCTION

When sleep paralysis occurs outside of a diagnosis of narcolepsy, it is called isolated sleep paralysis (ISP). ISP is defined as a condition occurring either while waking from sleep or falling asleep, characterised by feeling paralyzed for several seconds or minutes, and is often accompanied by hypnogenic hallucinations. Unlike in the dream state, the individual is aware of events in the reality world during the episode. Once the episode of paralysis passes, the individual often sits up with a start and experiences symptoms of anxiety, only to realise that the perception of danger was false(1).

ISP has been described across cultures(2-11). The current clinical studies have mostly been prevalence studies that highlighted the proportion of subjects having the experience in the populations studied. Researchers have paid scant attention to the relationship of the variables within the ISP experience. For instance, the following research questions are yet to be addressed: How does the frequency of ISP relate to demographic and psychological variables? How can these relationships help us to understand subjects' attitude to ISP and methods of coping with it?

In order to address these questions, we have sought to advance our previous prevalence studies in Nigeria (8-11) by recruiting subjects from the general population who admitted having had ISP, for a more intensive study. The specific objectives of the study were to assess subjects with ISP and explore the following:

(i) The gender differences in frequency of ISP, duration of ISP, emotional reactions to the experience, attitudes to the experience, and measures taken to prevent further attacks;

(ii) The associations among age, frequency of ISP, emotional reactions and attitudes to ISP;

(iii) The significant predictors of ISP health seeking behaviour. This was with a view to understanding the factors that are associated with health behaviour for ISP. This objective was informed by the widely noted finding that the issue of ISP is not topical among clinicians and that it is doubtful whether clinicians and subjects with the experience recognise it as a clinical problem worthy of attention in the formal health care sector(10,12,13). This situation is probably related to the paucity of clinical and biological information about the phenomenon. Hence ISP received a bare mention in the American DSM-IV, while the WHO ICD-10 (Section V for mental disorders) is silent on it.

It is hoped that attempts to characterise the phenomenon among those with the recurrent experience will help to bring it to the attention of clinicians, in order to make for a clearer understanding of the contribution of ISP to clinical presentations and improve the management of patients with such problems.

MATERIALS AND METHODS

Subjects and setting: The subjects involved in the study were members of the general population in the university town of Ibadan in southwest Nigeria, who were selected in their work places. They were approached individually by one of us (VAM), a senior registrar in psychiatry. Subjects were requested to complete the questionnaire if they could describe a clear episode of ISP, but had no evidence of narcolepsy on interview by VAM. In view of the fact that previous studies had shown that supernatural causation beliefs about ISP are highly popular, VAM also interviewed three traditional healers ("native doctors"/"herbalists") practicing in Ibadan who claimed to treat ISP, about their methods of treatment. As this was not an opinion survey of ISP among traditional healers, we chose these three healers on the basis that they could describe the experience clearly, and were willing to be interviewed on the subject.

The questionnaire: The questionnaire was provided by a USA colleague (D. Hinton) who had used it in studies in the USA. It is rendered in simple English, consisting of 24 items, with open-ended and close-ended items. Most of the items are presented in abridged form in Tables 1 and 2. They include age, gender; an operational definition of ISP, frequency of ISP in the life time, past year and past month; duration of episodes and time when ISP occurs. Other items include emotional reactions to the experience; opinion on the meaning of the experience (i.e., subject's disease attribution model); the nature of the hallucinatory experience; types of assistance sought for the problem and measures taken to prevent further attacks of ISP. The vast majority of subjects were highly literate in English and easily completed the questionnaire on their own, with VAM available to clarify items as needed.

At the preliminary stage of the study, we scrutinized the contents of the questionnaire in detail. Based on our experience in this field, we were satisfied that the items were sufficient to pursue the objectives of the study; and that they were rendered in such simple English as to be easily administered in Nigeria (official language is English) among educated persons without need for modification.

The reliability of the questionnaire was determined as follows. First, in a parallel study conducted by our group among college students in Sudan (a related African country), the questionnaire was applied twice to 37 subjects in a one week interval (Awadalla and Ohaeri, report in preparation). The test-retest reliability of some key items was assessed by the Kappa statistic for agreement of responses. Agreements were high for items that required categorical (yes/no) responses, with Kappa values of 0.74 - 0.88 ($T = 5.2 - 5.5$, $P = 0.00001$). Second, for the Nigerian study, we assessed the internal consistency of the responses of the entire 110 subjects for the three items that were continuous variables, using Cronbach's alpha coefficient. We hypothesized that the degree of fear generated by ISP (none - a lot) would be related to degree of worry about something being seriously wrong with the body and the degree of fear of dying from the experience.

