

Socio-Economic Influence on Mental Health in Post-War Jaffna Society – A Multivariate Statistical Review

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Abstract

This study focuses on the socio-economic influences on the nature of mental health in post-war Jaffna society, prior to Covid-19 pandemic. This is a follow-up study of “Jaffna Socioeconomic Health Study 1999”. A sample of 1036 siblings and their spouses were subjected to investigation. The general measures of Mental Health include “Confidence on Quality of Life” and “Pain or Discomfort in Daily Life”. Specific measures formulated were in dimensions, “Psychological Symptoms”, “Physiological Symptoms”, “Psycho-Physiological Symptoms” and “Ambiguous Symptoms”. Socio-Economic factors used were “Occupation”, “Income”, “Expenditure”, and “Food Consumption”. Exploratory data analysis, Cluster analysis, Canonical Discriminant analysis and Logistic regression analysis were adopted to extract the results in this study. We found that there are adverse effects among the majority (78%) of the couples in post-war scenario. In-depth analysis in terms of Psychological issues, shows that more than half of the couples feel low spirit, about half suffered by poor memory, less than one-fourth feels loneliness, about half of the husbands and more than one-fourth of the wives feels restless, about one-third of the couples feel failure of their expectations, about one-fifth of the couples feel wondering for un-worthwhile life, about two-fifth of the couples suffered by un-happiness, and about two-fifth of the couples are suffered by sleepless conditions. Similar outcomes were also found in the other three dimensions. Hence, our study confirms that the Jaffna society has been suffering in mental health in the post-war scenario. Investigation for the influence of socio-economic factors on the dimension ‘Psychological Symptoms’ reveals that the occupational level and family income have direct impacts on the psychological wellness of the people. The inherent causes of this effects were found to be the loss of employment or under employment due to the consequences of war and displacements. More than half of the couples have experienced psychological disorders due to economic reasons. We also found little more than one-fourth of the wives have been suffering by physiological, psycho-physiological and ambiguous symptoms due to socio-economic reasons. This nature of effects in such three types of mental health disorders due to economic reasons is found in more than three-tenth among the husbands. It is confirmed among the husbands due to the fact that their changing occupational levels, changing work environment which was hostile to normal life patterns and changing food consumption patterns stimulated such effects.

Keywords: socio-economic status, psychological-physiological-ambiguous symptoms, exploratory data analysis, cluster analysis, logistic regression analysis.

Introduction

The general health conditions of the people of Jaffna peninsula during the period prior to the intensified war during 2003 to 2008+ was well documented (Elankumaran, 2001). Self-assessment of people in a well-represented multistage sample explored that their general health conditions were vulnerable (Elankumaran & Sivagnanasundram, 2002). An in-depth statistical analysis of Physical and Mental Disabilities due to continuous war and displacements confirmed that the people of Jaffna peninsula were severely affected (Elankumaran, 2001a). The assessments of

physical and mental health status of the parents in the previous study, named as JSEHS-1999, was the basis (Elankumaran, 1999) to this follow-up study. This study conducted in 2018, dealt with 'Physical and Mental Health Statuses' with separate analysis for physical disabilities and mental disorders. We attempted to find out the relationships with socio-economic status. The analysis of physical disabilities was reported elsewhere (Elankumaran, 2018, 2019). The outcomes on mental disorders are now reported. The 'Disability', that includes physical and mental disabilities, was first classified by WHO (1980). This is known as ICIDH (**I**nternational **C**lassification of **I**mpairments, **D**isabilities, and **H**andicaps). This includes all types of mental and behavioral disorders. This is relevant to the long-term consequences of disease, injuries or disorders, and applicable to personal health care.

Circumstances can be expected to place individuals at a disadvantage in relation to their peers when viewed from the norms of society. Hence, this research concentrates on the intermediate stage '**disability**', which is least controversial according to WHO. According to ICIDH, the disability is classified under various dimensions, by two-digit classifications, each with major categories. We selected a number of disabilities most suitable to Jaffna society and compiled them under different headings. The fundamental cause of mental disorder common to everyone in the peninsula is displacement and their refugee status. Almost all the families have experienced the displacement during exodus and hence the study population has the common effect of displacement and hence the mental stress. The post war scenario effect was due to the incidence of injuries, torture, arrests, and harassments and the hence the people were fear of expectation of those incidents and hence the prevalence of mental disorders.

