Suicide in India

Dr. P.N. Suresh Kumar*

Abstract

Suicidal behavior with consequent fatal out come has become an important public health problem in India. On an average 100,000 people per year commit suicide in India. Despite the enormity of the problem there are only few methodologically sound studies in this area. Currently available data show that suicidal phenomena, which occur in India, are different from western society in a number of ways. Second and third decade seems to be the most susceptible age for Indian suicides. The predominance of males in suicide reported from western countries is not so significant in India. In India more than 65% of suicide victims are married. Though emotional disorders play an important role in suicides, social factors also have an important role in Indian suicides. Hanging and insecticide poisoning appear to be the favorite methods in Indian suicides. These observations have great relevance in planning suitable and meaningful suicide prevention strategies in India. Mental health professionals in India have an important responsibility to develop and implement effective suicide prevention programmes.

Key words- suicide, attempted suicide, India

Global Situation

W.H.O. defines suicide as an act with fatal outcome and suicide attempt as an injury with varying degrees of lethal intent. Suicide accounts for 0.4- 0.9% of all deaths. It accounts for 0.3-1% of all casualty admissions.

According to a recent report of W.H.O. on Violence and Health (World Reporting Violence and Health, WHO, 2002) about 8,15,000 people died from suicide in the year 2000, around the world. This represents an annual global suicidal rate of about 14.5 per 1 lakh population or one suicidal death about every 40 seconds.

The phenomenal increase in suicide during the last 5 decades had lead to the fact that today, that it is one of the three leading causes of death in 15-44 years. A significant observation has been the alarming increase of suicides among young adults in both high and low industrialized countries. Even though there has been an increase, the causes of suicide are still little understood within developing countries due to the complex interaction of social, health, economic, demographic and environmental factors.

* MD, DPM, DNB, MNAMS, FIAMS
Director, Institute of Mental Health & Neurosciences, Kozhikode-673016, Kerala

Table 1

Suicide rate by sex	Male	Female	Both sexes
Hungary	58.0	20.7	38.6
Sri Lanka	48.8	22.3	35.8
Finland	48.9	11.7	29.8
Switzerland	34.3	11.6	22.7
Belgium	32.0	13.8	22.7
Austria	34.6	11.6	22.6
Denmark	30.0	15.1	22.4
France	29.6	11.1	20.1
Sweden	26.8	10.6	18.6
Czechoslovakia	27.3	8.9	17.9
Germany	24.9	10.7	17.5
Japan	20.6	11.8	16.1
Norway	23.3	8.0	15.5
Poland	23.9	4.4	13.9
Singapore	14.7	11.5	13.1
Canada	20.4	5.2	12.7
USA	19.9	4.8	12.2
Puerto Rico	19.4	2.1	10.5
Uruguay	16.6	4.2	10.3
Netherlands	12.3	7.2	9.7
Portugal	14.9	4.6	9.6
Ireland	14.4	4.7	9.5
UK	12.4	3.6	7.9
Spain	11.6	3.9	7.7
Italy	11.2	4.1	7.5
Thailand	4.5	4.5	5.8
Chile	9.8	1.5	5.6
Venezuela	7.8	1.8	4.8
Greece	5.5	1.5	3.5
Colombia	5.1	1.5	3.3
Mexico	3.9	0.7	2.3

National Scenario

The massive demographic, socio-economic, cultural, epidemiological transformation with some progress in the control of communicable diseases has been resulted in the emergence of man-made, behavior linked and multifactorial non-communicable diseases such as "Suicides".

The only source of information on suicides has been the "National Crime Record Bureau" (NCRB), which compiles information from all states and union territories and publishes annual reports. Due to the complexities in underrepporting, misclassification, lack of suitable and simple methodologies, the precise magnitude of the problem is not clearly understood. It is assumed that the official suicide rates under-estimate the true rates by 20% to 100% (Isaac, 2003). Applying this ratio the number of persons completing suicide in the country every year will be around 1,50,000-1,75,000 (incidence figures based on earlier suicide incidence studies) (Gururaj et al, 2000), which is 1.5 times higher than the reported figures.