Considering that alpha coefficient values obtained from a few items need to be interpreted with caution (14), our Cronbach's alpha value of 0.66 just reached acceptable level of significance. Finally, the internal consistency of responses to some of the categorical variables was tested by assessing the agreement between responses to items of similar construct, using the Kappa statistic. Agreements on these responses were very high, with Kappa values of 0.76-0.94 ($T=7.7-9.8$, $P=0.00001$).

Data analysis: Data were analysed by the Statistical Package for Social Sciences (SPSS) version 12, using frequency counts, t-tests, chi-square tests, Pearson's correlation, multiple regression (method: enter) and logistic regression. All tests were two-tailed and significance level was set at $P=0.05$ for non-multiple tests. In the case of multiple tests, which mostly concerned the chi-square tests, a Bonferroni adjustment or correction was used, to reduce the probability of rejecting the null hypothesis when the null hypothesis is false. However, as this could mean a further loss of power with our relatively small sample size, we have followed the recommendation to use an overall significance level of 0.2 in such cases (15). The highest number of multiple tests for a variable in the relevant cases was eight, as seen in the specific objectives earlier highlighted. Hence our Bonferroni correction will mean that the adjusted level of significance for our multiple tests will be $0.2/8 = 0.025$, and the results are to be interpreted with this significance level in view. At any rate, the data were subjected to regression analysis, so that significant results from the univariate analyses were not taken at their face value in arriving at our conclusions. Data analysis was guided by the following hypotheses:

(i). There were no significant gender differences in age, frequency of ISP, duration of ISP, emotional reactions to the experience, attitudes to ISP and measures taken to prevent further attacks. T-test was used to assess gender differences for continuous variables, while categorical variables were cross-tabulated and chi-square tests were used to assess gender differences.

(ii). There were no significant associations among age, frequency of ISP, emotional reactions and attitudes to ISP. Pearson's correlation tests were used to assess the correlation between continuous variables, while chi-square tests were used to assess the association among categorical variables. Age was re-grouped into four almost equal categories as in the SPSS and this grouping was used in cross-tabulation with categorical data.

(iii). There were no significant predictors of help seeking behaviour (in this case measures taken by the subject to prevent further attacks of ISP) and the general degree of fear provoked by the ISP experience. As clinicians, we were interested in assessing how subjects coped with the experience and the factors that were most closely related to seeking help for the problem. Hence we delineated the item on "what did you do to prevent further attacks" as a dependent variable. The independent variables were those that were significantly associated with it on chi-square test. Logistic regression was used for this analysis since the responses were in categories. Following the rules of this analysis (16), the dependent variable was recoded and reduced to two categorical variables, (namely, 1 = subject did something to prevent further attacks; 0 = subject did nothing to prevent further attacks). Also as recommended for this analysis, the independent variables were recoded to consist of two or three categories of responses (16). In the course of the chi square/correlation tests,

the degree of fear generated by ISP ("were you afraid of the experience?": none - a lot) emerged as an important variable with many significant relationships. This variable was therefore used as a dependent variable for multiple regression and logistic regression, as it could be treated as categorical and continuous data. The independent variables were those significantly associated with it on chi - square and Pearson's correlation tests.

(iv). Assessing two theoretical models in the dynamics of the ISP experience: Based on clinical experience and logical premises, we hypothesized that the following three groups of variables would have meaningful relationships and be associated with methods of coping with ISP, namely: disease attribution(i.e., opinion on cause of ISP/ fear of what was happening to the body during the episode); the hallucinatory experience (its presence/clarity of experience as evidenced by description of object seen/ fear of being harmed by the hallucinatory object); and emotional reaction to ISP (degree of being afraid of it/worry something being seriously wrong with the body/fear of dying from it). Our objective was to see how these relationships could help clarify the widely noted finding that subjects rarely present in hospital with ISP. Towards this end, we articulated two disease attribution models, based on the assumption that attitudes (e.g., opinion on causation/fear of effect on body) and perceived seriousness of effect on the body(e.g., degree of worry about something being seriously wrong with the body) do drive health seeking behaviour(e.g., doing something to prevent further attacks). The first model - the supernatural disease attribution model was hypothesized as follows: having supernatural beliefs about ISP is significantly associated with explaining the effect of ISP on the body in supernatural terms, being afraid of being harmed by the hallucinatory experience, moderate - severe emotional reaction to ISP; and because worry about something being seriously wrong with the body is based on supernatural causation, they would predominantly seek faith healing methods for coping with the problem or preventing further attacks. The second model - the physiological/ psychosocial disease attribution - was hypothesized as follows: having physiological/psychosocial causation beliefs about ISP is significantly associated with explaining the ISP effect on the body in physiological/mechanistic terms, little or no emotional reaction to the experience and hallucinations; and because worrying about something being wrong with the body is based on the physiological attribution model, they would tend to either ignore the experience (i.e., do nothing about it) or resort to physiological/mechanical methods to cope with the problem. The corollary to these logical premises is that the subjects who would attend hospital or seek medical help for ISP would be those who either functioned in the mode of the physiological/psychosocial attribution model, or who were greatly worried that something was seriously wrong with their bodies. It was against the background of these theories that we interpreted and considered the implications of the statistical relationships in our data.

