

ORIGINAL ARTICLE

A Prospective Study of Socioeconomic Status by Modified Kuppuswamy Scale in Cases of Suicidal Deaths: An Autopsy Based Analysis

Karmakar SN.

Professor and Head, Department of Forensic Medicine, Terna Medical College, Nerul, Navi Mumbai.

Abstract:

Out of the various determinants which leads a person to commit suicide the Socioeconomic status (SES) of a person is very important. The combined total of economic and sociological measure of a persons work experience and of an individual family's economic access to resources and social position in relation to others is termed as Socioeconomic status (SES). Several scales have been proposed and reported to evaluate the socioeconomic classes of families of which the modified Kuppuswamy scale is most commonly used. The present study aims to study in details the various components of Socioeconomic status (SES) in cases coming for autopsy of suicidal manner at a tertiary care centre. The cases of suicidal manners were studied prospectively for a period of eight months from July 2020 to February 2021. A total 53 cases of suicidal deaths were included and studied. Skilled Agricultural & Fishery Workers were the commonest occupational group in cases of suicidal deaths. Intermediate or post high school diploma educated, Middle school certificate educated and Graduates education group formed majority of suicidal cases. Most of the cases had monthly family income upto Rs 74,755. Almost all the suicidal cases were in middle Socioeconomic class and upper lower Socioeconomic class groups. A detailed analysis of various factors of Socioeconomic status of suicidal cases can help to target necessary interventions in such target groups so that such cases of suicide can be avoided.

Keywords: Forensic science; Suicide; Hanging; Socioeconomic status; Modified kuppuswamy scale.

Introduction:

Suicide is the act of intentionally causing one's own death.¹ Suicide is a personal catastrophe that untimely takes the life of an individual and considerably affects the lives of families, friends and communities. A total of 1,39,123 suicides were reported in India during 2019 showing an increase of 3.4% in comparison to 2018 and the rate of suicides has increased by 0.2% during 2019 over 2018.² Every year 7,03,000 people take their own life worldwide and there are many more people who attempt suicide. Suicide occurs throughout the life span and was the fourth leading cause of death among 15–29 year olds, globally in 2019.³ Out of the various determinants which leads a person to commit suicide the Socioeconomic status (SES) of a person is very important. The combined total of economic and sociological measure of a person's work experience and of an individual's or family's economic access to resources and social position in relation to others is termed as Socioeconomic status (SES).^{4,5} Research studies of cases of suicidal deaths in relation to Socioeconomic status of the deceased are rare.

Aims and objectives: The present study aims to study in details the various components of Socioeconomic status (SES) in suicidal deaths using Modified Kuppuswamy scale which is the most commonly used Socioeconomic status scales.

Corresponding Author

Dr. Shibanand Nepal Karmakar

Email : shivanandkarmakardr@gmail.com

Mobile No. : +91-9766159176

Article History

DOR : 01.03.2023 DOA : 29.03.2023

Materials and methods:

The present study was conducted prospectively in the department of Forensic Medicine at our tertiary care centre for a period of eight months from July 2020 to February 2021. A total 53 cases of suicidal deaths were included and studied.

Out of the total autopsy cases inclusion criteria for the present study were as follows :-

- All cases of deaths due to suicidal manner.
- Suicidal death cases who were the family head.
- Suicidal death cases whose education and occupation was known at the time of conducting autopsy by asking to investigating agencies or relatives of the deceased.
- Suicidal death cases whose income per month of the family was known at the time of conducting autopsy by asking to investigating agencies or relatives of the deceased.

Exclusion criteria for the present study were as follows :-

- Suicidal death cases who were dependent and non-earning members of family were excluded from the present study. The rationale for excluding dependent and non-earning members of family was that education and occupation of head of family was difficult to obtain; as during medicolegal autopsy relatives were reluctant to provide such details of other members of family.
- Also cases with inadequate necessary information provided by relatives, inadequate history, doubtful findings and unknown bodies.
- All autopsy cases where manner of death is other than suicidal manner.

Table 1. Occupation of suicidal cases.