Some facts from NCRB are a testimony to the increasing problem of injuries and suicides in India. From 40,000 suicides in 1968, the numbers have risen to nearly 1,10,000 by 1999, an increase of 175%. Compared with the rate in 1998, suicides increased by 5.6% during 1999. These numbers are likely to be much higher considering the issues of non-reporting from several parts of the country, especially from rural areas.

The national suicide rate for India stands at 10.6/1,00,000 (NCRB, 2001). Kerala ranks first in India for its suicidal rate (27 per 1 Lakh), which is three times higher than the national average and many developed countries (SCRB, 2004). Pondichery, A&N Islands, Tripura, Karnataka are other states top in the list of suicides.

Table-2
Suicide rate in India per 1,00,000 population

Year	Rate
1987	7.50
1988	8.07
1989	8.47
1990	8.94
1991	9.23
1992	9.24
1993	9.5
1994	9.9
1995	9.7
1996	9.5
1997	10.0
1998	10.8
1999	11.2
2000	10.8
2001	10.6

Epidemiological studies on suicides in India

Till date there are no well systematic community based reports on the prevalence of suicides in India. Various studies report varying rates from as low as 5.13 (Nandi et al, 1979) to as high as 43.4 per I lakh population (Banerjee et al, 1990). The wide discrepancy in the rate could be due to lack of uniform criteria in case identification. It could also be a reflection of the socio-demographic variation and intracultural diversity of different states.

Age distribution

One of the classic observations in the epidemiology of suicides is the predominance of elderly and the general tendency of suicide rate to increase with age. Recently there is a shift in the predominance in the number of suicides from the elderly to younger people all over the world including India. In terms of vulnerable age group, uniformly all studies have pointed towards the second and third decades of life as the most vulnerable phase for Indian suicides (Sathyavathi & Murthy Rao, 1961; Venkoba Rao, 1965; Venkoba Rao & Chnnian, 1972; Singh, 1977; Kodandaram et al, 1983; Narang et al, 2000, Ponnudurai et al, 1986; Ponnudurai, 1996; Sharma, 1998; Subramanyan & Kumar, 2001; Kumar, 2002 & 2004). A five-year (1998-2002) analysis of suicides in Kerala showed 55-60% of all suicides committed by person between 15-45 years of age (Kumar, 2003). Only 19% of suicides were committed by people aged 50% and above.

Difficulties in securing suitable jobs, problems arising out of marriage which take place increasingly during the early phase of life and the financial burdens are some of the factors which enhance the suicide risk among young individuals. The respect the aged enjoys and the integration they have with the families and society in our culture might be protective mechanism in our elders against suicide.

Gender

All over the world suicide rates are consistently higher in males than females with a male female ratio ranging from 3:1 to 10.5:1. Globally the only exception for this observation is rural China (Philips et al, 2003). The ratio is vastly different in India also with a male female ratio of 1.6:1. This diminishing gender difference is worth investigating. For the last few years many studies from India ((Aiyappan & Jayadev, 1956; Sathyavathi & Murthi Rao, 1961; Nandi et al, 1979; Ponnudurai & Jayaker, 1980; Shukla et al, 1990; Banerjee et al, 1990; Kumar, 1998 & 2004) have reported an increasing female predominance in suicide.

The higher rate of female suicide is explained from situational, psychological and socio-cultural

perspectives by many authors. The situational problems of economic deprivation, financial insecurity and family discord are the predisposing factors for psychological conflict. This is accentuated by the low position of the women in the community. It is generally believed that women in India are more submissive, docile and non-assertive and these traits have built into their psyche with the result that they find themselves unable to deal with their negative feelings adequately. Among stresses the marital ones appear to be the most common in women. The hostile environment in families compounded by problem of a difficult husband and dowry-demanding in-laws are important issues in female suicides. They may feel helpless as they fear losing their husbands sympathies and often they do not have any one turn to. This results in the choice of suicide as a way out from psychological pain, anguish and suffering. This calls for measures to cultivate and improve their coping styles to face the domestic conflicts and dowry related problems (Venkoba Rao, 1989).