RESULTS

Demographic characteristics and frequency of ISP (Table 1). The 110 subjects consisted of 42(38.2%) males and 61(55.5%) females (seven subjects did not record their gender), age range 18 - 62 years, mean 30.9(SD 10.5). There were no significant gender

differences in age ($P=0.7$). The results in Table 1 are presented to reflect the categorical and non-categorical response options to open - ended questions. Hence we found that, of those who stated specific number of times that they had the experience, the average lifetime frequency was 6.7(SD 5.9), the average number of episodes in the past year was 2.02(SD 2.4), while the average number of episodes in the past month was 0.5(SD 2.2). Although they all had lifetime experience of ISP, 84(78.5% of 107 who responded to this item) had not experienced it in the past month. Only seven (6.5%) had experienced ISP at least twice in the past month, while 21(19.1%) had experienced it at least four times in the past year. Using the International Classification of Sleep Disorders' (ICSD -90)(16) criteria for severity, three subjects (2.8% of 107) could be judged as having severe experience (i.e. at least once per week), 20(18.7% of 107) had moderately severe experience (i.e., once per month) and 83(78.3% of 106) had mild experience (i.e. less than once per month). There were no significant gender differences in frequency and duration of ISP ($P> 0.05$). The estimated average duration of ISP episodes was about four minutes. For the vast majority of subjects (73 or 85.9% of 85), however, the episode lasted less than five minutes. For about two - thirds of subjects (63.6%), ISP occurred while awakening from sleep.

Emotional reactions and attitudes to ISP (Table 2) While the majority (62 or 56.9% of 109) were moderately to highly afraid of the experience, most (76 or 71% of 107) had little or no fear of dying from the experience and over three quarters (84 or 79.2% of 107) expressed little or no worries that the experience meant that something was seriously wrong with their bodies. In response to the item on what they thought was actually wrong with the body during the episode, only 30(27.3%) subjects gave physiological explanations, such as tiredness, and "seizure"; 49(44.5%) had no explanation, while a quarter of subjects gave supernatural explanations. But when asked about the causes of ISP, 39.1% attributed it to supernatural factors while 30.9% cited physiological mechanisms. Only a few believed that ISP was related to psychosocial stresses. While 49(44.5%) gave a description of the hallucinatory object experienced (mostly visual), only 31(28.2%) expressed fear that the object could harm them, and none had a specific name for the hallucinatory object. Most of those who described hallucinations (21 or 19.1% of 110) experienced objects of a human nature. As regards health seeking behaviour for ISP, only one subject attended hospital to complain to the doctor about the experience; and he claimed that the doctor prescribed a multivitamin for him. A second subject self-medicated with multivitamins. Only eight (7.3%) subjects admitted seeking help from a Christian or traditional faith healer for ISP. Otherwise, the most popular measure taken to prevent further attacks was a resort to Christian prayer. For example, one subject

stated that he put the Bible under his pillow and then placed a cutlass across the door to ward off evil influences. However, 46 (41.8%) chose to do nothing about the experience. The few subjects (8 or 7.3%) who took physiological measures included those who engaged in physical exercise on waking up or took a beverage drink to increase their energy levels.

Factors associated with ISP (Table 3): Of the ISP frequency parameters, the past year frequency had the greatest number of relationships, being significantly correlated with lifetime frequency ($P = 0.003$), frequency in the past month ($P = 0.0001$), and inversely related to the degree of being afraid of the experience (i.e., degree of fear provoked by ISP) ($P = 0.009$). Other noteworthy relationships were those between the indices of emotional reaction ($P = 0.003$). In chi-square analysis, we found that the dynamics of the hallucinatory experience had significant relationship with being afraid of ISP and what subject did to prevent further attacks. Using unadjusted significance levels, we found that the males were significantly more likely to describe the hallucinatory experience than the females (50% of males versus 29.5% of females) ($X^2 = 4.4$, $df = 1$, $P = 0.035$). But only 41.9% of those who held supernatural causation beliefs admitted hallucinatory experience ($P = 0.09$). Although the hallucinatory experience was significantly associated with degree of being afraid of ISP ($X^2 = 6.7$, $df = 1$, $P = 0.01$), this fear was primarily among those who could describe the hallucinatory object ($X^2 = 5.1$, $df = 1$, $P = 0.023$), and who tended to fear that the hallucinatory object could harm them ($P = 0.06$). Hence the real problem with the hallucinatory experience was the clarity of it, which was associated with being afraid of ISP and fear of being harmed by the hallucinatory object ($X^2 = 58.5$, $df = 1$, $P = 0.0001$).

