REVIEW ARTICLE

Atmospheric Variability and Prevalence of Common Psychiatric Disorders in South Asia: A Meta-regressive Analysis

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Abstract

Background: The review of literature suggests that there is a dearth of meta-analytical study that examines the role of Atmospheric Variability on the prevalence of mental disorders in South Asia. **Aims &Objectives:** Therefore, the present study explores the moderating role of variability in temperature, air pressure, humidity, and rainfall on the prevalence of Common Psychiatric Disorders in South Asia. **Material & Methods:** Databases of several web sources, namely, EBSCOhost, PubMed, PsycINFO, and Google Scholar were explored for the studies that had previously observed the prevalence of psychiatric morbidity in South Asian countries. Further, articles were also examined manually. Initially, geographical locations (i.e. latitude, longitude, and altitude) of surveyed places were determined. Based on these locations, historical atmospheric data were retrieved. Meta-regression analysis was computed using R –software with 'metafor' package**. Results**: The present Meta-analysis included 32 epidemiological studies consisting of 110402 persons reported a total morbidity in 7935 persons across seven countries of South Asia. Yearly rainfall ($z=2.8260$, $p<0.01$), yearly variability in temperature ($z=3.7160$, $p<0.001$), yearly variability in humidity ($z= -2.4031$, $p<0.05$) appear to have a significant influence on the prevailing patterns of common psychiatric disorders. However, yearly variability in atmospheric pressure did not have a significant influence on the prevalence of mental disorders ($z= 1.0364$, $p>0.300$). **Conclusion:** Discomfort weather conditions such as yearly temperature variability, excessive rainfall, and yearly variability in humidity have a significant role in the occurrence and maintenance of different psychiatric disorders in South Asia.

Keywords:

Atmospheric Variability; Mental Disorders; Southern Asia

Introduction

Atmospheric variables are usually characterized by seasonal temperature, humidity, precipitation, and air pressure etc. (1). South Asian regions have complex topographical features varied from the glaciated northern parts (i.e. Himalayas, Karakoram, and Hindu Kush mountains) which have yearly average temperatures at or below freezing level, whereas much of the Indian subcontinent be around 25°C to 30°C (77°F to 86°F) (2). It covers more than 30° latitudes (6° N at Sri Lanka to 36° N at Pakistan), with monsoon being characterized by high degree of spatial and temporal heterogeneity (3). Rainfall patterns are similarly varied, with some parts of the region receiving as little as 100 mm of average yearly precipitation and others receive nearly 5,000 mm (2, 4). In this particular part of the globe, coastal areas are generally more humid than inland areas. Average annual relative humidity (%) across the South Asian countries ranges from <25% to 100% across the South Asia (3). South Asian region has wider altitudinal variations ranging from sea level to 4000m above sea level (5) which additionally leads to variations in air pressure of different regions, since altitude and atmospheric pressure are negatively correlated (6).

These climatic immoderations are challenging for human well-being, and climate change amplifies these challenges (2). For example, prolonged heat exposures in the working environment, not only reduces the capacity to do physical activities (7) but also the capacity for mental activities (8). The resulting loss of income is most likely to increase the mental health problems (9).

The term 'common mental disorders' comprises a group of distress states manifested through anxiety, depression, unexplained somatic symptoms, and are considered similar to neurotic disorder, which are common complaint in primary care and general medical settings (10). A number of studies have reported that overall in South Asia and its subcontinent countries the prevalence of common mental disorders ranges from 6 to 534 per 1000 persons (11-18).

Cho et al. systemically reviewed and further computed meta-analysis to see geographical and temporal variations in relation to prevalence of suicide and mental disorders in different parts around the globe (19); however, they have reported only regional variations in the prevalence of suicide. Previous studies suggest that there is regional heterogeneity present across the studies related to the prevalence of mental disorders in South Asian countries (11-19). Despite of the complex topographical features and large atmospheric variability in the South Asia, there has not been a single study reported yet in this concern.