Religion and community

Ganapathy & Venkoba Rao (1966) noted the percentage of distribution of Brahmins, Muslims, Harijans and other communities in their samples to be 1.7, 2.1, 4, 7.5 and 84.7 respectively. However, since the figures in such reports are not calculated for the ratio of population and of the particular community, little inference could be drawn from these data.

Joint suicides

Satiavathy & Murti Rao (1962) identified 19 cases (5.96%) where suicide was committed with others. While 9 women had taken their lives along with their children the rest (5 pairs) had done so suicide pact with lovers. Noteworthy was, of the nine women died with children, 5 had mental illness.

Marital status

Most studies reported from the West indicate that being in a stable marital relationship is generally a protective factor against suicide. Being divorced, separated, widowed or being in single status are considered to be risk factors for suicide. In India more than 65% of persons who committed suicides were married (Kodandaram et al, 1983; Sathyavathi & Murthi Rao, 1961; Shukla et al, 1990; Kumar, 2000 & 2002). In our country's socio-cultural set up, factors such as dowry problems, adjustment problems between two previously unknown families, financial constraints, and stigma attached to separation and divorce could be some of the notable contributions for the self harming behavior in the married individuals (Ponnudurai, 1996).

Shukla et al (1990) have put forward several reasons for suicide being more common among the married in India. Here marriage is social obligation and is performed by the elders irrespective of the individuals preparedness for it. Further in our culture marriage is believed to be part of the treatment for mental illness and the mentally ill are therefore more likely to get married earlier than the mentally healthy. Marital partners in our culture are virtually strangers to each other (due to arranged marriage) and so are the families. Hence several adjustment problems could come across among the married mentally. Divorce being socially frowned upon and difficult suicide provides the only escape. In the west, on the other hand, marriage is believed to be a measure of emotional stability and married people have lower rate of mental illness.

Mode of suicide

Hanging and insecticide poisoning appear to be the favorite methods in Indian suicides (Sathyavathi & Murthi Rao, 1962; Ganapathy & Venkoba Rao, 1966; Nandi et al, 1978; Hegde,1980; Ponnudurai et al, 1986; Banerjee et al, 1990; Shukla et al, 1990; Sarma & Sawang, 1993; Kumar et al, 1997; Sharma, 1998; Jain et al, 1999). In a recent study, hanging and insecticide poisoning were the most favorite methods in both genders followed by insecticide poisoning in males

and self-immolation in females (Kumar, 2004). Burns in general have been reported more common in females (ICMR, 1987).

Factors like feasibility, accessibility, credibility and rapidity of action and degree of suicide intent could be behind the choice of method for committing suicide. The availability of method becomes more important when the suicidal act is impulsive in nature. Incidentally most of the studies on attempted suicide show that the predominant psychiatric problem is adjustment disorder following an adverse life experience. In our country, majority of males are being farmers, have an easy accessibility to insecticides. Similarly, for females because of limited mobility outside home as majority are housewives, have more accessibility to medicines, corrosives, kerosene etc. However in both genders stronger suicidal intention might have led them to choose more lethal like hanging or self-immolation as a sure means to commit suicide.

Subramanyan & Kumar (2001) have attempted to correlate the intention to commit suicide with lethality of attempt in suicide attempters. High positive correlation was observed between intent and lethality. Patients with psychiatric disorder especially depression had high suicide intent. Patients with adjustment disorder and those resorting to medicine overdose had low intent. Male attempters, those with a positive family history of mental illness and having a current psychiatric diagnosis had a positive correlation with lethality.

Precipitating factors for suicide

The causes or the factors that are reported for suicidal attempts differ in police records and in clinical experience. Maladjustment with significant family members, financial problems and domestic strife has been cited as the most important causes for suicide attempt in India (Nandi et al, 1979; Hegde, 1980; Shukla et al, 1990; Banerjee et al, 1990; Sharma, 1998; Jain et al, 1999; Kumar, 2000; Vijayakumar, 2003). Elsewhere, it has been pointed out that 12.5% females have committed suicide due to maladjustment with alcohol and drug abusing husbands (Ponnudurai & Jayakar, 1980). However, Sarma & Sawang (1993) have noted physical factors (males-60.8%, females- 68.%) as the chief driving force.