Dynamics of beliefs about ISP: Another important mediator in the ISP experience was the subjects' disease attribution model, which was hypothesized to influence

subjects' method of dealing with the problem. In this regard, the commonest characteristics of this sample were belief in supernatural causation of ISP (39.1%) and resort to Christian faith healing methods to cope with the perceived problem (44.5%). Belief in supernatural causation of ISP was significantly associated with resort to Christian faith healing methods (72.1% of subjects with supernatural beliefs used Christian faith methods to prevent further attacks), while those with physiological causation beliefs predominantly did nothing to prevent further attacks ($X^2 = 26.2$, $df = 4$, $P = 0.00001$).

The males had a greater tendency to describe the effect of ISP on the body in physiological terms ($X^2 = 6.3$, $df = 2$, $P = 0.04$). The older age group (38 - 62 years) was significantly more likely to choose supernatural explanations as cause of ISP (69.6% of this age group), and tended to describe its effect on the body in supernatural terms, while the younger age group (18-37 years) constituted the majority of those who cited psychosocial/physiological aetiological causation factors (39.4% of this age group) ($X^2 = 18.2$, $df = 6$, $P = 0.006$). Opinion on causes of ISP was significantly associated with the degree of worry over something being seriously wrong with the body ($X^2 = 9.3$, $df = 3$, $P = 0.025$) in such a way that, of those who believed in supernatural causation, 80% expressed little or no worries about their bodies, while 59% of those who expressed these bodily worries also believed in the physiological aetiology of ISP. That is, the disease attribution model of the subjects could not explain their impression of the seriousness of effect of ISP on the body. Considering the categorical variables, the only pathologically noteworthy finding was for the item on worry about something being seriously wrong with the body, such that, of the 22 who had that opinion, 59.1% admitted having had a hallucinatory experience ($X^2 = 4.4$, $df = 1$, $P = 0.04$; not significant with Bonferroni adjustment).

Table 1

Frequency of demographic and isolated sleep paralysis (ISP) characteristics

Characteristic	Frequency (%) Mean
Gender (n = 103) Male/Female (%)	42/61(38.2/55.5)
Age (n = 94) Mean (SD)	30.9 (10.5)
Mean (SD): Male/Female	31.5 (10.6)/ 30.6(10.4)
18-23	23(24.5)
24-25	20(21.3)
26-37	28(29.8)
38-62	23(24.5)
Lifetime frequency of ISP: Range: 1 - 35 Mean (SD)	6.7 (5.9) n = 70
Mean (SD): Male/Female	6.8 (6.3) 6.5 (5.9)
Once in lifetime (%)	2 (2.9)
Twice in lifetime	11 (15.7)
Three times	13 (18.6)
4 -10 times	35 (50)
13-35	9 (12.9)
Subject stated only category number of times (n =110)	
Many times/ several times / often	31 (28.2)
Few times / sometimes / once in a while	5 (4.5)
How many times in past year (n = 98): Mean (SD)	2.02 (2.4)
Mean(SD): Male/Female	1.7 (2.6) 2.0 (2.2)
None (%)	30 (30.6)
Once	23 (23.5)
Twice	14 (12.7)
Thrice	13 (11.8)
4- 15	18 (18.4)
Many times/ several/ often (n = 110)	3 (2.7)
How many times in past month (n = 107): Mean (SD)	0.5 (2.2)
Mean (SD): Male/Female	0.33 (0.9)/ 0.6 (2.9)
None (%)	84 (78.5)
Once	16 (15.0)
Twice	4 (3.7)
Thrice	1 (0.9)
4-22	2 (1.8)
How long unable to move/speak (Secs): Range 1-2700 mean (SD)	215.87 (387.9)
Mean (SD): Male/Female	311.6(551.4)/157.3(238.8)
1-60(%)	36 (42.4)
120-300	37 (43.5)
>/= 420	12 (14.1)
Few seconds (n = 110) (%)	2 (1.8)
Few minutes	8 (7.3)
Time of sleep when ISP occurs (n = 110)	
When falling asleep	20 (18.2)
When awakening	70 (63.6)
Both falling asleep and walking	10 (9.1)