Psychosocial Impacts of War in Jaffna Peninsula – Literature Review and Present Objectives

The objectives of the present study are concentrated with a cross-sectional study followed-up in the 'sample of siblings' derived from the 'sample of parents' in the JSEHS-1999. The post-war situation in the study area after 2008 is mixed with an atmosphere of the conclusion of continuous military battles. Hence, direct impacts of war on the population of study area is more important for scientific analysis. The direct impacts on the people are of either physical or mental or both. The study on effects of war (Sivarajah, 1997) on the same population that resettled during 1996 and 1997 after the exodus 1995 gave a clear picture about the physical disabilities and mental disorders of the population and motivated to expand the same in SEHS-1999. There were no official data or studies carried-out during the war periods. No other documentary evidence was available to describe the mental disorders due to war in the peninsula.

We concentrate on all type of mental disabilities in terms of 'Confidence in Quality of Life' and 'Pain or Discomfort in Daily Life' in the present study after a gap of 10 years with the intention that some of them would have recovered from their disorders and disabilities and the rest of them with severe effects could be meaningfully assessed. This is more meaningful in the sense that, all activities of daily living have direct relationships and impacts with the atmosphere of war and related events. The people are still continuing to fight for resettlement and searching for their missing family members. It is often argued that biologically and historically people have an innate propensity after war. There is a drive or instinct for aggression and destructiveness in man. One of the most important psychological reaction or outcome of war in a civilian population is **Post-Traumatic Stress Disorder** (PTSD). Most of the people suffer instead from the general war situation with its physical fatigue, the ever-present threat of death or mutilation and severe psychological shocks. Neuro-psychiatric disabilities are seen in almost all the war-affected regions of the world. Jaffna peninsula is not an exception, but more severe compared to other nations as there are no direct international observers.

A small scale study was conducted on randomly selected civilians related to war and related events in the peninsula (Somasundram, et. al., 1995). It was found that 64% of the persons had developed recognizable psycho-social sequelae. The mental health outcomes are due to the effects of war and related atmosphere that proves the prevalence of mental disorders in Jaffna. The mental disorders in Jaffna peninsula due to war for two decades of 80s and 90s was well documented (Somasundram, 1998). A number of case-studies on psychiatric sequelae to a chronic civil war and psychological impacts of acute war were thoroughly analyzed. The types of effects identified were loss, life threat, displacement, torture, rape, and indirect effects like lack of food, unemployment and so on. The objectives of the present research is to highlight the clear picture of Mental Health Status of the people of Jaffna peninsula within a period of a decade after the conclusion of 30 years of ethnic civil war and 15 years of intensified battles of armed struggle. The only pioneer study in this respect was JSEHS-1999. Therefore, it has become essential to review the nature of Mental Health prevailing now, and also specifically monitoring the Socio-economic influences on the Mental Health status.

Methodology– Socio-Economic Status Vs Mental Health

The measures ADL (Activities of daily living) and IADL (Instrumental Activities of Daily Living) are most common in disability studies (Ebrahim, et. al., 1985; Thorslund, et al., 1991; Kai, et. al., 1991). Various exploratory analytic methods have been useful in some studies (Orth-Gomer and Uden, 1987; Bridgman, et. al., 2000). The relationships among mental disability measures along with socio-economic characteristics have been highlighted by regression analysis (Peach and Charlton, 1986). The behaviours of humans in epidemiological studies have been analyzed by categorical variables successfully with ordered scores explaining the degrees of severity in the responses (Janet Reis, 1988).

In this study the definitions of ADL defined, carry ordered categorical scores and fit with the international standards. The researchers have used some strategies to get the overall status by their opinion on quality of life, pain or discomfort in daily life, emotional status, worry over health, social contacts, etc (Segovia, et. al., 1989). The socio-economic factors: **occupation** of parents and **monetary status** of family were considered to find out the relationships with mental disorders. We also considered the variables of **nutrient intakes** which were updated in this study in comparison with the previous study (Elankumaran, 2001b). We measure the overall mental health, **Confidence on Quality of Life** and **Pain or Discomfort in Daily Life** as ordinal scores.

