ISSN : 2394 - 0352

PEARL Multidisciplinary Journal

St Philomena's Exclusive Academic Research and Learning

A Bi-annual Multidisciplinary Peer Reviewed Research Journal

St Philomena College, Philonagar,
Darbe Post, Puttur, D K, Karnataka - 574 202

February - July-2015 Volume 1 No.1

Mass spectrum and decays of charmonium states in non-relativistic quark model

Antony Prakash Monteiro *, Vijaya Kumar K B **

* Department of Physics
Center for Post Graduate Studies and Research,
St. Philomena College, Puttur - 574 202

** Department of Physics, Mangalore University,
Mangalagangotri, Mangalore 574 199, India
(Dated: January 22, 2015)

The phenomenological non-relativistic quark model (NRQM) has been employed to obtain the masses of charmonium states. In the NRQM an exhaustive study of electromagnetic decays such as radiative, leptonic and two photon decay widths have been calculated. The Hamiltonian used in the investigation has kinetic energy, confinement potential and one-gluon-exchange potential (OGEP). An overall agreement is obtained with the experimental masses and decay widths.

PACS numbers: 14.40.-n; 14. 40. Lb; 12.39.-x; 12.39. Jh

I. INTRODUCTION

There is a wealth of experimental data in hadron spectroscopy that has emerged from a number of experimental facilities such as BES, E835, CLEO, BaBar, Belle, CDF, DO, NA60 etc. All these experiments are capable of discovering new hadrons, new production mechanisms, new decays and transitions and in general will be providing high precision data sample with higher confidence level. Hence the study of mass spectroscopy and decay rates of quarkonium becomes significant. Though QCD is accepted as the fundamental theory of strong interactions, there exists no exact solution to the theory in the non-perturbative low energy regime. The QCD is not exactly solvable in the non perturbative regime which is required to obtain physical properties of the hadrons. Hence various approximation methods have been employed to solve QCD in the non perturbative regime. The most promising of these is through lattice gauge theories. The lattice gauge theories involve gigantic computation hence the progress has been slow and the detailed predictions of hadron properties have not been made. As a consequence our understanding of hadrons continues to rely on insights obtained from the experiments and QCD motivated models in addition to lattice QCD results.

In the present work an attempt has been made to obtain the masses of the charmonium meson states and electromagnetic decay widths such as leptonic decay widths, two photon decay widths and radiative decay widths in the frame work of non-relativistic quark models (NRQM). This is required since several different potentials can predict the hadron spectrum but over estimate the decay rates[1–6] . Hence one needs other observables in order to test more precisely the resulting wave functions. Hence, a possibility is to study the transition between various states and their leptonic decay widths. The leptonic decay widths are a probe of the compactness of the $q\bar{q}$ system and provide important information complementary to the level spacings. For better estimations with reference to the experimental values, various corrections due to radiative processes, higher order QCD contributions are required [7]. In this context, the NRQM formalism is found to provide systematic treatment of the perturbative and non-perturbative components of QCD at the hadronic scale [8–13]. The NRQM should work better for heavy quark mesons, since a particle of mass m, localised in a volume of radius R, has a momentum $1/\mathrm{R}$ through the uncertainty relation its kinetic energy $(< \mathrm{T} >) << m$ only if $m\mathrm{R} >> 1$. In the constituent quark models this is satisfied for the *c, b* and *t* quarks. Also, in NRQM the spurious excitation of the centre-of-mass (CM) motion can be eliminated easily. Hence, in heavy meson spectroscopy non relativistic models are found to be more suitable in studying the mass spectra, predicting the higher orbital states and other properties like leptonic and radiative decays.

In our previous works, we had computed the masses of *S, P* and *D* wave light wave mesons in the frame work of NRQM[14–16]. In the present work, we have considered the *S, P* and *D* wave heavy mesons with both the quark and anti quark belonging to heavy flavour sector, the charm where the total non-relativistic Hamiltonian employed has kinetic energy, confinement potential and one-gluon-exchange potential (OGEP)[17] . The aim of the present study is to obtain a minimum number of parameters which reproduce the mass spectrum, the leptonic, two photon and radiative decay widths of charmonium states. The total energy or the mass of the meson is obtained by calculating the energy eigen values of the Hamiltonian in the harmonic oscillator basis. The details about the present employed model can be found in references [14–16, 18–21].

This paper is organized as follows. In sec. 2 we briefly review the Hamiltonian used in NRQM, the non-relativistic description of leptonic, two photon and radiative decay widths. In sec. 3 we discuss the results of the calculation and the conclusions are given in section 4.

II. THEORETICAL BACKGROUND

A. The Hamiltonian

The Hamiltonian employed in our model is given by [14–16],

$$H_{NRQM} = K + V_{\rm CONF}(r_{ij}) + V_{\rm OGEP}(r_{ij}), \tag{1}$$

where

$$K = \left[\sum_{i=1}^{2} M_i + \frac{P_i^2}{2M_i}\right] - K_{\rm cm} \tag{2}$$

where M_i and P_i are the mass and momentum of the ith quark respectively. The K is the sum of the kinetic energies including the rest mass minus the kinetic energy of the centre of mass motion (CM) of the total system. The potential energy part consists of confinement term V_{CONF} and the residual interaction V_{OGEP} .

The confinement term represents the non-perturbative effect of QCD that confines quarks within the colour singlet system, and is taken to be linear [14–16].

$$V_{\rm conf}(r) = -a_c r_{ij} \boldsymbol{\lambda}_i \cdot \boldsymbol{\lambda}_j, \tag{3}$$

where a_c is the confinement strength. Here, λ_i and λ_j are the generators of the colour SU(3) group for the i^{th} and j^{th} quark.

The following central part of two-body potential due to OGEP is employed [17],

$$V_{OGEP}(r_{ij}) = \frac{\alpha_s}{4}\ \lambda_i.\lambda_j \left[\frac{1}{r_{ij}} - \frac{\pi}{M_i M_j}\ (1 + \frac{2}{3}\ \sigma_i.\sigma_j)\ \delta(r_{ij})\right]; \tag{4}$$

where the first term represents the residual Coulomb energy and the second term the chromo-magnetic interaction leading to the hyperfine splitting. The σ_i is the Pauli spin operator and α_s the quark-gluon coupling constant.