There are sufficient shreds of evidence available regarding causal associations of personal and psychosocial determinants of mental disorders. However, there are very few evidences provide the causal association between mental illnesses and specific characteristics of physical environmental conditions. Some researchers have linked atmospheric variability to a diverse range of human behaviors (20), mood states (21), and overall mental health (22, 23), increased aggression (24) and increased risk of suicide (25).

Researchers have also examined the relationship between climatic variability and different psychiatric disorders i.e. mood disorders (26), anxiety disorders (27), psychosis and impulsiveness (28).

Literature review suggests that there is a dearth of evidence about the relationship between atmospheric variability and related mental health outcomes, particularly in South Asia.

Aims & Objectives

The present meta-analytical study was carried out to understand the moderating role of atmospheric variability on the prevalence of common mental disorders, particularly in South Asia.

Material & Methods

2.1 Identification of Studies: To find relevant studies, the authors ran searches on various journal hosting databases such as Ebscohost, PubMed, PsychINFO, and Google Scholar for the period up to October 2018. Various keywords such as "psychiatry" "prevalence", "epidemiology" and "community", along with "country name" were used for further refinement. With the use of Boolean operators keywords were combined so as to narrow down the search process. Title and abstract of articles suggesting potential information were further retrieved for detailed evaluation along with the manual search using bibliographies, references, and cross-references of the identified published studies [e.g. (11, 12)]. In addition to the above, two online accessible Indian journals namely, Indian Journal of Psychiatry and NIMHANS Journals were also searched manually.

2.2 Inclusion Criteria: The following criteria have been used for the inclusion of manuscripts:

1. Manuscripts in which prevalence of common mental disorders have been reported in general population with rural, urban, or mixed background
2. The inclusion of both genders
3. Studies should have quantitative data on either number or frequency
4. Written in the English language.

2.3 Exclusion Criteria: The following criteria have been used for the exclusion of manuscripts:

1. Manuscripts reporting review or meta-analysis.
2. Manuscripts based on hospitals or any clinical set-up.
3. Studies based on any specific group, i.e., tribe, migrated people etc.
4. Studies based children and geriatric population.

2.4 Review search strategies: The guidelines of Quality of Reporting Meta-Analysis (QUOROM) were duly considered while identifying the articles for review and analysis. As indicated in (Figure 1), 952 articles were identified as potentially relevant, among them 890 were excluded on the basis of title/abstract. Remaining 62 articles were retrieved for further evaluation, and finally 32 studies (29-54) were retrieved based on the criterion mentioned in (Figure 1).

2.5 Data Extraction and Selection Procedure: Manuscripts meeting the inclusion criteria were further reviewed and the basic details were extracted such as the name of researchers, year of publication, place where the survey/study was conducted, sample size, and the number of persons screened of having psychiatric problems etc. Details are given in (Table 1) & (Table 2).

2.6 Extracting Atmospheric Data

An official website of NASA was used to determine latitude and longitude of location/places surveyed (URL:https://mynasadata.larc.nasa.gov/latitudelongitude-finder/). Altitudes of locations/places were determined using a different website https://www.daftlogic.com/sandbox-google-maps-find-altitude.htm. Both the websites were using Google Earth to determine latitude, longitude, and altitude. Historic climatic information (e.g. temperature, rainfall, humidity, and air pressure) was extracted from the official website of Asia-Pacific Data-Research Centre, Hawaii, USA using derived latitude, longitude, and altitude of surveyed places (URL: http://apdrc.soest.hawaii.edu/data/data.php?discipline_index=3.). Details of historical atmospheric data are given in (Table 1) & (Table 2).

Computer software R along with 'metafor' and 'xlxs' packages were used for conducting the meta-regressive analysis (55). Functions namely, escalc ( ) were rma( ) were used for conducting meta-regressive analysis. Freeman-Tukey transformation for proportions (PFT) has been computed with the equation yi=$\frac{1}{2} \times \left(\operatorname{asin}\left(\sqrt{\frac{xi}{ni+1}}\right) + \operatorname{asin}\left(\sqrt{\frac{xi+1}{ni+1}}\right)\right)$. Where xi denotes the number of individuals experiencing the mental disorders and ni denotes the total number of sample surveyed (i.e., sample size). The equation of variance is vi=$\frac{1}{4ni+2}$. (56). Mixed effect model was used in the present meta-regression analysis because this model provides an unconditional inference about the included studies in the meta-analysis that are assumed to be carried out on a random sample (57).