Occupation	No of Cases
Private Bussiness Work	04 (7.5 %)
Domestic Helper	03 (5.6 %)
Vegetable and fruits street vendor	02 (3.8 %)
Shopkeeper	04 (7.5 %)
Daily wage Labourer	07 (13.2 %)
Bricklayerer	03 (5.6 %)
Carpenter	02 (3.8 %)
Farmer	15 (28.3 %)
Technician	03 (5.6 %)
Teacher	01 (1.9 %)
Clerk	02 (3.8 %)
Retired Person	01 (1.9 %)
Gardener	01 (1.9 %)
Unemployed	05 (9.4 %)
Total	53

After the above mentioned inclusion and exclusion criteria a total 53 cases of suicidal deaths were included in the present study.

Necessary permission for the present study was obtained from institutional ethical committee. Consent is not required for conducting medicolegal autopsies in our country and hence consent to participate was not required.

Occupation of the cases was ascertained and was grouped as per Kuppuswamy socioeconomic scale. Education of cases and Monthly income of family of cases was also ascertained and was grouped as per Kuppuswamy socioeconomic scale. For monthly income of family; (February 2020 CPI) of Modified Kuppuswamy scale (update for February 2020) was used. Each case was then scored as per Kuppuswamy socioeconomic scale score and total score as per Kuppuswamy socioeconomic scale score was calculated and the cases were divided into different socioeconomic class as per Kuppuswamy socioeconomic scale.⁸

Results:

3.1. Occupation of suicidal cases.

Out of the total 53 cases of suicidal deaths; 15 (28.3 %) cases were farmers, 07 (13.2 %) cases were daily wage labourers, 05 (9.4 %) cases were unemployed or were not working at the time of death, 04 (7.5 %) cases had private bussiness work and also 04 (7.5 %) cases were shopkeepers.

There were 03 (5.6 %) cases each of Bricklayerer, domestic helper and technician. There were 02 (3.8 %) cases each of Vegetable and fruits street vendor, carpenter and clerk. Also there was 01 (1.9 %) cases of teacher, gardener and a retired Person. (Table no 1)

3.2. Occupation of cases of death due to suicide as per Kuppuswamy socioeconomic scale.

Out of the total 53 cases of suicidal deaths; 15 (28.3 %) cases were skilled agricultural & fishery workers having Kuppuswamy socioeconomic scale score 5, 12 (29.8 %) cases were in elementary occupation having Kuppuswamy socioeconomic scale Score 2, 08 (15.1 %) cases were skilled workers and shop &

Table 2. Occupation of suicidal cases as per Kuppuswamy socioeconomic scale.

Occupation as per Kuppuswamy socioeconomic scale	Kuppuswamy socio-economic scale Score	No of Cases
Legislators, Senior Officials & Managers	10	0
Professional	9	02 (3.8 %)
Technicians and Associate Professionals	8	03 (5.6 %)
Clerks	7	
Skilled Workers and Shop & Market Sales Workers	6	08 (15.1 %)
Skilled Agricultural & Fishery Workers	5	15 (28.3 %)
Craft & Related Trade Workers	4	05 (9.4 %)
Plant & Machine Operators & Assemblers	3	01 (1.9 %)
Elementary Occupation	2	12 (29.8 %)
Unemployed	1	05 (9.4 %)

market sales workers having Kuppuswamy socioeconomic scale Score 6.

There were 05 (9.4 %) cases each of craft & related trade workers having Kuppuswamy socioeconomic scale Score 4 and of unemployed workers having Kuppuswamy socioeconomic scale Score 1. 03 (5.6 %) cases were technicians and associate professionals workers having Kuppuswamy socioeconomic scale Score 8.

There were 02 (3.8 %) cases each of professionals having Kuppuswamy socioeconomic scale score 9 and of clerks having Kuppuswamy socioeconomic scale Score 7.