Table 2*Emotional reactions and attitudes to ISP*

Reaction/ Attitude	Frequency (%)	
What were you afraid was wrong with your body? (n=110)		
Supernatural (spiritual attack/ demons/ not close to God)	28	(25.5)
Physiological explanation(weak body/ seizure/death/brain)	30	(27.3)
Don't know	49	(44.5)
Did you see shadow during experience: Yes (n=110)	43	(39.1)
What shape did you see? (n=110)		
Subject described shape or heard voices	49	(44.5)
What were you afraid the shape might do to you? (n=110)		
Afraid the shape might cause harm/kill me/scare me	31	(28.2)
Nothing	79	(71.8)
Is there a name for the being you saw? (n=110)		
Human/masquerade/ghost/evil/shadow	13	(11.8)
What causes sleep paralysis (n=110)		
Supernatural (witches/ spiritual attack/ evil spirit)	43	(39.1)
Psychosocial (family crises/ stress/ worries)	5	(4.5)
Physiological (hunger/ overwork/psychiatric illness/electrolyte imbalance/REM sleep/muscle pull/position of sleep/oversleep)	34	(30.9)
Don't know	28	(25.5)
Did you do something to prevent further attacks (n=110)		
No/ nothing specifically	46	(41.8)
Traditional medicine methods	3	(2.7)
Recited portions of the Koran	2	(1.8)
Christian prayer/ faith healing	49	(44.5)
Medical (consultation/ take multivitamins)	2	(1.8)
Physiological/mechanical (exercise/take beverage/alarm clock/ will to get up/ tell friend to wake me up)	8	(7.3)
Consulted Christian or traditional healer: Yes (n=110)	8	(7.3)
Degree of emotional reactions	Not at all/ a little	Some / a lot
Were you afraid of the experience? (n=109)	47 (43.1)	62(56.9)
Did you fear dying? (n=107)	76 (71.0)	31(28.9)
Worry something seriously wrong with body? (n=106)	84 (79.2)	22 (20.8)

Table 3
Factors associated with isolated sleep parasites

Variable	Statistics		
	No.	r	P-value
Pearson's correlation tests			
Frequency of ISP in the past year			
Vs Frequency lifetime	65	0.36	0.003
Vs Frequency past month	98	0.57	0.0001
Vs Degree of fear provoked by ISP	97	-0.27	0.009
Degree of fear provoked by ISP			
Vs Degree of fear of dying from the experience	106	0.56	0.0001
Vs Worry something could be wrong with body	105	0.24	0.014
Degree of worry something could be seriously wrong with body			
Vs Degree of fear of dying from the experience	103	0.37	0.0001
Vs Age	92	0.31	0.003
Chi-Square tests			
	X ²	DF	P-value
Afraid of the experience (little or none/ some - a lot)			
Vs Did something to prevent attacks (n = 109)	7.9	2	0.019
Vs Described hallucinatory object (n =109)	5.1	1	0.023
Vs Afraid hallucination could cause harm (n= 109)	3.5	1	0.06
Vs Did you see shadow? (n=109)	6.7	1	0.01
Doing something to prevent further episodes			
Vs Afraid hallucination could cause harm (n =110)	6.0	2	0.049
Vs Fear about what was happening to body (n=110)	10.4	4	0.034
Vs What causes ISP (n =110)	26.2	4	0.0001
What causes ISP: Vs Worry something wrong body	9.3	3	0.025
Vs Age group (n =94)	18.2	6	0.006
What were you afraid was wrong with your body			
Vs Worry something wrong with body (n = 106)	10.1	2	0.006
Vs Gender (n =103)	6.3	2	0.04
Vs Age group (n = 94)	11.3	6	0.079
Did you see shadow?			
Vs Afraid hallucination could cause harm (n =110)	66.3	1	0.0001
Vs Worry something wrong with body (n =106)	4.4	1	0.036
What shape did you see?			
Vs Gender (n = 103)	4.1	1	0.035