Results

The omnibus test was carried out to determine the role of different geographical co-ordinates of surveyed places as a moderator in the prevalence of common mental disorders. The estimated amount of residual heterogeneity is equal to τau2= 0.0182 and τau= 0.1348, suggesting that [(0.1348-0.0182)/0.1348)X100] = 86.49% of the total amount of heterogeneity can be accounted after inclusion of three moderators in the model. The omnibus test (QM= 18.8276, df = 3, p <0.01), suggest that geographical coordinates of different surveyed places such as longitude (z = 3.1894, p<0.001) and altitude (z = 2.73, p<0.01) in South Asian regions are playing moderating role on the prevalence of common psychiatric disorders. However, latitude does not have a significant influence on the prevalence of mental disorders (z= 1.058, p>0.290). The test for residual heterogeneity is significant (QE = 4763.8737, df = 33, p<0.0001) indicating that other moderators not considered in the model may also influence the prevalence of mental disorders in countries of South Asia. (Table 3) & (Figure 2)

The estimated amount of residual heterogeneity is equal to τau2= 0.0159 and τau =0.1262, suggests that ((0.1262-0.0159)/0.1262)=87.40% of the total amount of heterogeneity can be accounted for by including the four moderators in the model. Based on the findings of omnibus test (QM = 27.1068, df= 4, p <0.0001) suggest that yearly rainfall (z=2.8260, p<0.01), yearly difference in temperature (z=3.7160, p<0.001), yearly difference in humidity (z= -2.4031, p<0.05) appear to have a significant influence on the prevalence of common psychiatric disorders. However, yearly differences in atmospheric pressure do not have a significant influence on the prevalence of mental disorders (z= 1.0364, p>0.300).The test for residual heterogeneity is significant (QE = 4433.054, df= 32, p <0.0001) which reflects that other moderators not considered in the model are also influencing the prevalence of mental disorders in countries of South Asia. (Table 4)

The funnel plot is an indicator of heterogeneity and publication bias specifically when small and/or non-significant outcomes remain unpublished and therefore, these articles are less likely to be included in a meta-analysis, which subsequently lead to an asymmetric funnel plot (58). (Figure 3) shows two funnel plots, the first built on a random effects model without any moderators and the second one is based on a mixed effects model with annual rainfall, the annual difference in temperature, the annual difference in humidity, and annual differences in air pressure as moderators. It is evident from (Figure 3) that the symmetric nature of funnel plot (with moderators) indicates that the study has a significant amount of heterogeneity and it is free from publication bias.

Discussion

South Asia, harboring the largest number (40%) of the world's poorest population (59) has diversified climatic conditions, characterized by complex topographical features. There is a growing concern over the climate variability and its negative impact on livelihoods of the inhabitants (60). Atmospheric variables have not only been linked with psychiatric admission rates (61) but they have also been found to influence certain known biological mechanisms such as serotonin availability (62), and variety of disordered behaviors (63).

The geographical co-ordinates like latitude, longitude, and altitude are important parameters for determining physical environmental conditions of any place i.e. temperature, duration of sunlight exposure, humidity, etc. The results of the present study indicated that there is a significant impact of geographical co-ordinates i.e. longitude and altitude, and atmospheric variability i.e. yearly rainfall, differences in temperature and humidity on the prevalence rates of common psychiatric disorders in this particular region.

Findings of the present study are at par with the previous studies conducted in western part of the globe. For instance, altitude is a well-known cause of hypoxia; a condition that is believed to increase mood disturbances, especially in patients with emotional instability (64). Furthermore, non-migraine headaches are seen more frequent at high altitude places than at sea level (65). Apart from the physical complaints, researchers have also reported that high altitude also enhances the risk of psychiatric disorders such as panic attacks (66), and suicides (67). Therefore, it would be equitable to suggest that the possible aggravation of bioenergetics dysfunction may be a consequence of decreased oxygen saturation at higher altitudes (68), which further might be a reason behind the genesis of psychiatric disorders.