With the above description of various data, we prepared the following list of variables:

(a) Mental Disorders

(1) General Mental Disorders

- (a) Confidence on Quality of Life of Husband (CQLH)
- (b) Pain or Discomfort in Daily Life of Husband (PDCH)
- (c) Confidence on Quality of Life of Wife (CQLW)
- (d) Pain or Discomfort in Daily Life of Wife (PDCW)

(2) Psychological symptoms

(3) Physiological symptoms

(4) Psycho-physiological symptoms

(5) Ambiguous symptoms

[Details of (2) to (5) are given in Table 3.1]

(b) Socio-economic factors

- (1) Occupational level of husband (OcLeH)
- (2) Occupational Level of Wife (OcLeW)
- (3) Per Capita Total Expenditure of the family (PCExp)
- (4) Per Capita Income/Revenue of family (PCInc)
- (5) Per Capita Energy consumption (PCEnC)
- (6) Per Capita Protein consumption (PCPrC)

Table 3.1 : List of variables included in the dimensions of mental disorders of Couples.

		Variable names	Husband	Wife
Mental Disorder Dimensions	Psychological Symptoms	Low spirit	PSYH1	PSYW1
		Poor memory	PSYH2	PSYW2
		Lonely	PSYH3	PSYW3
		Restless	PSYH4	PSYW4
		Expectation failure	PSYH5	PSYH5
		Wandering un-worthwhile	PSYH6	PSYH6
		Unhappy	PSYH7	PSYH7
		Sleepless	PSYH8	PSYH8
	Physiological Symptoms	Poor appetite	PHYH1	PHYW1
		Fullness of head	PHYH2	PHYH2
		Frequent Fainting	PHYH3	PHYH3
	Psycho-Physiological Symptoms	Feel hot all over	PSPH1	PSPW1
		Feel weak all over	PSPH2	PSPW2
		Troubled by headache	PSPH3	PSPW3
	Ambiguous Symptoms	Palpitation	AMBH1	AMBW1
		Acid stomach	AMBH2	AMBW2
		Trembling hands	AMBH3	AMBW3

The CQLH & CQLW are categorized as ‘Absolutely confident’, ‘Very/Quite confident’, ‘Not very confident/Very Doubtful’, ‘Not at all confident’ and expressed by the scores 1, 2, 3, and 4 respectively. Similarly, the Discomfort measure was negatively defined. The specific measures of different dimensions: **Psychological symptoms**, **Physiological symptoms**, **Psycho-physiological symptoms**, and **Ambiguous symptoms** are scored by the values from 0 to 2. The value **0** represents ‘disorder not present’, **1** represents ‘disorder presents some times’, and **2** represents ‘disorder present always’.

We employed the popular approach of investigating the mental health (Gaitz and Scott, 1972), listed under the above four different mental health dimensions. The disorders of a person are investigated through batteries of questions under these dimensions. The impairments and disabilities in adults are naturally age-related problems and hence avoiding the very old couples of the families make more meaningful analysis in our research. Hence we have chosen altogether 1036 couples from responded families. *Exploratory Data Analysis* (EDA) was performed to describe the general mental health and 17 specific mental health disorders. In the second stage, we applied *Cluster Analysis* (CA) on suitably combined dimensions to identify natural groupings. Thirdly, *Canonical Discriminant Analysis* (CDA) was applied to see the interrelationships between mental disorders and Socio-economic status on the established clusters to confirm discrimination and to characterize them. Finally, we used nominal logistic regression on the characterized clusters to explore the relationships with socioeconomic variables.

Analytical Results and Outcomes

We analyze general nature using ‘Confidence in Quality of Life’ and ‘Pain or discomfort in Daily life’ and Table 4.1 produces the related frequency distributions. This table reveals that about 9% of Husbands and 8% of Wives have absolutely confident on the quality of life. Majority, about 59% and 62% of them, has felt the quality of life is very confident or quite confident. That is, they have not much confident on their current and future health. Further, a considerable number, about 30% and 28% of them, are very doubtful about their current and future health. In addition, about 2% of each of them are not at all confident. This highlights that the majority of the parents are mentally affected by worrying about their current and future health.

Table 4.1: The frequency distributions of general mental disorders of couples.