B. Leptonic Decays

The leptonic decay width of the vector meson is by the Van Royen Weisskopf formula [22],

$$\Gamma_{(nS\to l^+l^-)} = 4\alpha^2 \langle Q^2 \rangle \frac{|R_{nS}(0)|^2}{m_{nS}^2} \tag{5}$$

$$\Gamma_{(nD\to l^+l^-)} = 25\alpha^2\langle Q^2\rangle \frac{|R''_{nD}(0)|^2}{2m_{nD}^2 m_c^4} \tag{6}$$

In the above equations, $m_{nS}(m_{nD})$ is the mass of the VM, Q is the charge content and m_c is the mass of the quark. $R_{nS}(0)$ is the radial S wave function at the origin, and $R''_{nD}(0)$ is the second derivative of the radial D wave function at the origin. The leptonic decay width of VM including first order QCD radiative correction is given by [23, 24]

$$\Gamma'_{(nS\to l^+l^-)} = 4\alpha^2\langle Q^2\rangle \frac{|R_{nS}(0)|^2}{m_{nS}^2}(1 - \frac{16\alpha_s}{3\pi}) \tag{7}$$

$$\Gamma'_{(nD\to l^+l^-)} = 25\alpha^2\langle Q^2\rangle \frac{|R''_{nD}(0)|^2}{2m_{nD}^2 m_c^4}(1 - \frac{16\alpha_s}{3\pi}) \tag{8}$$

C. Two Photon Decays

The $C\bar{C}$ quark pair in charge conjugation even states with $J \neq 1$ can annihilate into two photons [25, 26]. For the decays of $^1S_0$, $^3P_0$ and $^3P_2$ states into two photons the expressions are [27],

$$\Gamma_{(^1S_0\to\gamma\gamma)} = 12\alpha^2\langle Q^2\rangle \frac{|R_{nS}(0)|^2}{m_S^2} \tag{9}$$

$$\Gamma_{(^3P_0\to\gamma\gamma)} = 2^4 3^3\alpha^2\langle Q^4\rangle \frac{|R_{nP}(0)'|^2}{m_P^2} \tag{10}$$

$$\Gamma_{(^3P_2\to\gamma\gamma)} = 2^6 3^2\alpha^2\langle Q^4\rangle \frac{|R_{nP}(0)'|^2}{5m_P^4} \tag{11}$$

where m_p is the mass of the meson. With the first order QCD radiative correction the two photon decay rate is given by [23, 27],

$$\Gamma'_{(^1S_0\to\gamma\gamma)} = 12\alpha^2\langle Q^2\rangle \frac{|R_{nS}(0)|^2}{m_S^2}[1 + \frac{\alpha_s}{\pi}(\frac{\pi^2}{3} - \frac{20}{3})] \tag{12}$$

$$\Gamma'_{(^3P_0\to\gamma\gamma)} = 2^4 3^3\alpha^2\langle Q^4\rangle \frac{|R_{nP}(0)'|^2}{m_P^2}[1 + \frac{\alpha_s}{\pi}(\frac{\pi^2}{3} - \frac{28}{9})] \tag{13}$$

$$\Gamma'_{(^3P_2\to\gamma\gamma)} = 2^6 3^2\alpha^2\langle Q^4\rangle \frac{|R_{nP}(0)'|^2}{5m_P^4}(1 - \frac{16\alpha_s}{3\pi}) \tag{14}$$

D. E1 transitions

The rate for transitions from a $^3S_1$ state to ^3P_J state [24] is given by,

$$\Gamma_{(^3S_1 \to \gamma\ ^3P_J)} = (2J+1)\frac{4}{27} e_c^2 \alpha k_0^3 |I_{PS}|^2 \tag{15}$$

where k_0 is the energy of the emitted photon, and I_{PS} is the radial overlap integral which has the dimension of length

$$I_{PS} = \langle P|r|S|\rangle = \int_0^\infty r^3 R_P(r) R_S(r) dr \tag{16}$$

With $R_{S,P}(r)$ being the normalised radial wave functions for the corresponding states. The transition from ^3P_J levels to a $^3S_1$ level is described by the expression for the rate

$$\Gamma_{(^3P_J \to \gamma\ ^3S_1)} = \frac{4}{9} e_c^2 \alpha k_0^3 |I_{SP}|^2 \tag{17}$$

For transitions $^1P_1 \to \gamma\ ^1S_0$ the same expression (17) is used to calculate the rate.

E. M1 Transitions

The allowed M1 transitions are essentially $^3S_1 \to \gamma\ ^1S_0$ and $^1S_0 \to \gamma\ ^3S_1$. The rate for transitions from a $^3S_1$ state to $^1S_0$ state is given by,

$$\Gamma_{(n^3S_1 \to \gamma m^1S_0)} = \frac{4}{3m_c^2} e_c^2 \alpha k_0^3 |I_{mn}|^2 \tag{18}$$

where I_{mn} is the overlap integral for unit operator between the coordinate wave functions of the initial and the final charmonium states.

$$I_{mn} = \int_0^\infty r^2 R_{nS}(r) R_{mS}(r) dr \tag{19}$$

For transitions $^1S_0 \to \gamma\ ^3S_1$ the following expression for the rate is used

$$\Gamma_{(n^1S_0 \to \gamma m\ ^3S_1)} = \frac{4}{m_c^2} e_c^2 \alpha k_0^3 |I_{mn}|^2 \tag{20}$$

III Fitting Procedure

There are four parameters in our model. These are the mass of charm quark c, the confinement strength a_c the harmonic oscillator size parameter b and the α_s. The values of these parameters are listed in table I. We have fixed the harmonic oscillator size parameter b using the experimental value of the square of the wave function at origin for J/ Ψ meson. The α_s is fixed by the J/Ψ - η_c splitting which comes from the colour magnetic term of OGEP. The mass of the charm quark quoted in PDG is 1270^{+70}_{-110} MeV (28). We have used in the present work a value 1160 MeV which is in the PDG mass range. The confinement strength parameter a_c is fixed by the stability condition for variation of the mass of J/Ψ against the size parameter b.

IV. RESULTS AND DISCUSSIONS

A. S wave states

The η_c *(1S)* is the lightest charmonium. Its mass has been determined through fits to the invariant mass spectrum of η_c*(1S)* decay products in reactions such as $\gamma\gamma \rightarrow \eta_c$*(1S) [29, 30],* $B \rightarrow \eta_c$*(1S)K [31],* and *J/ψ, ψ(2S)* $\rightarrow \gamma\eta_c$*(1S) [32, 33]* using all-charged or dominantly charged final states, and in $p\bar{p} \rightarrow \eta_c$ *(1S)* $\rightarrow \gamma\gamma$ *[35, 48].* The average value of mass of η_c*(1S) is 2980.4 ± 1.2 MeV [36]* and in the latest *PDG it is 2980.3 ± 1.2 MeV [28].* Our model gives the value, 2993.65 MeV (table II) which is a little higher than the experimental value [28].