There was a single case of plant & machine operators and assemblers having Kuppuswamy socioeconomic scale Score 3. There was no case of legislators, senior officials & managers having Kuppuswamy socioeconomic scale Score 10. (Table no 2)

3.3. Education of cases of suicidal deaths as per Kuppuswamy socioeconomic scale.

In our current study of the total 53 cases of suicidal deaths; 15 (28.3 %) cases were intermediate or post high school diploma educated having Kuppuswamy socioeconomic scale Score 5, 13 (24.5 %) cases were middle school certificate educated having Kuppuswamy socioeconomic scale Score 3, 11 (20.7 %) cases were graduate having Kuppuswamy socioeconomic scale score 6, 06 (4.3 %) cases were primary school certificate educated having Kuppuswamy socioeconomic scale Score 2, 04 (7.5 %) cases were high school certificate educated having Kuppuswamy socioeconomic scale Score 4.

There were 02 (3.8 %) cases each of profession or honours educated having Kuppuswamy socioeconomic scale Score 7 and of Illiterates having Kuppuswamy socioeconomic scale Score 1. (Table no 3)

3.4. Monthly income of family of deaths due to suicide as per Kuppuswamy socioeconomic scale.

Out of the total 53 cases of suicidal deaths; 19 (35.8 %) cases had monthly family income of 10,002–29,972 having Kuppuswamy socioeconomic scale score 2, 15 (28.3 %) cases had monthly family income of 29,973– 49,961 having Kuppuswamy socioeconomic scale score 3.

There were 06 (11.3 %) cases had monthly family income of 49,962–74,755 having Kuppuswamy socioeconomic scale score

Table 3. Education of cases of suicidal deaths as per kuppuswamy socioeconomic scale.

Education as per Kuppuswamy socioeconomic scale	Kuppuswamy socioeconomic scale Score	No of Cases
Profession or Honours	7	02 (3.8 %)
Graduate	6	11 (20.7 %)
Intermediate or post high school diploma	5	15 (28.3 %)
High school certificate	4	04 (7.5 %)
Middle school certificate	3	13 (24.5 %)
Primary school certificate	2	06 (4.3 %)
Illiterate	1	02 (3.8 %)

Table 4. Monthly income of family of deaths due to suicide as per kuppuswamy socioeconomic scale.

Monthly income of family as per Kuppuswamy socioeconomic scale 2020 (February 2020 CPI)	Kuppuswamy socioeconomic scale Score	No of Cases
≥ 199,862	12	02 (3.8 %)
99,931–199,861	10	04 (7.5 %)
74,755 –99,930	6	01 (1.9 %)
49,962–74,755	4	06 (11.3 %)
29,973– 49,961	3	15 (28.3 %)
10,002–29,972	2	19 (35.8 %)
≤ 10,001	1	06 (11.3 %)

4 also 06 (11.3 %) cases had monthly family income of ≤ 10,001 having Kuppuswamy socioeconomic scale score 1.

04 (7.5 %) cases had monthly family income of 99,931–199,861 having Kuppuswamy socioeconomic scale score 10. 02 (3.8 %) cases had monthly family income of ≥ 199,862 having Kuppuswamy socioeconomic scale score 12. Only a single case (1.9 %) had monthly family income of 74,755 –99,930 having Kuppuswamy socioeconomic scale score 6. (Table no 4)

3.5. Socioeconomic class of suicidal death cases as per Kuppuswamy socioeconomic scale.

In the present study 21 (39.6 %) cases were in upper lower socioeconomic class having total score 05-10 as per Kuppuswamy socioeconomic scale score, 17 (32.1 %) cases were in lower middle socioeconomic class having total score 11-15 as per Kuppuswamy socioeconomic scale Score, 12 (22.6 %) cases were in upper middle socioeconomic class having total score 16-25 as per Kuppuswamy socioeconomic scale score.

There were only 02 (3.8 %) cases in lower socioeconomic class having total score 01-04 as per Kuppuswamy socioeconomic scale score and only a single case (1.9 %) in Upper socioeconomic class having total score 26-29 as per Kuppuswamy socioeconomic scale score. (Table no 5)

Discussion:

Suicide is a tragedy and it affects families, society, countries and the whole world. It also has long-lasting effects on the people left behind who are associated with them. Worldwide every year 7,03,000 people take their own life.³ There are much more people who attempt suicide. Suicide occurs throughout the lifespan and was the fourth leading cause of death among 15–29-year-olds globally in 2019.³ Suicide is a global phenomenon and is seen in all regions of the world. In the year 2019 over 77% of global suicide cases were seen in low- and middle income countries.³

Table 5. Socioeconomic class of suicidal death cases as per kuppuswamy socioeconomic scale.