Longitude being a significant moderator in the present study is consistent with the previously conducted researches. For instance, Centres for Disease Control and Prevention (69) and Crosby et al. (70) have reported that rates of suicide varied by geographic region in USA and have consistently been higher in the Western states than in the Eastern states, even after adjustment of demographic variables. As the duration and amount of sunlight exposure are determined by both longitude and latitude, it further can indirectly affect the sleep duration and circadian rhythm (71) which in turn can be ascribed as a causative factor for various behavioral disturbances such as, ADHD (72) and other mental disorders.

With nearly three-fifths of the total arable land in South Asia being rain-fed, variability in rainfall is an important climatic indicator and a critical factor in determining the livelihoods of the inhabitants (73) as shown in the present study. The coping strategies with variable rainfall across the regions involve migration, distress, and sale of assets (74) that may lead to disturbances in emotional front. Other researchers have reported that coldness and precipitation has also been significantly associated with suicide and homicide rates in urban areas of the USA (75), and panic anxiety (76).

It is clearly evident in the present analysis that differences in humidity and temperature have significant role in the possible genesis of mental disorders. In concordance with previous studies, increase in temperature and humidity had been related to decrease in elation, urgency and social affection (77), concentration, self-confidence and self-assurance (21) which consequently affect suicide rates (25). It has also been indicated that as temperature and humidity increase, there is an increase in sleepiness (21), increase in uncooperative behavior as well as aggressive behavior (78), distress, anxiety and depression (23).

Conclusion

Earlier, few studies have shown an association between the psychiatric admission rates and atmospheric variability. But there is a dearth of literature when it comes to the inclusion of the complex topographical features and varied climatic conditions of South Asia and its relationship with the psychiatric disorders. The present meta-regressive analysis indicates that atmospheric variability such as yearly rainfall; yearly temperature and yearly humidity along with the geographical co-ordinates like longitude and altitude have a moderating effect on the genesis of psychiatric disorders. Since, the livelihood of the people residing in this particular part of the globe is dependent on the fertility of the land; the moderating role of atmospheric variability on the prevalence of common psychiatric disorders in South Asia is inevitable.

Recommendation

The present findings may be significant for mental health professionals as well as health policy makers of South Asian nations and other part of globe during the policy making and implementation of mental health services.

Limitation of the study

Since, the present study is an exploratory attempt to examine the moderating role of atmospheric variability in the genesis of common psychiatric disorders in South Asia, therefore, the generalizability of the present findings are limited due to several reasons. Firstly, all the studies conducted by several researchers, have used heterogeneous types of research designs, a wide range of screening and diagnostic tools, and so forth. Secondly, all the historical climatic information used in the present study retrieved from the website which only provides simulated data; therefore, non-inclusion of station-based atmospheric data is also a major limitation of the present study. Lastly, the review search process is only limited to the English indexed online, therefore, non-inclusion of offline published journals and unpublished manuscript is one of the major limitations of this study. These factors should be taken into consideration in future empirical study in order to have a broader perspective of the generalization of the findings.

Relevance of the study

South Asian region has complex topographical features and it further leads to wider atmospheric variability. There are regional variations across the nations of South Asia regarding the prevalence of mental disorders. This study provides first pragmatic and quantitative estimation regarding role of atmospheric variability in the genesis of common psychiatric disorders in South Asia.

Authors Contribution

The first author has initiated and conceptualized the work. He has contributed in the review of literature, data analysis and manuscript preparation. The second author has especially contributed in review of literature, data acquisition and preparation of the manuscript. The third author has especially contributed in designing of the study and manuscript editing.