The existence of η_c*(2S)* was claimed by Crystal Ball collaboration [37], at a mass of 3594 ± 5 MeV. It was observed later by Belle collaboration in $B \rightarrow K(K_S K_\pi)$ [38] and in $e^+e^- \rightarrow J/\psi + X$ [39] at a significantly higher mass [35]. Study of photon-photon collisions by CLEO [29] and BaBar [30] has confirmed it. Our model calculations give significantly higher mass value for η_c*(2S)* in comparison with PDG [28]. Table III and table IV give calculated values of two photon decays without and with QCD correction for η_c *(1S)* [28, 36, 40] and η_c *(2S)* [29, 41, 42] respectively. We note here that the calculated value for two-photon decay width of η_c *(2S)* agree with other theoretical predictions[41, 42] but contradicts with the experimental estimation by the CLEO collaboration [29].

The *J/ψ*, the first charmonium state discovered [43, 44] is the lowest $^3S_1$ $c\bar{c}$ state and can couple directly to virtual photons produced in e^+e^- collisions [35]. The most precise mass determination comes from the KEDR collaboration $m(J/\psi)$ = 3096.917 ± 0.010 ± 0.007 MeV [45]. The calculated mass of *J/ψ* in our model is given in table II.

The $\psi(2S)$ resonance was discovered at SLAC in e^+e^- collisions [46]. The most precise $\psi(2S)$ mass measurement comes from KEDR [45]. The current world average is $m(\psi(2S) = 3686.09 \pm 0.04$ MeV [28]. Our theoretical value is given in table II.

The leptonic J/ψ branching ratio was measured by the CLEO Collaboration by comparing the transitions $\psi(2S) \rightarrow \pi^+\pi^- J/\psi(1S) \rightarrow \pi^+\pi^- X$ with $\psi(2S) \rightarrow \pi^+\pi^- J/\psi(1S) \rightarrow \pi^+\pi^- l^+ l^- J/\psi$ [47]. The calculated values (with and without QCD correction) of leptonic decay width for J/ψ and $\psi(2S)$ are given in table VI.

B. P wave states

The $1P$ triplet states of charmonium, χ_{CJ}, were first seen in radiative decays from the $\psi(2S)$. The χ_{CJ} states lie 128/171/261 MeV below the $\psi(2S)$. Their masses can most accurately be determined in $p\bar{p}$ collisions with $\chi_{CJ} \rightarrow \gamma J/\psi \rightarrow \gamma(e^+ e^-)$ or by measuring the excitation curve, where the well known and small beam energy spread results in very low systematic uncertainty [48]. The J=0 state is wide while the J=1 and J=2 states are narrower[28]. Our calculated mass values for these states are given in the table II. We have given the calculated value of the mass of 1P singlet state of charmonium which had been observed by CLEO [49] in the same table. We have calculated two photon decay widths for $\chi_{C0}(^3P_0)$ and $\chi_{C2}(^3P_2)$ states with and without QCD correction. The calculated values are compared with those of references [36] and[50] in table V.

C. D wave states

A narrow resonance X (3872) discovered by Belle collaboration [51] in B decays has the positive C parity. An analysis of the angular correlations[52] in the process with the decay $X \rightarrow \pi^+\pi^- J/\Psi$ prefers the assignment $J^{PC} = 1^{++}$. A similar analysis by CDF [53] allows either 1^{++} or 2^{-+}. The latter assignment, however, would greatly suppress the decay of X to $D^0\bar{D}^0$, which is very close to its threshold. We have calculated the mass of $X(3872)$ taking J^{PC} as 2^{-+} which is far from good in agreement with PDG value. Hence we conclude that the possibility of $J^{PC} = 2^{-+}$ cannot be right [54]. Also positive C parity of X (3872) with decay $X \rightarrow \pi^+\pi^- J/\psi$ points to the conclusion that X resonance cannot be a pure $c\bar{c}$ system [55]. Taking $J^{PC} = 1^{--}$ we have calculated the mass of $\psi(4040)$ assigning it 1^3D_1 state which is given in table II. The leptonic decay width calculated for the same meson without QCD correction nearly agrees with the PDG value given in table VI.

D. Radiative decays

We have calculated in this paper the E1 and M1 transition widths for charmonium states. These transitions are reported in PDG. We studied the transitions allowed by long wavelength approximation. They are $^3P_J \rightarrow {}^3S_1$ and $^3S_1 \rightarrow {}^3P_J$ (E1 transitions); $^3S_1 \rightarrow {}^1S_0$ (M1 transitions) Along with these we have also studied a particular E1 transition corresponding to the decay $^1P_1 \rightarrow {}^1S_0$. In calculations energy of the photon equal to the energy difference between the resonances and in non relativistic phase space the term $\frac{Eb\,(ko)}{m_a}$ is equal to unity. Our results are shown in the tables VII,VIII, IX,X. A comparison with the ref [56] is also given. In the table X we have not included the decay $\psi(2S) \rightarrow \eta_c \gamma$ since the overlap integral vanishes for the 2S → 1S transition. This decay becomes possible due to the relativistic effects which we have not considered in this paper.

V. SUMMARY AND CONCLUSIONS

The main objective of the present work is to study the charmonium spectra and its decay properties with a single set of parameters. In this work, we have obtained the masses of Charmonium states in the frame work of NRQM in the harmonic oscillator basis spanned over a space extending up to the radial quantum number $n_{max} = 4$. With a single set of parameters we get a good agreement for the masses, their leptonic decay widths, two photon decay widths and for radiative decay widths. The calculations include QCD corrections for leptonic decay widths and two photon decay widths. The NRQM formalism has the right prediction both for the spectrum and the decay rates. This work could be extended for other heavy meson systems. Work in this direction is in progress.

Acknowledgments

One of the authors (APM) is grateful to BRNS, India, for funding the project (Sanction No. 37(3)/14/21/2014-BRNS/645)

[1] Buchmuller W and Tye S H (1981), Phys. Rev. D **24,** 132
[2] Quigg C and Rosner J L (1977), Phys. Lett. B **71**, 153
[3] Martin A (1980), Phys. Lett. B **93**, 338
[4] Eichten E, Gottfried K, Kinoshita T, Lane K D and Yan T -M, (1978), Phys. Rev. D**17**, 3090
[5] Pandya J N and Vinod Kumar P C (2001), Pramana J. Phys. **57,** 821