Socioeconomic class as per Kuppuswamy socioeconomic scale		Total score as per Kuppuswamy socioeconomic scale Score	No of Cases
I	Upper	26-29	01 (1.9 %)
II	Upper middle	16-25	12 (22.6 %)
III	Lower middle	11-15	17 (32.1 %)
IV	Upper lower	05-10	21 (39.6 %)
V	Lower	01-04	02 (3.8 %)

Suicide is an important public health problem. The availability, accessibility and usage of the health facilities and other service facilities by an individual depends on his/her socioeconomic status. Various variables such as income, education, occupation, family effluence, physical assets, social position, social participation, caste, political influence and muscle power determine the economic and social position. Wealth can be influenced by intergenerational transitions as well as accumulation of income, savings, and immovable property.⁶ Several scales have been proposed and reported to evaluate the socioeconomic classes of families in specific circumstances, such as in urban or rural setting: Rahudkar scale 1960, Jalota scale 1970, Udai Pareekh scale 1964, Kuppuswamy scale 1976, Shrivastava scale 1978, Kulshrestha scale 1972, and Bharadwaj scale 2001.⁷ The modified Kuppuswamy scale is the most commonly used of all scales and includes the education and occupation of the family head along with income per month of the family, which yields a score of 3–29. This scale classifies the study populations into five SES. Often, occupation and education of head of the family are not changeable with time. However, the income categories in the scale lose their scoring following the change in the value of the rupee. Therefore, there is a need to update the scale as per the changes in consumer price index (CPI), thus making the socioeconomic scale applicable to the study populations.⁷

For the year 2020 Kuppuswamy socioeconomic scale details were used as reference for the present study as published by Sheikh Mohd Saleem.⁸

4.1. Occupation of suicidal cases.

In the present study (28.3 %) cases were farmers and (13.2 %) cases were daily wage labourers, In study by Zandre Smith⁹ (56.6%) cases were unemployed. D. W. Knipe et al.¹⁰ in their study found; out of total 129 cases of suicides individual occupation were 43 farmer, 17 daily wage labourer, 14 salaried employee, 12 unemployed/retired, 12 house-worker/other, 10 students, 8 self-employed, 7 security forces, 5 Businessmen and 1 non-graduate foreign employed. Elfawal et al.¹¹ reported that most of the victims of suicidal hanging were laborers and domestic workers. Nattapong Tulapunt et al.¹² found that of the 244 victims of hanging cases, most (63.1%) were in the service industry, followed by merchants/managers (12%) and government service (5%) while the lowest number of cases was farmers (1 case).

4.2. Occupation of cases of death due to suicide as per Kuppuswamy socioeconomic scale.

In the present study (28.3 %) cases were skilled agricultural & fishery workers; (29.8 %) cases were in elementary occupation; (15.1 %) cases were skilled workers and shop & market sales workers; (9.4 %) cases each of craft & related trade workers and of unemployed.

Professionals and semi-professionals are the groups which are skilled and hence are ambitious but are subjected to ever increasing competitions in almost all fields of life. Failure to meet the expectations in life with possessing the skills results in anxiety, stress, strain, and this could be the reason for them committing suicide. While unskilled workers don't possess the skills but hardships in workplace with resulting very less financial gains from such hardships may be the reason for their subjected poverty and alcohol addiction probably making them more vulnerable to commit suicide.

4.3. Education of cases of suicidal deaths as per Kuppuswamy socioeconomic scale.

In the present study (28.3 %) cases were intermediate or post high school diploma educated, (24.5 %) cases were middle school certificate educated, (20.7 %) cases were graduate, (4.3 %) cases were primary school certificate, (7.5 %) cases were high school certificate educated.