Psychiatric diagnosis

The relationship between suicidal behavior and psychiatric diagnosis has always been a matter of debate. The psychiatric diagnosis depends on the method of identification and classificatory system adopted. Western literature reports that about 90% of all those who commit suicide suffer from a psychiatric disorder. A recent systematic review conducted by WHO (Bretolete & Fleischmann, 2002) found that 98% of those who committed suicide had a diagnosable mental disorder. No reliable data are available from India on psychiatric diagnoses of suicide victims. Venkoba Rao et al (1989) in a study of one hundred female burns suicides found psychiatric disorders only in 23% of cases. Sarma & Sawang (1993) in their study of attempters had identified only one third of their sample to be psychiatrically ill. Shukla et al (1990) also found out mental illness in only 23.5% of suicides in Jhansi city. Narang et al (2000) in a study of attempters in Ludhiana reported 35% suffering from mood disorder, 13% adjustment disorder, 3% substance dependence and schizophrenia each and 1% each of personality disorder, panic disorder and dissociative disorder. Galgali et al (1998) reported adjustment disorder as the commonest diagnosis (33.7%) followed by mood disorder (27.2%) in their study. Sharma reported psychiatric illness in 46.7% of their sample with mood disorder being the predominant presentation. Jain et al (1999) reported psychiatric illness in 57% of attempters in their study with depression (37.5%) being the commonest diagnosis. In a series of studies on suicide attempters by the author, the predominant psychiatric problem was major depression closely followed by adjustment disorder and alcohol abuse/

dependence (Subramanyan & Kumar, 2001; Kumar, 2000 & 2002). Several of these attempts were of impulsive type and were done within hours of some triggering factor.

Suicide and availability of lethal methods

The relationship between availability of lethal methods of injury and suicide rate is an important unresolved question. Moreover, factors like feasibility, accessibility, credibility and rapidity of action and degree of suicide intent could be behind the choice of method for committing suicide. The availability of methods becomes more important when the suicidal act is impulsive in nature. Marzuk et al (1992) in a study on the effect of access to lethal methods of injury on suicide rates concluded that difference in suicide between communities are, in large part, due to difference in accessibility to lethal methods of injury. Evidence has grown in recent years that restricting a method used for suicide reduce the suicide rate by that method. Considering the high rate of suicide attempt with organophosphorous compounds in India, Ganapathy & Venkoba Rao (1966) and Nandi et al (1979) have pleaded for the restriction in the sale of these compounds. Systematic studies are needed to evaluate the effect of reducing the availability to specific lethal methods on suicide rates.

In our state, majority of males are being farmers, they have an easy accessibility to insecticides. Similarly for females because of limited mobility outside home as majority are housewives they have more accessibility to native poisons, medicines, corrosives, kerosene etc. However in both genders stronger suicidal intention might have led them to choose more lethal method like handing as sure means to commit suicide. It has been revealed in Indian studies that domestic burns as a method of completing suicide by young women and most lethal one with a promise of a high degree of success. Burns in general have reported more in younger women (ICMR, 1987).

Time of suicide and secrecy of act

No consistency is observed in the time selected for suicide. Sathyavathy & Murthy Rao (1962) noted early morning and proximity to noon as the most preferred time. 60.8% of their samples committed the act when they were alone. Further, in their sample 18.8% have accomplished their act while others were asleep. It is possible that these individuals have waited for opportune moment of isolation or they have deliberately made their way clear by tactfully sending of others from that spot, or they have carefully selected places where there is no scope of intervention by others. Ponnudurai & Jayakar (1980) observed 6.00PM to 12.00 Midnight as the most preferred time. In a study by Kumar (2002), the fateful hour of suicide falls between 6.00PM and 12.00PM in majority of cases followed by 12 to 6.00AM. Milev & Milkev (1992) have observed that suicide occurred mainly after 2.00PM with the maximum frequency between 8.00PM and midnight. The high incidence of suicide in the evening and night hours gives more room for the speculation whether there is any association between suicidal behavior, diurnal variation of mood and abnormal plasma cortisol levels in the evening and night hours as reported in many depressed patients (Carrol & Mendels, 1976). Choosing nighttime for suicide also involves secrecy of action that at this time other members of the household will be asleep there by minimizing the chance of detection by others.