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Tables

TABLE 1: EXTRACTED GEOGRAPHICAL CO-ORDINATES AND HISTORICAL ATMOSPHERIC DATA OF SURVEYED PLACES IN INDIA

Investigators	Year	Center	Sample Size	No. of cases	Latitude (°N)	Longitude (°E)	Altitude (Mt.)	TYR (mm)	HMAT (K)	LMAT (K)	HMAH (%)	LMAH (%)	HMAAP (Pa)	LMAAP (Pa)
Surya (29)	1964	Pondichery	2731	26	11.913	79.814472	3.73	861.34	305.4763	297.5	77.0004	60.81282	101384	100506.8
Sethi et al. (30)	1967	Lucknow	1733	126	26.846	80.946	117.32	997.11	309.8121	292.0547	88.18355	24.03925	102174.5	99694.81
Dube (31)	1970	Agra	29468	531	27.176	78.008	167.86	538.33	311.9213	292.864	84.48986	24.56864	101892.5	99641.7
Elnagar et al. (32)	1971	Hoogly	1393	38	22.896	88.246	12.3	1271.3	302.2213	296.0167	87.99327	49.21998	101892.8	99911.57
Sethi et al. (33)	1972	Lucknow	2691	106	26.846	80.946	117.32	476.57	311.056	293.7605	83.18922	24.83076	102020.7	99814.31
Verghese et al. (34)	1973	Vellore	1887	126	12.916	79.132	218.16	822.03	305.0116	297.494	76.25375	60.8074	101338.5	100451.5
Sethi et al. (35)	1974	Lucknow	4481	300	26.846	80.946	117.32	704.19	309.4253	291.0235	85.18436	29.07787	102104.4	99636.83
Thacore et al. (36)	1975	Lucknow	2696	220	26.846	80.946	117.32	794.86	310.6205	290.1774	84.64761	24.80587	101982.5	99837.99
Nandi et al. (37)	1975	North 24 Parganas	1060	109	22.616	88.402	7.11	1504.17	306.3061	294.5322	88.39761	48.21212	101830.6	99930.79
Nandi et al. (38)	1977	Midnapore	2918	170	22.43	87.321	53.37	1644.36	303.5465	294.9531	86.7925	50.49851	101815.8	100064.7
Nandi et al. (39)	1979	North 24 Parganas	3718	380	22.616	88.402	7.11	1180.82	306.7603	296.1342	83.93311	50.37199	101677.9	99945.05
Shah et al. (40)	1980	Ahmedabad	2712	128	23.022	72.571	50.38	602.98	307.006	295.5228	86.39111	38.70088	101698.6	100002.7
Mehta et al. (41)	1985	Vellore	5941	86	12.916	79.132	218.16	1277.92	304.8372	297.475	78.63058	62.02477	101404.6	100329.5
Sachdeva et al. (42)	1986	Faridkot	1989	44	30.593	74.827	206.89	220.44	309.4851	290.5023	74.34003	42.29598	102115.4	99454.7
Premranjan et al. (43)	1993	Pondichery	1066	106	11.913	79.814	3.73	1507.3	305.0161	297.2436	80.74878	58.78895	101396.9	100481.2
Shaji et al. (44)	1995	Erankulam	5284	82	9.981	76.299	3.43	2367	301.3999	299.1299	86.33707	63.79036	101259.8	100832.3
Nandi et al. (45)	2000	North 24 Parganas	3488	367	22.616	88.402	7.11	1369.73	303.4786	294.5397	86.67626	55.53743	101814.2	100002.3
Sharma &Singh (46)	2001	Goa	4022	242	15.33	73.59	20	2683	301.3419	298.5541	82.66493	64.74583	101119.9	100494
Deswal&Pawar(47)	2012	Pune	3023	152	18.52	73.856	559.9	1092.9	303.65	292.9833	87.39996	69.09995	10139.8	10054.2
Rao et al. (48)	2014	Suttur	3033	740	12.165	76.795	655.54	1821.765	303.0455	295.21	88.999	72.999	101170.1	100547.5

TYR: Total yearly rain fall (in mm); HMAT: Highest monthly average temperature (in K); LMAT: Lowest monthly average temperature (in K), HMAH: Highest monthly average humidity (in %); LMAH: Lowest monthly average humidity (in %); HMAAP: Highest monthly average air pressure (in Pa); LMAAP: Lowest monthly average air pressure (in Pa); DT(Yearly Differences in Temperature) = HMAT-LMAT; DH (Yearly Differences in Humidity)= HMAH-LMAH; DAP (Yearly Differences in Air Pressure)= HMAAP-LMAAP