Score	Husband		Wife	
	CQLH	PDCH	CQLW	PDCW
1	95 (09.18)	126 (12.17)	87 (08.41)	119 (11.50)
2	609 (58.84)	696 (67.25)	642 (62.03)	718 (69.37)
3	313 (30.24)	202 (19.52)	292 (28.21)	184 (17.78)
4	18 (01.74)	11 (01.06)	14 (01.35)	14 (01.35)

(Percentages are given within the parenthesis)

Regarding pain or discomfort in their life, about 12% of couples have expressed no such pains or discomfort. But, about 67% of husbands and 69% of wives have experienced poor or mild, pain and discomfort. Further, 20% and 18% of them have moderate pain and discomfort. Also 1% of couples have extreme pain. These two classifications on ‘confidence on life’ and ‘pain in life’ clearly explore that the majority of the couples are suffering due to mental health disorders. We have found that about 78% of the couples have unsatisfactory mental health status. Hence further investigation is required.

Psychological Symptoms

This is described by eight important symptoms known as low spirit, poor memory, loneliness, restless, expectation failure, Un-worthy life, unhappy, and sleepless. We produced frequency distributions for all these eight variables. Table 4.2 and 4.3 give the results for husbands and wives respectively. These tables reveal that, only about 36% of Husbands and 32% of Wives have no disorders in ‘**low spirit**’. This means most people feel, reduced courage and interest in daily life. Only about 52% of Husbands and 49% of Wives have no disorders in ‘**poor memory**’. This means that about half of the people have poor memory problems regarding past and current life events. Further, about 81% of Husbands and 78% of Wives have never felt ‘**lonely**’. That is, a small group of persons felt that they are isolated within the society. Also about 48% of Husbands and 70% of Wives have never felt ‘**restless**’. That is, most of the husbands and some wives feel they are occupied too much without rest.

Table 4.2 : Frequency distributions of psychological symptoms of **husbands**.

Score	PSYH1	PSYH2	PSYH3	PSYH4
0	370 (35.75)	538 (51.98)	842 (81.35)	502 (48.50)
1	611 (59.03)	474 (45.80)	179 (17.29)	517 (49.95)
2	54 (05.22)	23 (02.22)	14 (01.35)	16 (01.55)
Score	PSYH5	PSYH6	PSYH7	PSYH8
0	684 (66.09)	814 (78.65)	632 (61.06)	564 (54.49)
1	324 (31.30)	214 (20.68)	386 (37.29)	407 (39.32)
2	27 (02.61)	7 (00.68)	17 (01.64)	64 (06.18)

(Percentages are given within the parenthesis)

Table 4.3 : Frequency distributions of psychological symptoms of **wives**.

Score	PSYW1	PSYW2	PSYW3	PSYW4
0	330 (31.88)	503 (48.60)	805 (77.78)	727 (70.24)
1	666 (64.35)	506 (48.89)	212 (20.48)	301 (29.08)
2	39 (03.77)	26 (02.51)	18 (01.74)	7 (00.68)
Score	PSYW5	PSYW6	PSYW7	PSYW8
0	718 (69.37)	899 (86.86)	617 (59.61)	642 (62.03)
1	288 (27.83)	130 (12.56)	393 (37.97)	349 (33.72)
2	29 (02.80)	6 (00.58)	25 (02.42)	44 (04.25)

(Percentages are given within the parenthesis)

About 66% of Husbands and 69% of Wives have no disorders related to '**failure of expectation**'. That is, a considerable number of people have disappointments in daily life. About 78% of Husbands and 87% of Wives never felt, they have been '**wandering for un-worthwhile**' events. That is, a smaller group felt they wasted their times. Further, about 61% of Husbands and 59% of Wives never felt '**unhappy**'. About 55% of Husbands and 62% of Wives never felt '**sleepless**'. Hence, we can conclude that a considerable number of people were affected by unhappy and sleepless conditions.

Physiological Symptoms

This is described by three symptoms known as poor appetite, fullness of head and frequent fainting. Table 4.4 gives the results for husbands and wives.

Table 4.4 : Frequency distributions of physiological symptoms of **husbands and wives**.