Season and suicide

Some studies from other countries like Finland (Hakko et al, 1999), China (zhang, 1996), South Africa (Flisher et al, 1997), reported some seasonal effects on suicide. The link between season and suicide is due to the effects of whether changes on neurotransmitters and blood chemistry. Sarma & Anand (2000) analyzed the seasonal effects on suicides in Warangal district over a period of seven years. No significance seasonal effect on suicides was found in that study. In another study by

Sarma & Sawang (1993) more than half of the suicides were in monsoon months. In Calcutta seasonal variations in suicides were witnessed a century ago with 61.7% of cases having been reported in the hot months (April to September). However, this trend could not be confirmed in the years 1973, 1974 and 1975 (Nandi et al, 1978). Further studies are needed in this area.

Suicide notes

In a study conducted by Kumar (2000) only 9% had left behind suicidal notes. On the other hand 39% had expressed suicide threat prior to the attempt. In a study conducted by Sahtyavathi & Murthy Rao (1962) 6.89% had left behind suicidal notes. Ponnudurai et al (1986) reported that 4.7% had written suicide notes prior to their attempts. Many factors such as literacy, inhibition, availability of writing materials, subjective urge to communicate their wish and the nature of circumstances may be contributory for leaving behind suicidal notes.

Venues of suicide

Venue on suicide has received little attention till date. Some time this aspect may offer a clue besides the individual's psychological states, about the intensity of suicide intent. One half of the sample of Sahtyavathi & Murti Rao (1962) preferred their residence for this fatal act. Ganapathy and Venkoba Rao (1966) in their cases of drowning pointed out that the preference was for a well in the majority, while others chose temple or public tanks or river channel. Ponnudurai et al (1997) has reported that 33.7% of males preferred places out side their house for suicidal act where as it was so only in 3.64% in females. Further more in this study in about 80% of persons were suffering from mental illness the preferred place was out side the house. The lesser frequency of hanging inside houses in comparison to the other common des might be due to the realization of consequences likely to ensue due to the widely held belief in our culture that after the death by hanging, the individual's ghost will continue to haunt their place. Despite noting that 30 of the 35 who died by hanging did so inside a room, Shukla et al (1990) have not outlined the location of these rooms. However, they have noted that the remaining five (4 males, 1 females) hanged themselves from trees. The author (Kumar, 2002) in their study found that more males (33.3%) preferred places out side the house than females (10.6). These observations may be reflective our socio-cultural traditions, which inhibit the movement of females out side their houses freely.

Follow up study of suicide attempters

Studies in this direction are very few from India. Ponnudurai et al (1991) followed up 51 cases of attempted suicide for two 2 years after their initial attempt. One person (1.96%) committed suicide, one half years after the first attempt. This individual was single, male and in the age group of 21-25 years. Seven subjects (133.73%) continued to harbour suicidal ideation. Gupta and Singh (1981) in their follow up of 61 subjects, came across two suicides both of them were females, married, and aged 18 and 25. One of them was schizophrenic and the other was suffering from psychotic depression.

Alcohol intake at the time of suicide attempt

Ponnudurai & Jayakar (1980) in their study reported that among males 10.3% had committed suicide while they were under the influence of alcohol. Same author (Ponnudurai et al, 1986) in another reported a figure of 10.4% under the influence of alcohol during their attempt. A study conducted on social and toxicological data on suicide (Breur et al, 1986) also reported that 24% had taken alcohol in addition to other drugs. A study conducted by the Kumar (2000) found only 5% had consumed alcohol at the time of attempt. The intake of alcohol during attempt could be for minimizing the inhibition of suicidal act and to mask the unpleasant taste of the poisonous substance consumed. Further studies warranted in this area.