[6] Ajay Kumar Rai and Vinod Kumar P C (2006), Pramana J. Phys. **66**, 953
[7] Hafsakhan and Pervez Hoodbhoy (1996), Phys. Rev. D **53**, 2534
[8] Bhaduri R K, Cohler L E and Nogami Y (1981), Nuovo Cimento, A **65**, 376
[9] Godfrey S and Isgur N (1985), Phys. Rev. D **32**, 189
[10] Gromes D and Stamatescu I O (1976), Nucl. Phys. B **112**, 213
[11] Silvestre-Brac B and Gignoux C (1985), Phys. Rev. D **32**, 743
[12] Chliapnikov P V (2000) Phys. Lett. B **496,** 129
[13] Burakovsky L and Goldman T (1997), Nucl. Phys. A **625**, 220
[14] Bhavyashri, Vijaya Kumar K B, Hanumaiah B, Sarangi S and Zhou S G (2005), J. Phys.G: Nucl. Part. Phys. **31**, 981
[15] Bhavyashri, Sarangi S, Godfrey Saldanha and Vijaya Kumar K B (2008), Pramana J. Phys. **70**, 75
[16] Vijaya Kumar K B, Bhavyashri, Yong-Ling Ma, Antony Prakash Monteiro (2009), Int. J. Mod. Phy. A **22**, 4209
[17] De Rujula A, Georgi H and Glashow S L (1975), Phys. Rev. D **12**, 147
[18] Khadkikar S B and Vijaya Kumar K B (1991), Phys. Lett. B **254**, 320
[19] Vijaya Kumar K B and Khadkikar S B (1993), Nucl. Phys. A **556**, 396
[20] Vijaya Kumar K B and Khadkikar S B (1998), Pramana J. Phys. **50**, 149
[21] Vijaya Kumar K B, Hanumaiah B and Pepin S (2004) Eur. Phys. J. A **19**, 247
[22] Van Royen R and Weisskopf V F (1967), Nuovo Cim. A **50**, 617
[23] Barbieri R, d Emilio E, Curci G and Remiddi E (1979), Nucl. Phys. B **154**, 535
[24] Kwong W and Rosner J L (1988), Phys. Rev. D **38**, 279
[25] Barbieri R, Gatto R and Kogerler R (1976), Phys. Lett. B **60**, 183
[26] Novikov V A et al. (1978), Phys. Rep.C **41**, 1
[27] Kwong W, Mackenzie P B, Rosenfeld R and Rosner J L (1988), Phys. Rev. D **37**, 3210
[28] Amsler C et al. (2008), Phys. Lett. B **667**, 1 and its online update
[29] Asner D M et al. (CLEO) (2004), Phys. Rev. Lett. **92**, 142001
[30] Aubert B et al. (BaBar) (2004), Phys. Rev. Lett. **92**, 142002
[31] Fang F et al. (Belle) (2003), Phys. Rev. Lett. **90**, 071801
[32] Bai J Z et al. (BES) (2000), Phys. Rev. D**62**, 072001
[33] Bai J Z et al. (BES) (2003), Phys. Lett. B **555**, 174
[34] Ambrogiani M et al. (Fermilab E835) (2003), Phys. Lett. B**566**, 45
[35] Eichten E et al. (2008), arXiv: hep-ph/0701208v3
[36] Yao W M et al. (PDG) (2006), J. Phys. G **33**, 1
[37] Edwards C et al. (Crystal Ball) (1982) Phys. Rev. Lett. **48**, 70
[38] Choi S K et al. (Belle) (2002) Phys. Rev. Lett. **89,** 102001
[39] Abe K et al. (Belle) (2002) Phys. Rev. Lett. **89**, 142001
[40] Eidelman S et al. (2004) Phys. Lett. B **592,** 1

[41] Ackleh E S and Barnes T (1992), Phys. Rev. D **45**, 232
[42] Kim C S, Lee T and Wang G L (2005), Phys. Lett. B **606**, 323
[43] Aubert J J et al. (BNL E 598) (1974), Phys. Rev. Lett. **33**, 1404
[44] Augustin J E et al. (SLAC-SP-017) (1974), Phys. Rev. Lett. **33**, 1406
[45] Aulchenko V M et al. (KEDR) (2003) Phys. Lett. B **573**, 63
[46] Abrams G S et al. (1974), Phys. Rev. Lett. **33**, 1453
[47] Li Z et al. (CLEO) (2005), Phys. Rev. D **71**, 111103
[48] Andreotti M et al.(Fermilab E835) (2003), Phys. Rev. Lett. **91**, 091801
[49] Rosner J L et al.(CLEO) (2005), Phys. Rev. Lett. **95**, 102003
[50] Huang H W et al. (1997), Phys. Rev. D **45,** 368
[51] Choi S K et al. (Belle) (2003), Phys. Rev. Lett.**91**, 262001
[52] Rosner J L (2004), Phys. Rev D. **70**, 094023
[53] Abulencia A et al.(CDF) (2007), Phys. Rev. Lett. **98**, 132002
[54] Gokhroo G et al.(Belle) (2006), Phys. Rev. Lett. **97**, 162002
[55] Voloshin M B (2008), Prog. in Part. and Nucl. Phys. **61**, 455
[56] Bonnaz R, Silvestre-Brac B and Gignoux C (2002), Eur. Phys. J. A **13**, 363

TABLE I: Value of parameters

b	0.325 fm
M_c	1160 MeV
a_c	260.0 MeV fm^{-1}
α_s	0.2

TABLE II: Masses of Charmonium states (in MeV)

$^{2S+1}L_J$	Meson	Experimental Mass	Calculated mass
$^1S_0$	$\eta_c(1S)$	2980±1.2	2993.65
	$\eta_c(2S)$	3637±4	3867.32
$^3S_1$	$J/\psi(1S)$	3096.916±0.011	3053.43
	$\psi(2S)$	3686.09±0.04	3885.28
$^1P_1$	$h_c(1P)$	3525.93±0.27	3527.28
$^3P_0$	$\chi_{c0}(1P)$	3414.75± 0.31	3405.9
$^3P_1$	$\chi_{c1}(1P)$	3510.66± 0.07	3534.6
$^3P_2$	$\chi_{c2}(1P)$	3556.2± 0.09	3580.4
$^1D_2$	X(3872)	3872.2± 0.8	4063.7
$^3D_1$	$\psi(4040)$	4039± 1	4050.8

TABLE III: Two Phton decay width of $\eta_c(1S)$ (in KeV)

Meson	Ref[40]	Ref [36]	Ref[28]	$\Gamma_{(^1S_0\to\gamma\gamma)}$	$\Gamma'_{(^1S_0\to\gamma\gamma)}$
$\eta_c(1S)$	$7.0^{+1.0}_{-0.9}$	7.06 ±0.8 ± 2.3	$6.7^{+0.9}_{-0.8}$	7.89	6.2

TABLE IV: Two Phton decay width of η_c (2S) (in KeV)

Meson	Ref[29]	Ref [41]	Ref[42]	$\Gamma_{(^1S_0\to\gamma\gamma)}$	$\Gamma'_{(^1S_0\to\gamma\gamma)}$
$\eta_c(2S)$	1.3 ± 0.6	3.7	4.44 ± 0.48	4.76	3.74

TABLE V: Two Phton decay width of χ_{c0} (1P) and χ_{c2} (1P) (in KeV)