Score	Husband			Wife		
	PHYH1	PHYH2	PHYH3	PHYW1	PHYW2	PHYW3
0	654 (63.19)	691 (66.76)	823 (79.52)	753 (72.75)	672 (64.93)	727 (70.24)
1	357 (34.49)	323 (31.21)	201 (19.42)	265 (25.60)	345 (33.33)	288 (27.83)
2	24 (02.32)	21 (02.03)	11 (01.06)	17 (01.64)	18 (01.74)	20 (01.93)

(Percentages are given within the parenthesis)

About 63% of Husbands and 73% of Wives have no problems on '**poor appetite**'. About 67% of husbands and 65% of wives have no disorders regarding '**fullness of head**'. About 79% of Husbands and 70% of Wives have no disorders in '**frequent fainting**'. This means about one third of the people have been suffering due to these types of physiological symptoms indicating a considerable mental disorder in the population.

Psycho-Physiological Symptoms

This is described by three symptoms known as feel hot all over suddenly, feel weak all over, and troubled by head ache. Table 4.5 gives the results for husbands and wives.

About 69% of husbands and 66% of wives have no problems on feeling '**hot all over**' suddenly. About 58% of husbands and 59% of wives have no disorders on feeling '**weak all over**'. About 59% of husbands and 50% of wives have no disorders in '**troubled head ache**'. This means about half of the people have these types of psycho-physiological symptoms indicating mental disabilities.

Table 4.5: Frequency distributions of psycho-physiological symptoms of **husbands** and **wives**.

Score	Husband		Wife			
	PSPH1	PSPH2	PSPH3	PSPW1	PSPW2	PSPW3
0	711 (68.70)	599 (57.87)	615 (59.42)	685 (66.18)	616 (59.52)	522 (50.43)
1	299 (28.89)	421 (40.68)	397 (38.36)	323 (31.21)	402 (38.84)	472 (45.60)
2	25 (02.42)	15 (01.45)	23 (02.22)	27 (02.61)	17 (01.64)	41 (03.96)

(Percentages are given within the parenthesis)

Ambiguous Symptoms

This is described by three symptoms known as palpitations, acid stomach, and trembling hands. Table 4.6 gives results of all these variables for husbands and wives.

Table 4.6: Frequency distributions of ambiguous symptoms of **husbands** and **wives**.

Score	Husband			Wife		
	AMBH1	AMBH2	AMBH3	AMBW1	AMBW2	AMBW3
0	739 (71.40)	796 (76.91)	897 (86.67)	606 (58.55)	781 (75.46)	925 (89.37)
1	276 (26.67)	212 (20.48)	125 (12.08)	400 (38.65)	222 (21.45)	98 (09.47)
2	20 (01.93)	27 (02.61)	13 (01.26)	29 (02.80)	32 (03.09)	12 (01.16)

(Percentages are given within the parenthesis)

About 71% of husbands and 58% of wives have no ‘**palpitation**’ problems. But, the rest of them feel palpitation for unknown reasons. About 77% of husbands and 75% of wives have no ‘**acid stomach**’ problems. But, the rest of them experienced acid stomach, which is not related to hungry. About 87% of husbands and 89% of wives have no problems in ‘**trembling hands**’. That is, a smaller group of persons have these types of ambiguous symptoms indicating mental disorders.

Socio-Economic Influences on Mental Disorders

In the preceding section, we exhibited the prevalence of mental health statuses and now proceed to see their possible relationships with socio-economic status. We attempted to interrelate the six key socio-economic variables: ‘occupation of parents’, ‘per capita income’, ‘per capita expenditure’, ‘per capita energy consumption’, and ‘per capita protein consumption’. Altogether 1034 couples were included in this investigation. Working with higher number of variables, for both husbands and wives, become statistically cumbersome. Hence, we applied CDA on all the variables by dimensions and gender separately in order to reduce the dimensionality of our problem. We found that all disability variables are equally important.

We first wanted to know about the clusters of couples, which have distinct mental disorders. By considering the number of variables and their similarities we consider the psychological symptoms together and considering the relationships of dimensions we combined physiological, psycho-physiological, and ambiguous symptoms together. We included the variables of husbands and wives together as our focus is on families. We applied hierarchical cluster analysis with Ward’s minimum variance method to find out the different clusters of couples, which possess distinct features of mental disorders and consequently we employed LR to characterize the features of the clusters of couples.