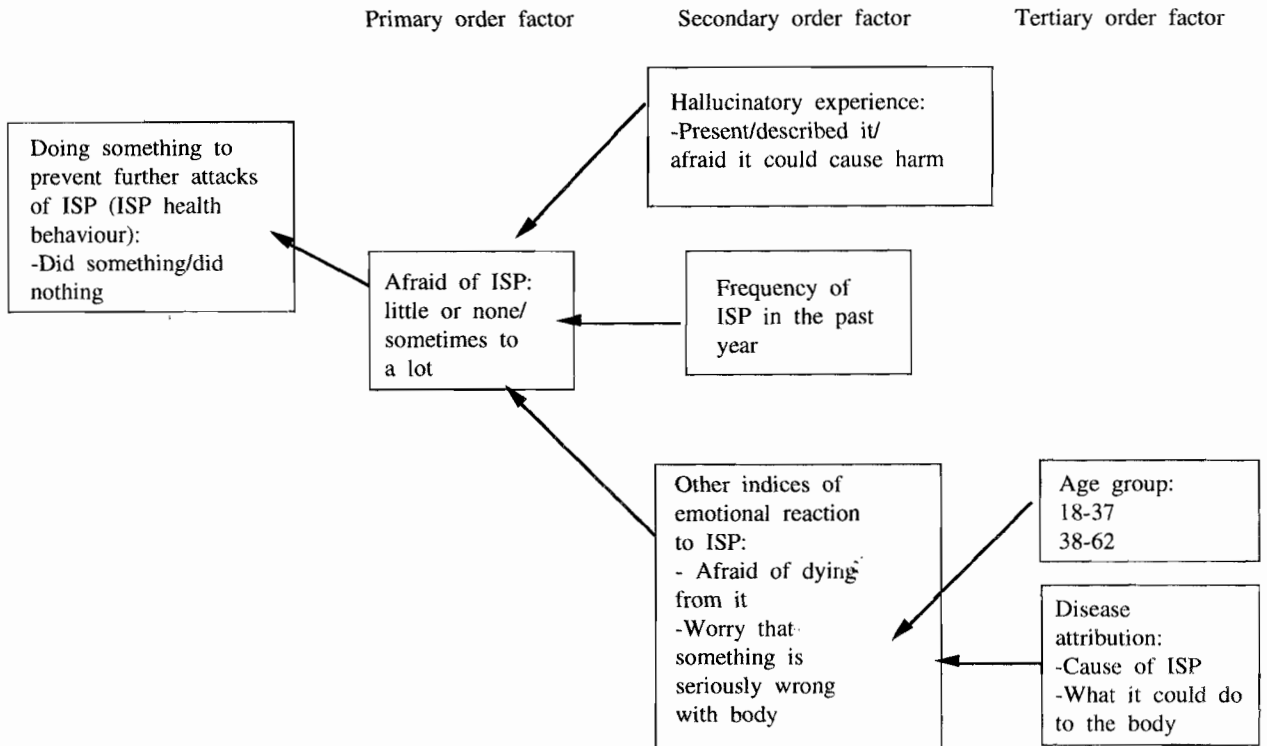
Table 4

Predictors of attempt at prevention and degree of fear provoked by the experience of ISP (afraid of ISP)

Type of regression technique/ Dependent variable	Independent variable	Regression values			
		B	Beta	T	P
Multiple regression					
Degree of fear provoked by ISP experience (afraid of ISP): (None – a lot)	- Frequency of ISP in past year	-0.29	-0.39	-3.2	0.00
	- Feared dying from ISP	0.57	0.56	4.8	0.00001
	- Hallucination during ISP	-0.62	-0.20	-1.9	0.070
	- Worry something seriously wrong with body	0.11	0.11	0.85	0.004
Percent age of variance accounted for by model		73%			
Logistic regression					
		B	Exp (B): Odds ratio	P	
Doing something to prevent further attacks (O = did nothing; I = did something)	- Degree of fear provoked by ISP	1.14	3.13	0.034	
	- Age group	1.04	2.83	0.099	
	- Described shape seen	0.84	2.32	0.58	
	- Hallucinations present	0.46	1.58	0.76	
Overall percentage of correct prediction by model		73.8%			
Degree of fear provoked by ISP (0 = little or not afraid; i = some /a lot)	- Fear of dying from ISP	1.77	5.85	0.005	
	- Worry something seriously wrong with body	1.24	3.45	0.091	
	- Described shape seen	0.71	1.07	0.96	
Overall percentage of correct prediction by model		76.5%			

Figure 1

Model of ISP health seeking behaviour resulting from bivariate and multivariate analyses



Being afraid of ISP and methods of coping with ISP: The only noteworthy associations with the effort to prevent further attacks of ISP were, being afraid of the experience ($X^2 = 7.9$, $df = 2$, $P = 0.019$), fear that the hallucinatory object could cause harm ($X^2 = 6.0$, $df = 2$, $P = 0.049$) and fear of what was happening to the body ($X^2 = 10.4$, $df = 4$, $P = 0.034$).