Meson	Ref[36]	Ref [50]	Γ	Γ'
$\chi_{c0}(1P)$	2.9 ± 0.4	5.32	4.15	4.19
$\chi_{c2}(1P)$	0.534 ± 0.05	0.44	0.94	0.62

TABLE VI: Leptonic decay widths of Charmonium states (in KeV)

Meson	Experimental Leptonic width[28]	Calculated Leptonic width(without QCD correction)	Calculated Leptonic width (with QCD correction)
$J/\psi(1S)$	$5.55 \pm 0.14 \pm 0.02$	5.48	3.6
$J/\psi(2S)$	2.38 ± 0.04	3.36	2.22
$\psi(4040)$	0.86 ± 0.07	0.814	0.54

TABLE VII: Decay widths for $^3S_1 \to {}^3P_J$ transitions

Transition	Expl. value $\Gamma(KeV)$	k_0(MeV)	Ref [56]	Calculated $\Gamma(KeV)$
$\psi(2S) \to \chi_{c0}(1P)\gamma$	25.76 ± 3.81	271	19.77	25.94
$\psi(2S) \to \chi_{c1}(1P)\gamma$	24.10 ± 3.49	175	38.40	20.96
$\psi(2S) \to \chi_{c2}(1P)\gamma$	21.61 ± 3.28	130	47.35	14.32

TABLE VIII: Decay widths for $^3P_J \to {}^3S_1$ transitions

Transition	Expl. value $\Gamma(KeV)$	k_0(MeV)	Ref [56]	Calculated $\Gamma(KeV)$
$\chi_{c0}(1P) \to J/\psi(1S)\gamma$	92.40 ± 41.52	318	268.67	188.63
$\chi_{c1}(1P) \to J/\psi(1S)\gamma$	240.24 ± 40.73	414	349.33	416.23
$\chi_{c2}(1P) \to J/\psi(1S)\gamma$	270.00 ± 32.78	459	387.90	567.26

TABLE IX: Decay widths for $^1P_1 \to {}^1S_0$ transitions

Transition	Expl. value $\Gamma(KeV)$	k_0(MeV)	Calculated $\Gamma(KeV)$
$h_c \to \eta_c(1S)\gamma$	seen	546	954.82

TABLE X: Decay widths for $^3S_1 \to {}^1S_0$ transitions

Transition	Expl. value $\Gamma(KeV)$	k_0(MeV)	Ref[56]	Calculated $\Gamma(KeV)$
$J/\psi(1S) \to \eta_c(1S)\gamma$	1.13 ± 0.35	117	2.04	5.14

Structure report: (2E)-1-(3,4-dimethylphenyl)-3-(3-methylthiophen-2yl)prop-2-en-1-one

D'Silva E D

*Depart*ment of Physics
Center for Post Graduate Studies and Research,
St. Philomena College, Puttur, India
deepak.dsilva@gmail.com

The compound (2E)-1-(3,4-dimethylphenyl)-3-(3-methylthiophen-2-yl) prop-2-en-1-one was synthesized by the reaction of 3-methylthiophene -2-carbaldehyde with 3,4-dimethylacetophenone. The structure of the synthesized compound was characterized by subjecting it to single crystal X-ray diffraction studies. The compound crystallizes in the monoclinic crystal class with space group P 1 21/c 1. The cell parameters are a = 7.1331(4) Å, b = 28.5501(11) Å, c = 7.2354(5) Å, β = 116.873(8)°, V = 1314.36(14) Å^3 and Z = 4.

Introduction

Chalcones are precursor of various natural products such as flavonoids, isoflavanoids and key intermediates for synthesis of various heterocyclic scaffolds [1]. Chalcone consists of two aromatic rings joined together by a three carbon α,β-unsaturated carbonyl system. These compounds have broad range of biological activities such as anticancer, antimalarial activity, anti-TB activity, antiviral, antibacterial, antifilarial activity etc [2]. A vast number of naturally occurring chalcones are polyhydroxylated in the aryl rings. The radical quenching properties of the phenol groups present in many chalcones have raised interest in using the compounds or chalcone rich plant extracts as drugs or food preservatives [3]. Chalcones are finding applications as organic non-linear optical materials (NLO) due to their good SHG conversion efficiencies and higher order nonlinear optical properties [4].Owing to the importance of these chalcones, this new chalcone (2E)-1-(3,4-dimethylphenyl)-3-(3-methylthiophen-2-yl)prop-2-en-1-one was synthesized and its crystal structure is reported.

Experimental

The compound (2E)-1-(3,4-dimethylphenyl)-3-(3-methylthiophen-2-yl)prop-2-en-1-one was synthesized by the condensation of 3-methylthiophene-2-carbaldehyde (0.01 mol) with 3,4-dimethylacetophenone (0.01 mol) in methanol (60 ml) in the presence of a catalytic amount of sodium hydroxide solution (5 ml, 30%) [5]. After stirring (6 h), the contents of the flask were poured into ice-cold water (500 ml) and left to stand for 5 h. The resulting

crude solid was filtered and dried. The precipitated compound was recrystallized from methanol.

The single crystal X-ray diffraction data was collected on Bruker Kappa Apex using Apex2 software package [6]. The radiation used was graphite monochromatic MoK a radiation. All the data were corrected for Lorentz factor and empirical absorption. The structure was solved by direct method and all the non-hydrogen atoms and hydrogen atoms were found in difference electron density maps. The atomic coordinates and anisotropic temperature factors for non-hydrogen atoms were refined by the full matrix least square method using SHELXTL program package [7].

The molecule exhibits an E configuration with respect to the C10=C11 double bond with the C9—C10—C11—C12 torsion angle being -178.6 (2)°. The bond lengths and bond angles are found to have normal values [8]. The dihedral angle between the benzene and the thiophene ring are 27.79°, indicating that they are non-planar.

In the crystal structure, the molecules are stacked along the *b* axis. Along each axis the adjacent molecules are inverted and arranged in head-to-tail fashion. The parallel molecules between two axes aligned in the same direction. The crystal packing is consolidated by inter molecular C—H···O and C—H···H hydrogen bonding interactions.

Special Details :

Geometry: All e.s.d.'s (except the e.s.d. in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell e.s.d.'s are taken into account individually in the estimation of e.s.d.'s in distances, angles and torsion angles; correlations between e.s.d.'s in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell e.s.d.'s is used for estimating e.s.d.'s involving l.s. planes.

Refinement: Refinement of F^2 against ALL reflections. The weighted R-factor wR and goodness of fit S are based on F^2, conventional R-factors R are based on F, with F set to zero for negative F^2. The threshold expression of $F^2 > \sigma(F^2)$ is used only for calculating R-factors(gt) etc. and is not relevant to the choice of reflections for refinement. R-factors based on F^2 are statistically about twice as large as those based on F, and R- factors based on ALL data will be even larger.