Influence on Psychological disorders

Figure 5.1 shows the Dendrogram of couples of psychological symptoms. This figure reveals that there are 3 distinct groups of couples who experience different disorders. We confirmed this with correct classification of 88% by discriminant analysis. To identify the features of the clusters, we employed CDA on these clusters with the 16 psychological variables. We further inspected pooled within class standardized canonical coefficients. The first canonical variate with 85% variation clearly demarcate the three clusters, showing low to high values of most of the variables. The second canonical variate with 15% variation has also given the influence on the discrimination of

the clusters with low to high values of some of the variables. We also inspected the cluster wise descriptive statistics, to characterize the clusters. These results reveal that the cluster 1 (48% of couples) has mild psychological disorders. The cluster 2 (44% of couples) has average psychological disorders and cluster 3 has severe psychological disorders.

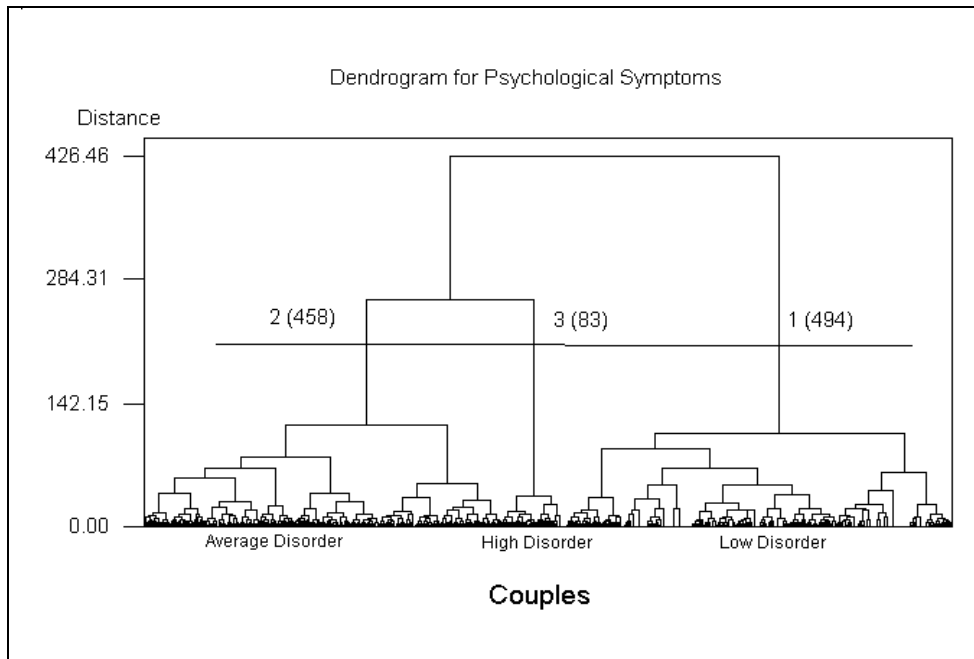


Figure 5.1: Dendrogram showing the clusters of couples for psychological symptoms.

We then interrelated our socio-economic variables with these three identified clusters. Hence we employ logistic regression. Since a ranking of clusters has been possible we could apply the logistic regression on these clusters with the six socio-economic variables as predictors. The results of logistic regression in Table 5.1 reveals that the occupational level of husbands and per capita income have the influence on the overall psychological disorders. Further, the odd ratio greater than one for the occupational level of husband indicates that for every unit increase in occupational level has 3% decrease in psychological disorders. The other variables seem less effect on psychological disorders.

Table 5.1: Logistic regression on psychological disorders for socio-economic variables.

Predictors	Coef	StDev	Z	P	Odds Ratio
Const(1)	-0.5858	0.2782	-2.11	0.035	
Const(2)	2.0477	0.2925	7.00	0.000	
OcLeH	0.028963	0.006633	4.37	0.000	1.03
OcLeW	-0.004945	0.009432	-0.52	0.600	1.00
PCExp	0.0000475	0.000217	0.22	0.827	1.00
PCInc	0.0002770	0.000120	2.29	0.022	1.00
PCEnC	-0.0002486	0.000158	-1.57	0.117	1.00
PCPrC	0.002025	0.005571	0.36	0.716	1.00

Test that all slopes are zero: $G = 74.078$, $DF = 6$, $P\text{-Value} = 0.000$

Goodness of fit test : $\text{Chi-Sq} = 1946.015$, $DF=2060$, $P\text{-Value}=0.964$

Influence on Physiological, Psycho-Physiological & Ambiguous disorders

We now consider the nature of clusters in combined physiological, psycho-physiological, and ambiguous symptoms. Figure 5.2 shows Dendrogram of couples on this combined disorders. This figure reveals that there are 3 distinct groups of couples who experience different mixed disorders. We confirmed this with correct classification of 85% by linear discriminant analysis. CDA was employed to see the features of these identified clusters with the eighteen physiological and related variables.