In study by Zandre Smith⁹ (36.3%) cases had completed their high school education. D. W. Knipe et al.¹⁰ in their study found that out of total 129 cases of suicides 81 cases had O-level education, 33 cases had primary education, 10 cases had university/A-level education and 5 cases were illiterate. Sachidananda Mohanty et al.¹³ found usually the suicidal victims were less educated or illiterates. Gopal B K et al.¹⁴ in their study found that 10.78% cases had educational qualification of masters degree; 24.08% cases had basic degree; 25.8% cases had educational qualification up to preuniversity; 24.85% cases had educational qualification up to higher primary while educational qualification was unknown in 14.45% cases. Ali E et al.¹⁵ in their study found that more than a half cases of hanging (51.8%) were illiterate followed by 23.1% cases passed primary education level, 20.1% cases passed S.S.C education level and 1.8% cases passed H.S.C level education.

4.4. Monthly income of family of deaths due to suicide as per Kuppuswamy socioeconomic scale.

In the present study (35.8 %) cases had monthly family income of 10,002–29,972; (28.3 %) cases had monthly family income of 29,973–49,961; (11.3 %) cases had monthly family income of 49,962–74,755; (11.3 %) cases had monthly family income of ≤ 10,001. Ali E et al.¹⁵ in their study found that (78.1%) cases of hanging deaths were from middle income group, (16.5%) cases were from lower income group and (2.1%) cases were from higher income group while socio-economic class was not known in 11 (3.3%) cases. T. Saisudheer and T.V. Nagaraja¹⁶ in their study found that 78% of the victims belonged to the middle income group. Thomas Zachariah and Joseph T John¹⁷ found that 48% cases were of lower middle class (Rs.501-1000); 18% cases were of lowest income group (Rs.0-300); 16% cases were of lower classes (Rs.301-500); 16 cases were of high income group

(Rs.1000 & above) and 2% cases unknown income group.

4.5. Socioeconomic class of suicidal death cases as per Kuppuswamy socioeconomic scale.

In the present study (39.6 %) cases were in upper lower socioeconomic class; (32.1 %) cases were in lower middle socioeconomic class; (22.6 %) cases were in upper middle socioeconomic class. There were only (3.8 %) cases in lower socioeconomic class and only a single case (1.9 %) in upper socioeconomic class. D. W. Knipe et al.¹⁰ in their study found that out of total 129 cases of suicides; 70 cases were of high asset score, 48 cases were of middle asset score, 11 cases were of low asset score. Elfawal et al.¹¹ reported that most of the victims of suicidal hanging were from low socioeconomic class. Sachidananda Mohanty et al.¹³ found (48%) cases of suicidal victims were from low socioeconomic status. Gopal B K et al.¹⁴ in their study found that (58.38%) cases were of lower socioeconomic status; (32.26%) cases were of middle socioeconomic status and (9.2%) cases were of upper socioeconomic status. Tirpude B.H et al.¹⁸ in their study found that (83.87%) cases were of low socioeconomic status, (9.67%) cases were of middle socioeconomic status and (6.45%) cases were of high socioeconomic status. Dinesh Rao¹⁹ found majority (59.09%) cases of the victims belonged to the low socioeconomic group. Jagannatha S R et al.²⁰ found majority of the victims (58.38%) belonged to lower socioeconomic strata.

Conclusion:

The present study aims to study in details the various components of socioeconomic status (SES) using Modified Kuppuswamy scale which is the most commonly used socioeconomic status scales. Skilled agricultural & fishery workers were the commonest occupational group in cases of suicidal deaths. Intermediate or post high school diploma educated, middle school certificate educated and graduates education group formed majority of suicidal cases. Most of the cases had monthly family income upto 74,755 Rs. Almost all the suicidal cases were in middle socioeconomic class and upper lower Socioeconomic class groups.

A detailed analysis of various factors of socioeconomic status of suicidal cases helps to target necessary interventions in such target groups so that such cases of suicide can be avoided.

Conflict of Interest: None.

Source of funding: No funding received.

Acknowledgement: None.

Abbreviations: None.

References:

1. Stedman's Medical Dictionary (28th ed). Philadelphia: Lippincott Williams & Wilkins. 2006. ISBN 978-0-7817-3390-8.
2. Accidental Deaths & Suicides in India 2019. https://ncrb.gov.in/sites/default/files/Chapter-2-Suicides_2019.pdf
3. World Health Organization. Home/Newsroom/Fact sheets/Detail/Suicide. [(accessed on 28 August 2023)].