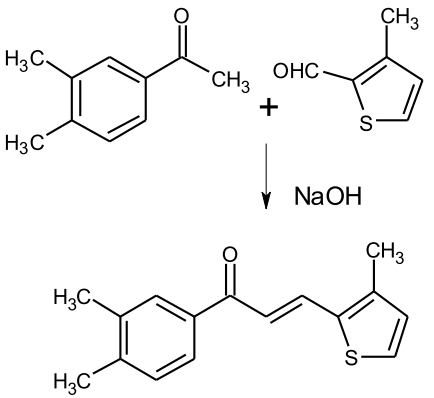

Fig. 1 Reaction Scheme for the title compound

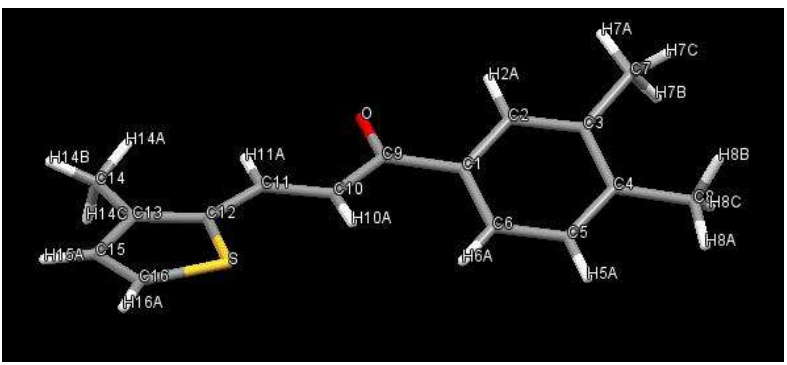

Fig. 2 Molecular structure of the title compound, showing the atom labeling scheme and 50% probability displacement ellipsoids.

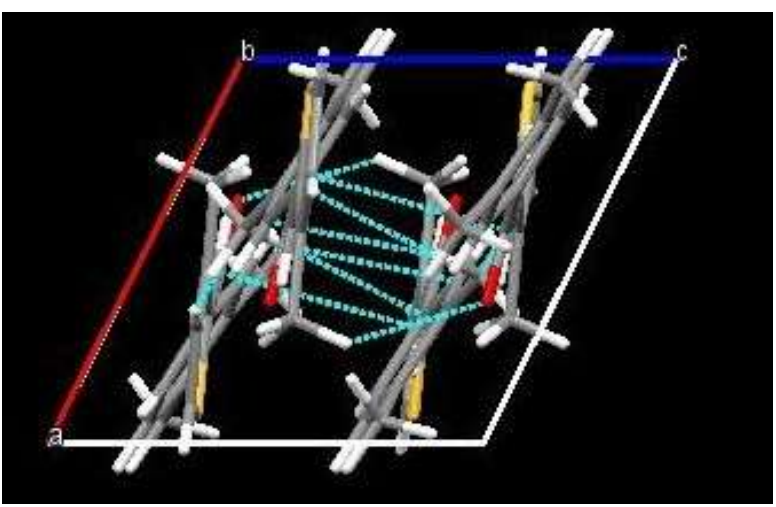

Fig. 3 Packing diagram of the title compound, viewed down the *b* axis. Dashed lines indicate intermolecular bond interaction

Table 1. Crystal data and structure refinement

Empirical formula	C16 H16 O S	
Formula weight	256.35	
Temperature	110(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P 1 21/c 1	
Unit cell dimensions	a = 7.1331(4) Å	$\alpha = 90°$.
	b=28.5501(11) Å	$\beta = 116.873(8)°$.
	c = 7.2354(5)Å	$\gamma = 90°$.
Volume	1314.36(14) $Å^3$	
Z	4	
Density (calculated)	1.295Mg/m^3	
Absorption coefficient	0.231 mm^{-1}	
F(000)	544	
Crystal size	0.46 x 0.34 x 0.14 mm^3	
Theta range for data collection	4.77 to 32.65°.	
Index ranges	-10<=h<=10, -41<=k<=36, -10<=l<=9	
Reflections collected	13232	
Independent reflections	4397 [R(int) = 0.1711]	
Completeness to theta = 25.00°	99.1 %	
Absorption correction	Semi-empirical from equivalents	
Max. and min. transmission	1.00000 and 0.78949	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	4397 / 0 / 166	
Goodness-of-fit on F^2	1.151	
Final R indices [I>2sigma(I)]	R1 = 0.0833, wR2 = 0.1625	
R indices (all data)	R1 = 0.1329, wR2 = 0.1759	
Largest diff. peak and hole	0.567 and -0.395 e.$Å^{-3}$	

Supplementary materials

Table 2. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters ($Å^2x10^3$).U(eq) is defined as one third of the trace of the orthogonalized U^{ij} tensor.

	x	y	z	U(eq)
S	721(1)	2210(1)	1923(1)	24(1)
O	6320(3)	3610(1)	3452(3)	28(1)
C(1)	3306(3)	4057(1)	2812(3)	14(1)
C(2)	4215(3)	4463(1)	2476(3)	13(1)
C(3)	3358(3)	4904(1)	2378(3)	13(1)
C(4)	1533(3)	4948(1)	2648(3)	14(1)
C(5)	610(3)	4541(1)	2945(3)	15(1)
C(6)	1463(3)	4099(1)	3013(3)	17(1)
C(7)	4389(3)	5331(1)	2021(4)	17(1)
C(8)	614(3)	5424(1)	2637(4)	18(1)
C(9)	4460(3)	3602(1)	3052(4)	18(1)
C(10)	3316(3)	3159(1)	2807(4)	19(1)
C(11)	4325(4)	2746(1)	3094(4)	19(1)
C(12)	3400(3)	2287(1)	2863(4)	17(1)
C(13)	4443(3)	1861(1)	3337(4)	20(1)
C(14)	6761(4)	1799(1)	4173(5)	35(1)
C(15)	3022(4)	1479(1)	2937(4)	21(1)
C(16)	979(4)	1615(1)	2173(4)	23(1)

Table 3. Bond lengths [Å] and angles [°]

S-C(16)	1.711(2)	C(3)-C(4)	1.407(3)
S-C(12)	1.729(2)	C(3)-C(7)	1.506(3)
O-C(9)	1.224(3)	C(4)-C(5)	1.399(3)
C(1)-C(6)	1.392(3)	C(4)-C(8)	1.506(3)
C(1)-C(2)	1.402(3)	C(5)-C(6)	1.393(3)
C(1)-C(9)	1.504(3)	C(5)-H(5A)	0.9500
C(2)-C(3)	1.387(3)	C(6)-H(6A)	0.9500
C(2)-H(2A)	0.9500	C(7)-H(7A)	0.9800