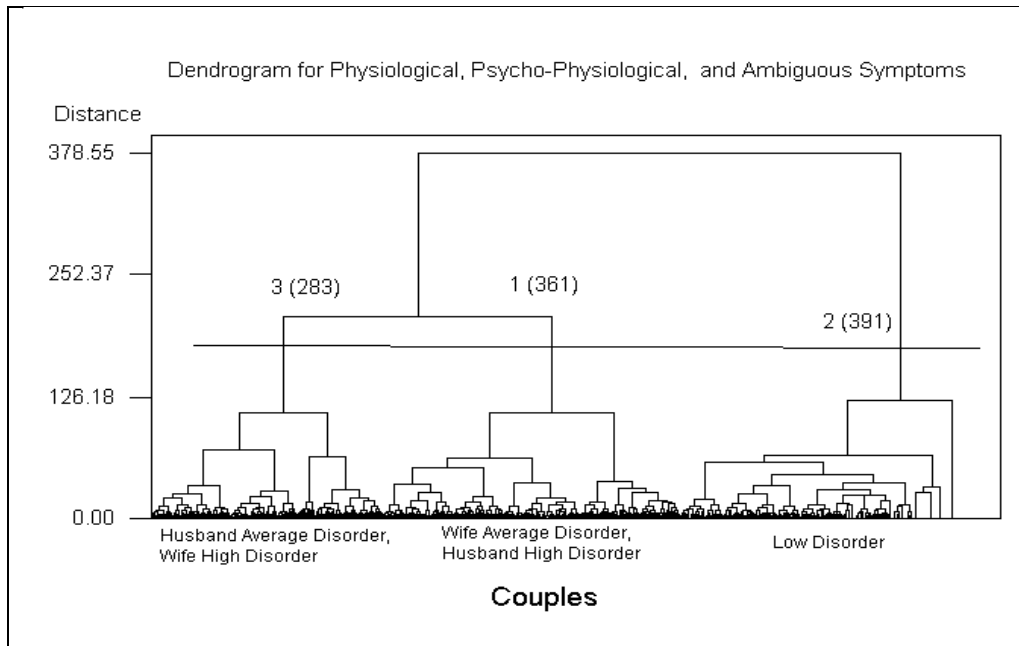


Figure 5.2: Dendrogram showing the clusters of couples for physiological, psycho-physiological, and ambiguous symptoms.

Inspection of score plot for canonical variates show that Cluster 3 is discriminated by the higher values of the first canonical variate, which explains 70% of variation. Similarly, the cluster 1 is discriminated by the second canonical variate, which explains 30% of the variation. Cluster 2 is not influenced by both of the variates. We inspected the pooled within class standardized canonical coefficients of both variates and cluster-wise descriptive statistics. The comparison of the results of both these outcomes reveal that the cluster 2 seems to have low degrees in all the symptoms. However, the clusters 1 and 3 have the couples with gender specific disorders. This is summarized in Table 5.2.

This table reveals that the first and third clusters have the couples of high and average physiological and related disorders for husbands and wives and vice versa. We can also conclude that about 38% of couples have not reported any physiological and related symptoms of mental disorders hence they are unaffected. Further, about 35% of couples have the problem of husband suffering high disorders and wife suffering average disorders. About 27% of wives have higher disorders while their husbands suffer average disorders. Hence we cannot rank the clusters.

Table 5.2: Characteristics of the three clusters under various disorder symptoms.

Disorders		Cluster 1 (35%)	Cluster2 (38%)	Cluster 3 (27%)
Husband	PHYH1	Average	Low	High
	PHYH2	High	Low	Average
	PHYH3	High	Low	Average
	PSPH1	High	Low	Average
	PSPH2	High	Low	Average
	PSPH3	High	Low	Average
	AMBH1	High	Low	Average
	AMBH2	High	Low	Average
	AMBH3	High	Low	Average
Wife	PHYW1	Average	Low	High
	PHYW2	Average	Low	High
	PHYW3	Average	Low	High
	PSPW1	Average	Low	High
	PSPW2	Average	Low	High
	PSPW3	Average	Low	High
	AMBW1	Average	Low	High
	AMBW2	Average	Low	High
	AMBW3	Average	Low	High

We interrelated the socio-economic variables with clusters. CDA was performed on the clusters against variables, but there were no clear discrimination of clusters in score plot. Since the ranking of the clusters is not possible we used Nominal logistic regression. Table 5.3 describes the corresponding results. We consider the cluster 2 as the reference group since the other two groups are not suitable for reference.