TABLE 2: EXTRACTED GEOGRAPHICAL CO-ORDINATES AND HISTORICAL ATMOSPHERIC DATA OF SURVEYED PLACES IN PAKISTAN, BANGLADESH, NEPAL, AND SRI LANKA

Investigators	Year	Center	Sample Size	No. of cases	Latitude (°N)	Longitude (°E)	Altitude (Mt.)	TYR (mm)	HMAT (K)	LMAT (K)	HMAH (%)	LMAH (%)	HMAAP (Pa)	LMAAP (Pa)
Mumford et al. [P] (16)	1996	Chiral, Hindukush	515	42	35.852	71.787	1509.76	988.28	294.568	276.538	79.456	57.017	102749	99737.94
Mumford et al. [P] (17)	1997	Rural Punjab	664	148	33.251	73.306	458.09	500.42	309.752	287.994	76.297	46.929	102081.6	99653.36
Mumford et al. [P] (18)	2000	Rawalpindi	760	140	33.598	73.044	503.95	186.1	312.882	288.162	76.102	33.546	101951.3	99899.56
Chowdhury et al.[B] (49)	1981	Dasherkandi	1181	77	23.762	90.464	6.81	1946.67	302.288	293.834	89.497	56.817	101704	100027.9
Islam et al. [B] (50)	2003	Dhaka	1145	321	23.81	90.412	16.01	1718.43	303.979	288.057	76.685	54.458	101995.2	100047.1
Karim et al. [B] (51)	2006	Dhaka	327	40	23.81	90.412	16.01	1660.88	303.068	289.941	74.104	49.256	101762.4	100162.4
Firoz et al. [B] (52)	2006	Dhaka	1432	742	23.81	90.412	16.01	1660.88	303.068	289.941	74.104	49.256	101762.4	100162.4
	2006	Rajshahi	3161	437	24.363	88.624	23	1307	304.025	289.821	80.240	46.437	101829	100034.4
	2006	Chittagong	2507	336	22.347	91.812	33.66	2887.95	301.802	288.306	82.386	52.048	101499.3	99954.03
	2006	Khulna	1526	343	22.845	89.54	8.17	1726.1	302.714	297.6	72.533	48.010	101616.7	99792.23
	2006	Barishal	872	170	22.702	90.346	7.4	1726.1	302.715	297.606	72.533	44.010	101616.7	99792.23
	2006	Sylhet	872	72	24.904	91.861	23.92	1994.8	301.783	294.038	70.351	49.398	101846.7	100118.6
Hosain et al. [B] (53)	2007	Savarnabinagar	766	125	23.914	90.216	14.81	2010.88	303.269	290.805	83.78	55.142	102330.1	100649.2
Tausig et al. [N] (14)	2000	Jiri,	653	135	27.627	86.226	1940.24	1988.97	296.892	277.180	90.155	50.935	102435.6	100790.2
Upadhayay& Pol [N] (15)	2003	Syangja,	773	274	28.0196	83.804	1260.62	2360.14	286.452	263.402	70.351	49.398	101588.2	100163.9
Khattri et al. [N] (13)	2013	Baglung	261	98	28.194	83.621	1423.25	814.96	287.249	259.716	71.351	50.139	102342.6	100017.5
Wijesinghe et al. [S] (54)	1978	EtulKotte, Pita Kotte	7653	354	6.891	79.905	389.81	2512	301.26	298.811	81.150	71.588	101031.1	100786.9

TYR: Total yearly rain fall (in mm); HMAT: Highest monthly average temperature (in K); LMAT: Lowest monthly average temperature (in K), HMAH: Highest monthly average humidity (in %); LMAH: Lowest monthly average humidity (in %); HMAAP: Highest monthly average air pressure (in Pa); LMAAP: Lowest monthly average air pressure (in Pa); DT(Yearly Differences in Temperature) = HMAT-LMAT; DH (Yearly Differences in Humidity)= HMAH-LMAH; DAP (Yearly Differences in Air Pressure)= HMAAP-LMAAP. [P]- Pakistan, [B]- Bangladesh, [N]- Nepal, [S]- Sri Lanka.