C(7)-H(7B)	0.9800	C(6)-C(5)-H(5A)	119.0
C(7)-H(7C)	0.9800	C(4)-C(5)-H(5A)	119.0
C(8)-H(8A)	0.9800	C(1)-C(6)-C(5)	119.59(17)
C(8)-H(8B)	0.9800	C(1)-C(6)-H(6A)	120.2
C(8)-H(8C)	0.9800	C(5)-C(6)-H(6A)	120.2
C(9)-C(10)	1.473(3)	C(3)-C(7)-H(7A)	109.5
C(10)-C(11)	1.347(3)	C(3)-C(7)-H(7B)	109.5
C(10)-H(10A)	0.9500	H(7A)-C(7)-H(7B)	109.5
C(11)-C(12)	1.441(3)	C(3)-C(7)-H(7C)	109.5
C(11)-H(11A)	0.9500	H(7A)-C(7)-H(7C)	109.5
C(12)-C(13)	1.387(3)	H(7B)-C(7)-H(7C)	109.5
C(13)-C(15)	1.427(3)	C(4)-C(8)-H(8A)	109.5
C(13)-C(14)	1.492(3)	C(4)-C(8)-H(8B)	109.5
C(14)-H(14A)	0.9800	H(8A)-C(8)-H(8B)	109.5
C(14)-H(14B)	0.9800	C(4)-C(8)-H(8C)	109.5
C(14)-H(14C)	0.9800	H(8A)-C(8)-H(8C)	109.5
C(15)-C(16)	1.360(3)	H(8B)-C(8)-H(8C)	109.5
C(15)-H(15A)	0.9500	O-C(9)-C(10)	121.80(18)
C(16)-H(16A)	0.9500	O-C(9)-C(1)	119.29(17)
C(16)-S-C(12)	92.15(10)	C(10)-C(9)-C(1)	118.91(18)
C(6)-C(1)-C(2)	118.59(17)	C(11)-C(10)-C(9)	120.3(2)
C(6)-C(1)-C(9)	123.81(17)	C(11)-C(10)-H(10A)	119.8
C(2)-C(1)-C(9)	117.51(17)	C(9)-C(10)-H(10A)	119.8
C(3)-C(2)-C(1)	122.10(18)	C(10)-C(11)-C(12)	126.3(2)
C(3)-C(2)-H(2A)	118.9	C(10)-C(11)-H(11A)	116.9
C(1)-C(2)-H(2A)	118.9	C(12)-C(11)-H(11A)	116.9
C(2)-C(3)-C(4)	119.31(17)	C(13)-C(12)-C(11)	127.03(19)
C(2)-C(3)-C(7)	120.39(18)	C(13)-C(12)-S	111.10(15)
C(4)-C(3)-C(7)	120.29(17)	C(11)-C(12)-S	121.87(15)
C(5)-C(4)-C(3)	118.38(17)	C(12)-C(13)-C(15)	111.58(19)
C(5)-C(4)-C(8)	121.01(19)	C(12)-C(13)-C(14)	125.17(19)
C(3)-C(4)-C(8)	120.61(17)	C(15)-C(13)-C(14)	123.25(19)
C(6)-C(5)-C(4)	121.99(18)	C(13)-C(14)-H(14A)	109.5

C(13)-C(14)-H(14B)	109.5	C(16)-C(15)-H(15A)	123.3
H(14A)-C(14)-H(14B)	109.5	C(13)-C(15)-H(15A)	123.3
C(13)-C(14)-H(14C)	109.5	C(15)-C(16)-S	111.77(15)
H(14A)-C(14)-H(14C)	109.5	C(15)-C(16)-H(16A)	124.1
H(14B)-C(14)-H(14C)	109.5	S-C(16)-H(16A)	124.1
C(16)-C(15)-C(13)	13.39(18)		
Symmetry transformations used to generate equivalent atoms			

Table 4. Anisotropic displacement parameters ($Å^2 x\ 10^3$). The anisotropic displacement factor exponent takes the form: $-2\ \pi 2\ [\ h^2\ a^{*2} U^{11} + ...\ + 2\ h\ k\ a^*\ b^*\ U^{12}\ ]$

	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
S	18(1)	16(1)	33(1)	3(1)	7(1)	1(1)
O	17(1)	18(1)	40(1)	1(1)	5(1)	1(1)
C(1)	13(1)	14(1)	11(1)	0(1)	1(1)	-2(1)
C(2)	10(1)	17(1)	8(1)	0(1)	1(1)	-1(1)
C(3)	14(1)	14(1)	9(1)	0(1)	2(1)	-2(1)
C(4)	14(1)	16(1)	9(1)	-1(1)	2(1)	0(1)
C(5)	11(1)	22(1)	11(1)	-1(1)	4(1)	-3(1)
C(6)	18(1)	15(1)	12(1)	0(1)	4(1)	-6(1)
C(7)	18(1)	14(1)	16(1)	0(1)	7(1)	-4(1)
C(8)	18(1)	19(1)	14(1)	-2(1)	4(1)	3(1)
C(9)	18(1)	14(1)	16(1)	1(1)	2(1)	-1(1)
C(10)	17(1)	15(1)	19(1)	2(1)	4(1)	-2(1)
C(11)	21(1)	15(1)	20(1)	1(1)	7(1)	-2(1)
C(12)	15(1)	15(1)	17(1)	1(1)	5(1)	-1(1)
C(13)	21(1)	16(1)	23(1)	0(1)	10(1)	1(1)
C(14)	20(1)	27(1)	56(2)	1(1)	17(1)	1(1)
C(15)	26(1)	13(1)	23(1)	-2(1)	12(1)	-1(1)
C(16)	23(1)	14(1)	30(1)	-2(1)	10(1)	-4(1)

Table 5. Hydrogen coordinates (x 10^4) and isotropic displacement parameters ($Å^2$x 10^3)

	x	y	z	U(eg)
H(2A)	5458	4435	2311	16
H(5A)	-636	4568	3106	18
H(6A)	791	3828	3196	20
H(7A)	5589	5235	1795	25
H(7B)	4877	5536	3236	25
H(7C)	3372	5500	799	25
H(8A)	-649	5388	2836	27
H(8B)	244	5578	1307	27
H(8C)	1650	5614	3762	27
H(10A)	1859	3164	2445	22
H(11A)	5788	2758	3486	23
H(14A)	7353	2069	3783	52
H(14B)	7050	1513	3600	52
H(14C)	7402	1775	5687	52
H(15A)	3458	1161	3181	25
H(16A)	-165	1405	1820	28

Table 6. Torsion angles [°]