Table 5.3: Logistic regression table for 3 psychiatric disorders against SE variables

Predictor	Coef	StDev	Z	P	Odds Ratio
Logit 1: (Wife High - Husband Average Disorder / Both Low Disorder)					
Constant	0.5665	0.3676	1.54	0.123	
OcLeH	-0.027684	0.008635	-3.21	0.001	0.97
OcLeW	-0.00288	0.01237	-0.23	0.816	1.00
PCExp	-0.0001346	0.0002845	-0.47	0.636	1.00
PCInc	-0.0001758	0.0001581	-1.11	0.266	1.00
PCEnC	0.0005467	0.0002187	2.50	0.012	1.00
PCPrC	-0.018410	0.007705	-2.39	0.017	0.98
Logit 2: (Husband High – Wife Average Disorder / Both Low Disorder)					
Constant	0.6343	0.3393	1.87	0.062	
OcLeH	-0.017772	0.007589	-2.34	0.019	0.98
OcLeW	-0.00900	0.01047	-0.86	0.390	0.99
PCExp	-0.0002686	0.0002184	-1.23	0.219	1.00
PCInc	0.00007514	0.00009318	0.81	0.420	1.00
PCEnC	0.0003675	0.0002096	1.75	0.080	1.00
PCPrC	-0.014045	0.007153	-1.96	0.050	0.99

Test all slopes are zero: $G = 53.989$, $DF = 12$, $P\text{-Value} = 0.000$

Goodness-of-Fit Tests : $\text{Chi-Square} = 2078.796$, $DF = 2054$, $P = 0.346$

If we consider the logit of both of the cases, there is insufficient evidence to conclude that the changes in occupational levels of wives, per capita income, and per capita expenditure have

affected the couples of low disorder and to become average and high disorders. However, it is evident that the changes in the occupational levels of husbands, per capita energy and protein consumption have some effects on low disorder couples to make them average or high disability. If we consider the odds ratios it is clear that the unit decline of occupational level in husbands has created about 3% increase of husband's average disorder and 2% increase of husband's high disorder. Further, the unit decline of per capita protein consumption has created about 2% increase in average or high disorder from low disorder people.

Findings and Conclusions

We compile all our findings from various multivariate statistical techniques with the standard methodologies adopted in Mental Health literature. There is a limitation in the results of this study in the sense that, the data collection was made in 2018. The socio-political and socio-economic scenario created due to Easter violence of 2019 and Coved-19 pandemic situations that restricted the Mental Health of the people.

Mental Disabilities

Considering general mental health disorders, we found that only about 9% of the husbands and 8% of the wives have absolutely confident in their quality of life. That is the majority of the parents are worrying about their current and future health issues. Regarding the pain or discomfort, only about 12% of the couples had no such pains or discomfort. Hence, we conclude that the majority of the parents of Jaffna peninsula are suffering due to mental health disorders. Regarding Psychological symptoms, we have found and reported specific degrees of such disorders in terms of all the eight measures. Similarly, for Physiological symptoms, Psycho-physiological symptom, and Ambiguous symptoms; we have found similar specific degrees of disorders in terms of the considered three measures in each of the three dimensions.

Socio-Economic Influences

We found that there are reasonable clusters of couples in Jaffna peninsula, which have distinct mental health disorders in the psychological sphere as well as in the combined sphere of physiological, psycho-physiological and ambiguous dimensions. We found that there are three distinct groups of couples in both of these spheres. We have also highlighted the inter-relationships of Psychological sphere and Combined sphere (Psychiatric sphere) with Socio-Economic sphere, using standard statistical techniques in multivariate scenario with the standard or basic socio-economic indicators such as Occupation, Income, Expenditure and Food Consumption. Hence, we conclude that the socioeconomic conditions of the people coincide with the post-war scenario in determining the mental health situation of the people.

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