Biological studies

There are only few studies from India related to biological markers in suicide. Palaniappan et al (1983) reported an inverse relation ship between urine and C.S.F 5 HIAA and serotonin levels and severity of suicide. A low metabolic syndrome of depression and suicide has been documented by Venkoba Rao et al (1984). With antidepressant treatment, and with clinical improvement the melatonin level reverted to normal. The low melatonin may reflect low serotonin turnover since serotonin is the precursor of melatonin and it may also indicate a low noradrenergic tone.

An inverse relationship between the serum lipid level, depression and suicidal behavior has been demonstrated previously (Maes et al, 1994). The comparison of serum cholesterol, HDL, LDL, TGL and VLDL between suicide attempters versus normal age, sex and BMI matched controls showed no difference in a study conducted by author (2003). Correlation analysis of Risk Rescue Rating Scale, Hamilton Depression Rating Scale and serum lipid profile did not show any significant interrelationship between these factors.

Conclusion

Currently available data show that suicidal phenomena, which occur in India, are different from the west in a variety of ways. Second and third decade seems to be the most susceptible age for Indian suicides. The gender difference in suicide is diminishing. Noteworthy are the imported causative factors such as maladjustment with significant family members and domestic strife. Further more the event of marriage in our culture appears to augment the proneness for suicidal behavior. The commonly observed modes of suicide in our country are hanging, poisoning, drowning and burning. This indicates that apart from the credibility and rapidity of action, the availability and accessibility of particular method is also vital.

It is important for our country to develop locally and culturally relevant and feasible strategies for suicide prevention that can be implemented along with other national health, education, and welfare programmes. Some of the principles on which suicide prevention strategies need to be developed are as follows:

1. Early detection and treatment of depression and other mental disorders including alcohol and drug abuse.
2. Enhanced access to mental health services
3. Intervention aimed at psychological reaction to physical illness.
4. Assessment and intervention for those who attempt suicide with close liaison with other medical specialties
5. Intervention after a suicide - postvention
6. Interventions for high risk and special groups
7. Training - health / education / welfare personnel
8. Restrict availability of means such as insecticides and medicines
9. Training for acute care management of poisoning and establishment of such facility in every community health centres

School based interventions

a) Life skills education (improve self-esteem and problem solving skills)
b) School based counseling
c) Training for teachers
d) Close liaison with mental health services
e) Include mental health in curriculum

Crisis intervention

a) Telephone help line
b) Samaritans, Befrienders
c) Suicide prevention centres

10. Public education
11. Collaboration with media for responsible reporting
12. Sensitization of policy makers regarding sustainable development, employment.