TABLE 3: THE RESULTS OF META-REGRESSION MODEL OF LATITUDE, LONGITUDE AND ALTITUDE AS MODERATOR VARIABLES AND PREVALENCE OF MENTAL DISORDERS AS CRITERION VARIABLE

Moderators	Estimate (β)	SE	Z Value	P value
Intercept	-0.7428	0.3026	-2.42	0.0141
Latitude	0.0038	0.0036	1.0582	0.290
Longitude	0.0115	0.0036	3.1894	0.0014
Altitude	0.0001	0.0001	2.738	0.0062

TABLE 4: THE RESULTS OF META-REGRESSION MODEL OF ATMOSPHERIC VARIABILITY AS A MODERATOR VARIABLES AND PREVALENCE OF MENTAL DISORDERS AS A CRITERION VARIABLE

Moderators	Estimate (β)	SE	Z Value	P value
Intercept	0.0415	0.1107	0.3747	0.7079
Total yearly rain fall	0.0001	0.0000	2.8260	0.0047
Yearly differences in temperature	0.0166	0.0045	3.7160	0.0002
Yearly differences in Humidity	-0.0047	0.0019	-2.4031	0.0163
Yearly differences in air pressure	0.0000	0.0000	1.0364	0.3000

Figures

FIGURE 1: FLOWCHART OF SEARCHES FOR STUDIES REPORTING THE PREVALENCE OF MENTAL DISORDERS IN SOUTH ASIA

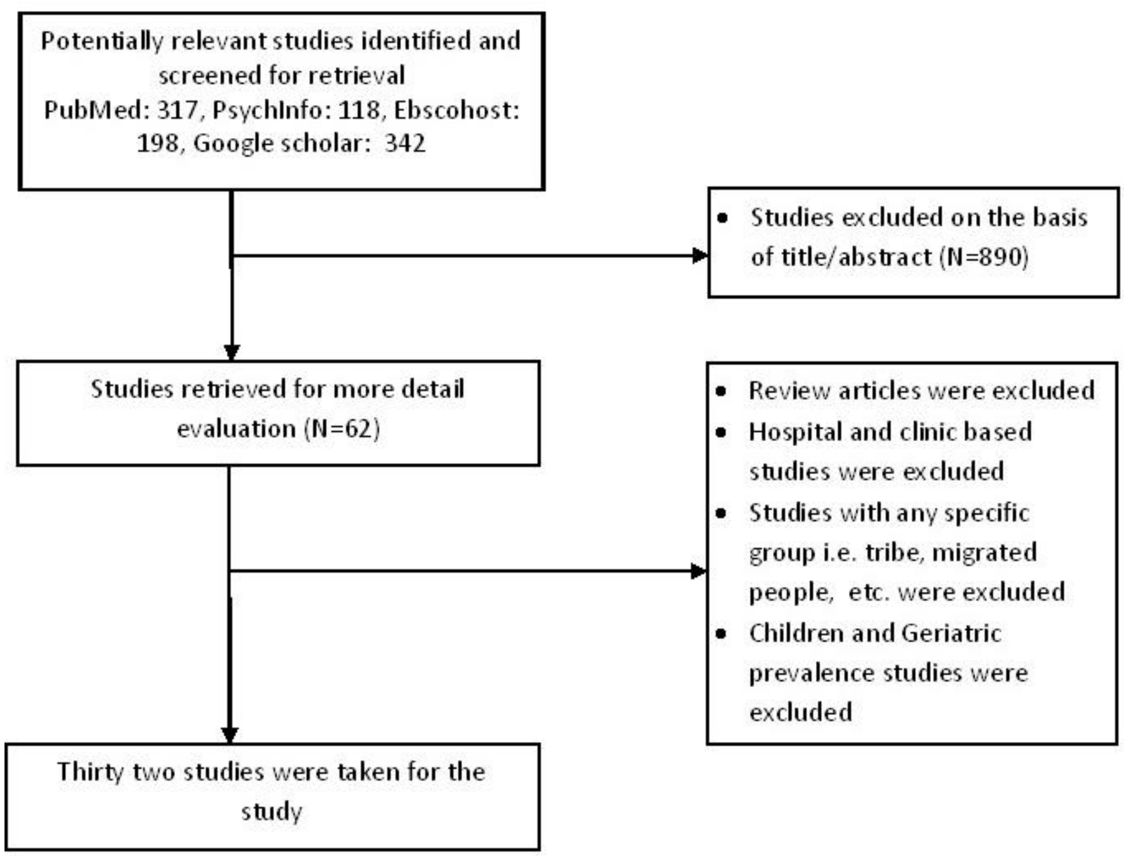

FIGURE 2: REGRESSION LINE FOR GEOGRAPHICAL CO-ORDINATES AS INDEPENDENT VARIABLE AND PREVALENCE RATE AS CRITERION VARIABLE

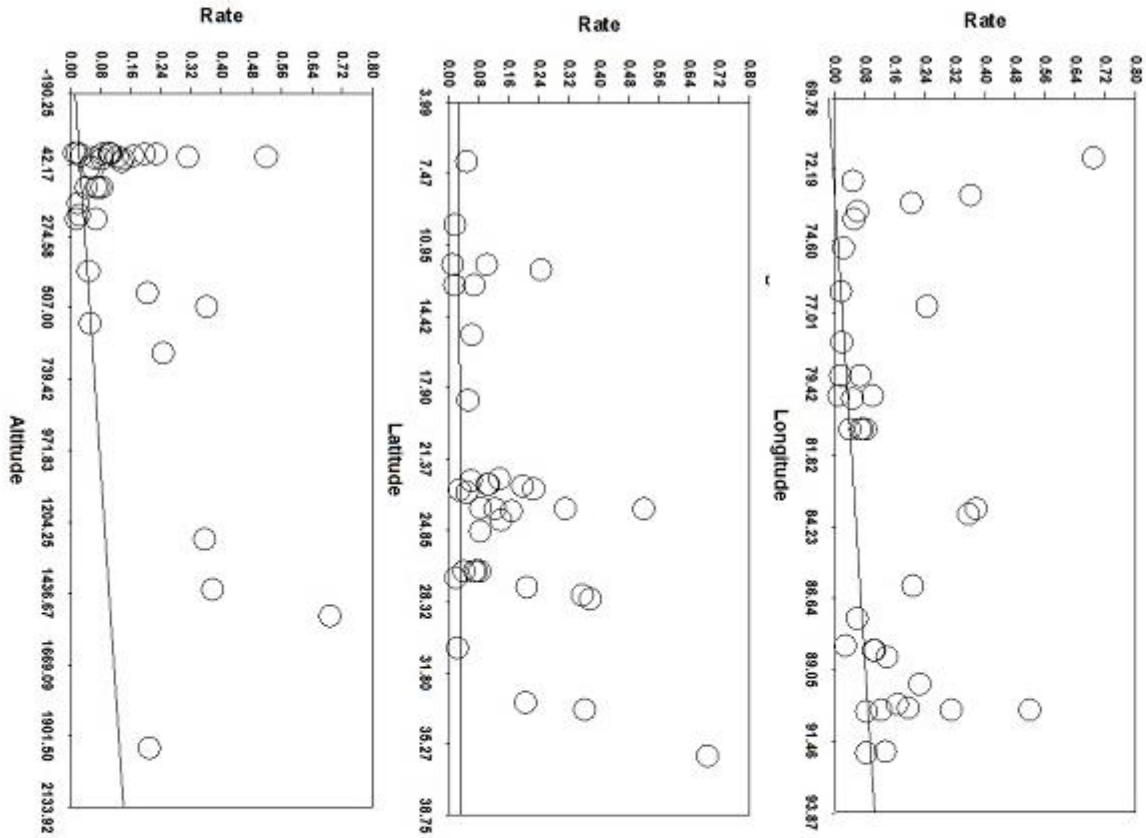

FIGURE 3: FUNNEL PLOT FOR A MODEL WITHOUT MODERATORS (RANDOM EFFECT MODEL) AND A MODEL WITH MODERATORS (MIXED EFFECTS MODEL)