Regression analysis (Table 4): In order to clarify these (sometimes dissonant) relationships, the data were subjected to regression analysis. In multiple regression analysis using the continuous variables, the only significant predictors of being afraid of ISP were frequency of ISP in the past year ($P = 0.004$) and fear of dying from ISP ($P = 0.00001$). When the data were suitably recoded to the categorical mode (as required by the method of analysis) and subjected to logistic regression, we found that, the only significant predictor of being afraid of ISP was the degree of fear of dying from the experience ($OR = 5.85$, $P = 0.005$). In the same way, logistic regression analysis showed that, regarding doing something to prevent further attacks of ISP, the only significant predictor was being afraid of ISP ($OR = 3.13$, $P = 0.034$).

DISCUSSION

The major limitation of our study is that, although the sampling technique was in line with the objectives of the study, the subjects were not a representative sample of the general population of Nigerians with the ISP experience. In addition, the relatively small sample size could have contributed to some of the statistically non-significant results.

However, the socio-demographic characteristics of the subjects were similar to those of our previous Nigerian general population prevalence study(11). Furthermore, the parameters of ISP among our subjects were remarkably similar to those of a recent cross-cultural (USA/Japan/Hong Kong) study(2). Our subjects had the following mean frequencies of ISP experience: lifetime, 6.7(SD5.9); past year, 2.0(SD 2.4); past month, 0.5(SD 2.2); and duration of episode, 3.59 minutes (SD 6.5). For at least three quarters of our subjects, the experience lasted less than five minutes, and it occurred predominantly while awakening from sleep. The cross-cultural study referred to above(2) had reported a mean lifetime frequency of 4.03 -18.5 (SD 4.5 - 57.1) and

mean duration of episode of 4.46 -11.23 minutes (SD 5.19-24.9). Similarly, our frequency data regarding hallucinations (39.1%) and supernatural attribution of ISP (39.1%) were comparable to those of the cross-cultural study (20-52.9% for hallucinations and 22.3 - 62.5% for supernatural attribution).

Hypothesis 1: Gender differences: In line with the findings of our previous studies(8,9,11) and those of others(2-4), gender experiences were broadly similar. The few gender differences concerned emotional reactions and attitudes towards the experience and were no longer significant after Bonferroni correction. Hence the males had a greater tendency than the females to describe the effect of ISP on the body in physiological/ psychosocial terms ($P = 0.04$) and also to give a description of the hallucinatory experience ($P = 0.035$). The implication of this tendency is not obvious because these differences were neither linked to other variables in the analyses that we carried out, nor have they been highlighted by other workers. However, we speculate that these differences could be related to the general observation that men tend to be more analytical than women (hence able to describe hallucinations more vividly and have greater tendency to offer psychological/ physiological explanations).

Frequency of ISP and emotional reactions to the experience: The frequency of ISP parameters (particularly in the past year) and the mixed emotional reaction to the experience, appear to be the most important factors in helping us to understand ISP health behaviour. We found that, using ICSD criteria, only 2.7% had severe experience (i.e., once per week), and 56.4% admitted having moderate to severe feeling of being afraid of the experience. But the experience was not associated with pain or enduring long-term problems. The following comments help to clarify subjects' ISP health behaviour:

- (i) "I had no fear of anything wrong with my body, since I woke up and there was no problem"
- (ii) "Since I don't have pains when it occurs, I don't think it has something to do with my physical body, but a lot to do with my mind"
- (iii) "Initially I was afraid but later learnt to suppress the fear"
- (iv) "I thought I would outgrow it with age".

In addition, there was dissonance in the response of many subjects with the severe experience, who expressed little or no emotional reactions towards the experience, and did nothing to prevent further attacks. An implication of the emergent importance of past year frequency of ISP in this study is that it is a more reliable index than lifetime frequency; and hence we recommend that, in order to harmonize the results of prevalence studies, researchers should focus on the past year and past month prevalence, within the context of the ICSD -90 criteria for severity(17);

Unfortunately, the vast majority of prevalence values in the literature are based on lifetime experience. We suggest that this is probably a major contributor to the wide variation in estimated prevalence of ISP even within cultures. In a contribution to the debate on the wide variation in estimated prevalence of ISP, a Japanese study found that it was partly due to the expression used in the questionnaire to define ISP(18). Hence in a cross-cultural study, it was found that different prevalence rates resulted when ISP was defined by either the "unable to move" or "unable to move and pressure on the chest" criteria(2). We are of the opinion that defining ISP by these two criteria could lead to problems of reliability and validity of responses, because these two criterias do not include the full conditions for a diagnosis of ISP. Hence we suggest that researchers in the field should harmonize their work by highlighting the frequency in the past year and past month, using ICSD criteria to judge severity of the experience, and include the full conditions of the experience in their operational definition of ISP. From such a harmonized base, frequency data can be meaningfully compared.