- Available online: <https://www.who.int/news-room/fact-sheets/detail/suicide>
4. Oakes JM, Rossi PH. The measurement of SES in health research: current practice and steps toward a new approach. *Soc Sci Med*. Feb; 2003 56(4):769–784. [PubMed: 12560010]
 5. Palta P, Szanton SL, Semba RD, et al. Financial strain is associated with increased oxidative stress levels: the Women's Health and Aging Studies. *Geriatric Nursing (New York, N.Y.)*. 2015 Mar-Apr;36 (2 Suppl):S33-7. doi:10.1016/j.gerinurse.2015.02.020. PMID 25784083; PMCID: PMC6053071.
 6. Gaur KL. Socio-economic status measurement scale: Thirst area with changing concept for socio-economic status. *Int. J. Innov. Res. Dev*. 2013;2:139–45.
 7. Rabbanie TW. Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh's scale updated for 2019. *J Family Med Prim Care*. 2019 Jun; 8(6): 1846–1849.
 8. Sheikh MS. Modified Kuppuswamy socioeconomic scale updated for the year 2020. *Indian Journal of Forensic and Community Medicine*, January-March, 2020;7(1).
 9. Zandre S. Death due to hanging: a retrospective descriptive study of the socioeconomic and demographic profiles of hanging victims in central South Africa. *Forensic Sci Med Pathol*. 2021 Jun. 2021 Jun;17(2):223-229.
 10. Knipe DW, Gunnell D, Pieris R, Priyadarshana C, Weerasinghe M, Pearson M, et al. Socioeconomic position and suicidal behaviour in rural Sri Lanka: a prospective cohort study of 168,000+ people. *Social Psychiatry and Psychiatric Epidemiology* (2019) 54:843–855.
 11. Elfawal MA, Awad OA. Death from hanging in the eastern province of Saudi Arabia. *Med Sci Law* 1994 Oct; 34(4): 307-12.
 12. Tulapunt N, Phanchan S, Peonim V. Hanging Fatalities in Central Bangkok, Thailand: A 13-Year Retrospective Study. *Clin Med Insights Pathol*. 2017; v.10: PMC5398332.
 13. Sachidananda M, Sahu G, Mohanty MK, Patnaik M. “Suicide in India- A four years retrospective study”, *Journal of Forensic and Legal Medicine*; 2007; Vol 14 (4) 185-189.
 14. Gopal BK, Jagannatha SR, Viswakanth B, Harsha RG. Analysis of suicide hanging deaths in South Bangalore: A three-year retrospective study. *Indian Journal of Forensic and Community Medicine* 2021;8(3):181–184.
 15. Ali E, Maksud M, Zubyra SJ, Hossain MS, Debnath PR, Alam A, Chakrabarty PK. Suicide by hanging : a study of 334 cases. *Bangladesh Med J*. 2014 May; 43 (2): 90-93.
 16. Saisudheer T, Nagaraja TV. A study of ligature mark in cases of hanging deaths. *Int J Pharm Biomed Sci*, 3 (3) (2012), pp. 80-84.
 17. Thomas Z, Joseph TJ. Major Predisposing Factors Influencing the Suicide by Hanging: A Retrospective Study from a Tertiary Care Government Hospital in Kerala State, South India. *International Journal of Contemporary Medical Research*. Volume 6; Issue 1: January 2019: ICV: 77.83.
 18. Tirpude BH, Murkey PN, Pawar VG, Shende SA. Profile of hanging cases on autopsy at a tertiary care hospital in central india. *J.Kar.Med.Leg.Soc*. Jan-Jun 2010 Vol 19(2): 3-8.
 19. Rao D. An autopsy study of death due to Suicidal Hanging – 264 cases. *Egyptian Journal of Forensic Sciences* Volume 6, Issue 3, September 2016, Pages 248-254.
 20. Jagannatha SR, Viswakanth B, Harsha RG. Analysis of suicide hanging deaths in South Bangalore: A three-year retrospective study. *Indian journal of forensic and community medicine*. [//www.ijfcm.org/html-article/14761](http://www.ijfcm.org/html-article/14761).