References

- Aiyappan, A & Jayadev, C.J. (1956) Society in India. Social Science Publication, Madras.
- Banerjee, G., Nandi, D.N. & Nandi, S. (1990) The vulnerability of Indian women to commit suicide-a field study. Indian Journal of Psychiatry, 32, 305-308.
- Breur, H.W.G., Breur Jr & Fischback-Breur, B.R. (1986) Social, toxicological and meteorological data on suicide attempts. European Archives of Psychiatry and Neurosciences, 235, 367-370.
- Carrol, B.J. & Mendez, J. (1976) Neuroendocrine regulation in affective disorders. In hormones, Behavior and Psychopathology. Sachar, E.J. (editor). New York, Raven Press.
- Flisher, A.J., Parry, C.D., Bradshaw, D. & Juritz, J.M. (1997) Seasonal variations in suicide in South Africa. Psychiatric Research, 66, 13-22.
- Galgali, R.B., Rao, S., Ashok, M.V., Appaya, P. & Srinivasan, K. (1998). Psychiatric diagnosis of self-poisoning cases: a general hospital study. Indian Journal of Psychiatry, 40(3), 254- 259.
- Ganapathy, M.N. & Venkoba Rao, A. (1966) A study of suicide in Madurai. Journal of Indian medical Association, 46, 18-23.
- Gupta, S.C. & Singh, H. (1981) Psychiatric illness in suicide attempters. Indian Journal of Psychiatry, 23(1), 69-64.
- Gururaj, G., Thomas, A.A., & Reddi, M.N. (2000) Under reporting of injuries in Bangalore. Implications for road safety policies and programmes. Proceedings of the 5th World Conference on injury Prevention & Control, New Delhi, 1-3-1-04.
- Hakko, H., Rasanan, P. & Tihonen, J. (1998) Seasonal variations in suicide occurrence in Finland. Acta Psychiatrica Scandinavica, 98, 92-97.
- Hegde, R.S. (1980) Suicide in a rural community of North Karnataka. Indian Journal of Psychiatry, 22, 368-370.
- Indian Council of Medical research (1987) Report on collaborative study on Burn Injury.
- Issac, M. (2003) Public Health aspect of Suicide in India. Indian Journal of Psychological Medicine, 26 (1), 6-9.
- Jain, V., Singh, H., Gupta, S.C. & Kumar, S.(1999) A study of hopelessness, suicidal intent and depression in cases of attempted suicide. Indian Journal of Psychiatry, 41(2), 122-130.
- Kodandaram, P., Sathyavathi, K. & Murthy, H.N. (1983) Indian Journal of Psychological Medicine, 6, 44-49.
- Kumar, .P.N.S., Kuruvilla, K., Dutta, S., John, G. & Jayaseelan. (1995) Psychosocial aspects of attempted suicide. Indian Journal of Psychological Medicine, Vol.18, No.2, 32-42.
- Kumar, P.N.S., Kuruvilla, K., Dutta, S., John, G. & Nair, S.M. (1997) Hundred cases of suicide attempters admitted in a medical intensive care unit: study of psychosocial factors in relation to age and sex. Annals of Academy of Medical Sciences (India), 33, 223-33.
- Kumar, P.N.S. (1998). Age and gender related analysis of psychosocial factors in attempted suicide - study from medical intensive care unit. Indian Journal of Psychiatry, 40(4), 338-345.
- Kumar, P.N.S. (2000). A descriptive analysis of methods adopted, suicide intent and causes of attempting suicide. Indian Journal of Psychological Medicine, [illegible].
- Kumar, P.N.S., Abraham, A. and Kunhikoyamu, A.M. (2002). Age and sex related analysis of psycho-socio-demographic characteristics of suicide attempters. Indian Journal of Psychological Medicine, 25(1), 20-24.
- Kumar, P.N.S., Abraham, A., Thomas, B. & Kunhikoyamu, A. M. (2003). A comparative study of serum lipid profile of suicide attempters versus normal age, sex and BMI matched controls. Indian Journal of Psychological Medicine, 26(1), 33-37.
- Kumar, P.N.S. (2003). Suicide in Kerala-A critical analysis. Kerala Journal of Psychiatry, Vol.18, No.2, 14-21.
- Kumar, P.N.S. (2004). An analysis of suicide attempters versus completers in Kerala. Indian Journal of Psychiatry, Vol.46, No.2, 144-149.
- Maes, M., Delanghem J. & Metzer, H.G. (1994) Lower degree of esterification of serum cholesterol in depression. Relevance of depression and suicide research. Acta Psychiatrica Scandinavica, 90:252-258.
- Marzuk, P.M., Leon, A.C., Tardiff, K., Morgan, E.B., Satjic, M. & Man, J.J. (1992) The effect of access to lethal methods of injury on suicide rates. Archives of General Psychiatry, 49, 451-458.
- Milev, V. & Milkev, D. (1992) attempted suicide by poisoning in Sofia region. British Journal of Psychiatry, 169,560-562.