Hypotheses 2 - 4: The theoretical models in the dynamics of ISP experience (Tables 3, 4 and Figure 1): In considering the statistical relationships highlighted in Tables 3 and 4 against the background of the supernatural and physiological disease attribution models earlier highlighted, we found that, while there were significant associations among the variables, the details of the relationships were sometimes against the direction predicted by theory. For instance, the significant association between the opinion on causes of ISP and degree of worry over something being wrong with the body ($P = 0.025$), was such that 80% of those who held supernatural beliefs had little or no worries about their bodies, while 59% of those who expressed serious concern over the body did believe in physiological aetiology. In addition, a significant majority of those who expressed either supernatural (81.5%) or physiological (60%) fears on their bodies, stated that they had little or no worries about something being wrong with their bodies. Furthermore, opinion on the etiology of ISP was not significantly associated with other indices of emotional reaction to ISP and the hallucinatory experience; while the tendency for those who feared that the ISP experience meant a "spiritual attack" on their bodies, to also believe that the hallucinatory object could harm them, just failed to reach significance ($P= 0.08$). These negative results could be attributed to the fact that the vast majority of subjects (over 70% of them) had little or no worries about something being seriously wrong with their bodies, nor were they afraid of the hallucinatory experience or of dying from the experience. In other words, for most of these subjects ISP was an

experience that could be ignored as it provoked little or no serious emotional reactions.

It appeared that the majority of the significant associations with being afraid of ISP were concerned with the hallucinatory experience. Hence it could be said that the primacy of the effect of being afraid on attempts at coping with ISP was based on the former's relationships with the dynamics of the hallucinatory experience, frequency of ISP in the past year, the other indices of emotional reaction to ISP; as well as the relationship of worry over what was happening to the body to causal attributions and age. However, the predictions of the models were partially upheld. Hence, belief in supernatural causation was highly significantly associated with resort to Christian faith healing methods, while those with physiological causation beliefs afraid of being harmed by it), frequency of ISP in the past year, and other indices of emotional reactions (i.e., afraid of dying/worry something was wrong with the body), indirectly affected this decision by their contribution to the general fear of ISP; while the tertiary order factors, such as disease attribution (i.e., aetiological belief/belief about what was happening to the body) and age, affected that decision through their impact on degree of worry that something was wrong with the body. Unfortunately, we could not test the structural integrity of this model in structural equation modeling (i.e., path analysis), because the categorical nature of the data on the factor to be predicted (i.e., ISP health behaviour) precludes the use of such analysis by the available methods(16).

Supernatural beliefs and faith healers: The seeming paradox of the commonness of supernatural causation beliefs for ISP, along with the uncommon patronage of the traditional healers and the popular resort to Christian faith healing methods, is a reflection of the reality situation in modern Nigeria, where the increasing appeal of Christian Pentecostal faith healers and the declining influence of the traditional healers, has been noted(19-21). However, supernatural causation beliefs about ISP have been noted across cultures(1,2,6). Despite this, there are no reports in the literature on how traditional healers in various cultures treat their patrons with ISP. In order to fill this gap in knowledge, we interviewed three traditional healers who claimed to treat the condition. We found that, the general principle of their practice was to produce a concoction made from grounding together a mixture of parts of reptiles and /or birds (e.g., chameleon, hawk and wall gecko), black soap and alligator pepper, and then applying this concoction on incision marks made on the head or torso. The details about the contents of the concoction and site of incision marks, differed with healer and gender of patron. We were not able to assess the efficacy of their methods.

CONCLUSION

The strength of our study is a fairly in - depth statistical exploration of the relationships within the dynamics of the ISP experience, the use of qualitative and quantitative data, interpretation of data from the background of theoretical frameworks (i.e., the attribution models), and the generation of a model that seeks to explain subjects' ISP health behaviour. To our knowledge, this level of analysis is unusual in the ISP literature. In addition, subjects were interviewed to exclude narcolepsy. From our analyses and results of previous studies(10), we conclude that the reason for which ISP is a rare cause of presentation in the clinical setting is that it is a rather hidden problem, being episodic, usually with infrequent episodes for the individual, not associated with painful after-effects, and therefore could be ignored. But it becomes a health problem when it is associated with fears, which either exacerbate existing psychological symptoms, or trigger psychological symptoms in predisposed individuals. On the other hand, the issue is not topical among doctors because their patients rarely complain of it, and they are not aware of the contribution of ISP to their patients' presentations in the clinical setting. Towards this end, we hope that the model of ISP health behaviour that we have proposed, as well as the highlighted implications of our findings (for public mental health education and treatment) and the recommendations for harmonizing the results of prevalence studies, will make for scientific rigor in research in this field and promote awareness of the phenomenon among clinicians and the general public.

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