- Nandi, D.N., Banerjee, G. & Boral, G.C. (1978) Suicide in West Bengal- A century apart. Indian Journal of Psychiatry, 20, 155-160.
- Nandi, D.N., Mukherjee, S.P. & Banerjee, G. (1979) Is suicide preventable by restricting the availability of lethal agents? A rural survey of west Bengal. Indian Journal of Psychiatry, 21, 251-255.
- Narang, R.L., Mishra, B.P. & Mohan, N. (2000). Attempted suicide in Ludhiana. Indian Journal of Psychiatry, 42(1), 83-87.
- National Crime Record Bureau (2001) Accidental deaths and suicides in India. New Delhi, Ministry of Home Affairs, Govt. of India.
- Palaniappan, V. (1083). Suicidal ideation and biogenic amines in depression. Indian Journal of Psychiatry, 25(4), 286-292.
- Philips, M.R., Xianyleen, L.I., & Zhang, Y. (2003) Suicide rate in China, 1995-1999. In: Vijayamar, L.(Ed.) Suicide prevention- Meeting the challenge together. Orient Longman Private Limited.
- Ponnudurai, R. & jayakar J. (1980) Suicide in Madras. Indian Journal of Psychiatry, 22, 203-205.
- Ponnudurai, R., jayakar J. & Saraswathy, M. (1980) Attempted suicide in Madras. Indian Journal of Psychiatry, 28(1), 59-62.
- Ponnudurai, R., Vivekananthan, V.R., Raju, B. & Uma Shivakumari, T.S. (1991) Attempted suicide - a two year follow up study. Indian Journal Psychiatry, 33(4), 291-292.
- Ponnudurai, R. (1996) Suicide in India. Indian Journal of Psychological Medicine, Vol.19, No.1, 19-25.
- Ponnudurai, R., Patnaik, K., Sathianathan, R. & Subhan, K. (1997) A study on the venues of suicide. Indian Journal of Psychiatry, 39(1), 34-36.
- Sarma, G. P. & Sawang, G. (1993) Suicides in rural areas of Wrarngal District. Indian Journal of Behavioral Sciences, 3, 79-84.
- Sarma, G.P.& Anand, B. (2000) Suicides in Wrarngal District: season and suicide. Indian Journal of Psychological Medicine, 23(2), 33-36.
- Sathyavathi, K. & Murthi Rao, D.L.N. (1961) A study of suicide in Bangalore. Transactions of All India Institute of Mental Health, 2, 1, 1-19.
- Sathyavathi, K. & Murthi Rao, D.L.N. (1962) A study of suicide in Bangalore. Transactions of All India Institute of Mental Health, 3, 5, 5-25.
- Sharma, R.C. (1998) Attempted suicide in Himachal Pradesh. Indian Journal of Psychiatry, 40(1), 50-54.
- Shukla, G.D., Verma, B.G. & Mishra, D.N. (1990). Suicide in Jhansi city. Indian Journal of Psychiatry, 32, 44-51.
- Singh, H. (1977) A study of psychosocial factors in attempted suicide. Indian Journal of Psychiatry, 20, 25.
- State Crime Record Bureau (2004). Accidental deaths and suicides in Kerala, Thiruvananthapuram, Govt. of Kerala.
- Subramanyan, N., Kumar, P.N.S. & Kunhikoyamu, A.M. (2001) Psycho-socio- demographic correlates of intent and lethality in attempted suicide. Thesis submitted University of Calicut in partial fulfillment of the rules and regulations for the MD Degree examinations in Psychiatry 2001.
- Venkoba Rao,A., Mahendran, N., Gopalakrishnan, G., Reddy, K.T., Prabhakar, E.R., Swaminathan, R., Belinda, C., Andal,G., Baskaran, S., Rashme, Prahee, Kumar, N., Luthra, U.K., Aynkaran, J.R., & Cahterine, I. (1989) One hundred female burn cases: A study on Suicidology. Indian Journal of psychiatry, 31(1), 43-50.
- Venkoba Rao, A., Devi,P & Srinivasan,V. (1984) Low melatonin syndrome in depression. Proceeding of the 17th South Annual Conference of Indian Psychiatric Society at Coimbatore, October 1984.
- Venkoba Rao, A. (1965). Attempted suicide: An analysis of 114 medical admissions. Indian Journal of Psychiatry, 7, 253-264.
- Venkoba Rao, A. & Chinnian, R.R. (1972) Attempted suicide and suicide among students in Madurai. Indian Journal of Psychiatry, 14, 389.
- Vijayakumar, L. (2003) Psychosocial factors for suicide in India. In: Suicide Prevention- Meeting the challenges together (Ed.Vijayakumar, L.), Orient Longman Private Limited.
- World Health Organization (2002) World Report on Violence and Health, Geneva, WHO.
- Zhang, J. (1996) Suicides in China, 1992-1993. Suicide and Life Threatening Behavior, 6, 75-80.