C(6)-C(1)-C(2)-C(3)	1.2(3)
C(9)-C(1)-C(2)-C(3)	-175.42(19)
C(1)-C(2)-C(3)-C(4)	0.8(3)
C(1)-C(2)-C(3)-C(7)	179.81(19)
C(2)-C(3)-C(4)-C(5)	-1.9(3)
C(7)-C(3)-C(4)-C(5)	179.09(18)
C(2)-C(3)-C(4)-C(8)	177.48(19)
C(7)-C(3)-C(4)-C(8)	-1.5(3)
C(3)-C(4)-C(5)-C(6)	1.1(3)
C(8)-C(4)-C(5)-C(6)	-178.3(2)
C(2)-C(1)-C(6)-C(5)	-2.1(3)

C(9)-C(1)-C(6)-C(5)	174.3(2)
C(4)-C(5)-C(6)-C(1)	1.0(3)
C(6)-C(1)-C(9)-O	-158.8(2)
C(2)-C(1)-C(9)-O	17.6(3)
C(6)-C(1)-C(9)-C(10)	20.9(3)
C(2)-C(1)-C(9)-C(10)	-162.63(19)
O-C(9)-C(10)-C(11)	2.4(4)
C(1)-C(9)-C(10)-C(11)	-177.4(2)
C(9)-C(10)-C(11)-C(12)	-178.6(2)
C(10)-C(11)-C(12)-C(13)	-173.5(2)
C(10)-C(11)-C(12)-S	6.2(4)
C(16)-S-C(12)-C(13)	0.40(19)
C(16)-S-C(12)-C(11)	-179.3(2)
C(11)-C(12)-C(13)-C(15)	179.2(2)
S-C(12)-C(13)-C(15)	-0.6(3)
C(11)-C(12)-C(13)-C(14)	-0.5(4)
S-C(12)-C(13)-C(14)	179.8(2)
C(12)-C(13)-C(15)-C(16)	0.5(3)
C(14)-C(13)-C(15)-C(16)	-179.8(3)
C(13)-C(15)-C(16)-S	-0.2(3)
C(12)-S-C(16)-C(15)	-0.1(2)

Symmetry transformations used to generate equivalent atoms

1] Butcher R J, Jasinski J P, Narayana B, Veena K, Yathirajan H S, (2010). *Acta Cryst.* E66, o1638.

2] Beazely M A, Dimmock J R, Elias D W, Kandepu N M, (1999). *Curr. Med. Chem.* 6, 1125.

3] Dhar D N (1981). *The Chemistry of Chalcones and Related Compounds*. NewYork: John Wiley .

4] Ashalatha B V, Indira J, Lobo K J, Narayana B, Sarojini B K,(2006). *J Cryst. Growth.* 295, 54.

5] Alka Agarwal, Firasat Hussain, Shailja Singh, Singh M K, Awasthi S K, (2011). *Acta Cryst.* E67, o1616.
6] Bruker. (2005). APEX2, SAINT and SADABS. Bruker AXS Inc., Madison, Wisconsin, USA.
7] Sheldrick G M, Acta Cryst. (2008). A64, 112.
8] Allen F H, Brammer L, Kennard O, Orpen A G, Watson D G, Taylor R, (1987). *J. Chem. Soc. Perkin* Trans. 2. S1.

Self Help Groups and Micro-Finance through bank linkage a study of coastal women community in Dakshina Kannada district

Haribert Nazareth

Department of Commerce
St. Philomena College, Puttur, India
elazhharibert@gmail.com

After the pioneering efforts of last many years the micro finance seen in India has reached a take off point. With some more efforts with the collaborative support of SHGs, substantial progress can be made in taking microfinance movement to the next orbit of sustainability. This needs innovative and forward looking policies, based on the ground realities. This will make this sector vibrant and help to achieve its single –minded mission of providing services to the poor and fridge the increasing gap between the demand and supply. Women, through SHGs are very important segment in development at local to global level. Economic independence and education of women will go a long way in attaining self reliance for women. Real change will come when women are treated on par with men and given equal opportunities. The SHGs and microfinance in the study area are taking the lead and playing an important and pivotal role in social transformation, welfare activities and infrastructure building and also they have served the cause of women empowerment, social solidarity and socio –economic betterment of the poor.

Introduction

Without personal assets, paid or self employed, the world's poor has found it exceptionally grueling to generate sustainable income opportunities. Where commercial financial lending demands collaterals to acquire credit, their unenviable and impoverished circumstances render the impoverished so incompetent to access external financial support mechanisms.

Micro finance has increasingly begun to be seen as a contributor to the reduction of poverty in developing countries, by creating opportunities for the poor to engage in economic and productive activities [UNESCO 1997]. The concept of micro-finance involves the accessibility to collateral-free loans from financial institutions by small groups or associations of poor individuals. The membership fee collected by the group is deposited in banks as savings, which in turn imparts eligibility to these groups to access institutional financial assistance.

Micro finance schemes are particularly targeted towards poor and rural women, who are often faced with discrimination not only by financial institutions, but also within their own households. The provision of micro financial assistance to women, on one hand can increase their household wealth through income generating activities initiated through such assistance, and on the other, can empower women. Empowerment of rural women through micro finance does not limit itself to financial empowerment through improvements in income, savings and living conditions and improvement in financial management capability and financial security. This is where the mechanism through which these rural women graduate themselves for accessing micro finance comes into the foray. One form of such micro finance mechanism, is Self-Help Group [SHG].

Self Help Groups were organized under the initiatives of the National Bank for Agriculture and Rural Development [NABARD] under directions of the Reserve Bank of India. Promoted by the governments as well as non-governmental organizations, it is group of rural poor, particularly women, who have volunteered to organize themselves into a group for eradication of poverty of the members through collective internal savings and access to external credit. Access to external credit is achieved through SHG-bank linkage, based on group solidarity instead of formal collateral.

Under the SHG-bank linkage programme, each self-help group is linked with a bank – a rural, co-operative or commercial bank – where the group account is maintained. Over time the bank begins to lend to the group as a unit, without collateral, relying on self-monitoring and peer-pressure within the group for repayment of these loans.

These linkages were designed not just as a strategy for poverty alleviation through financial empowerment. It was designed to be a vehicle by which rural women could achieve social, personal and political empowerment as well. Improvements in confidence levels, independence, mobility, decision-making capability and increased acceptance within the family were considered to be pointers towards personal empowerment. It was also anticipated that the rural women could accomplish social empowerment through micro finance, epitomized by improvements in organizational, interactive and public speaking skills, group cohesiveness, increased awareness on rights, social problems, increased acceptance in the society and participation in social activities. Rural women can successfully empower themselves against social evils like alcoholism, domestic violence, abuse and exploitation, gender bias and social exclusion.

The SHG model of micro finance has been accepted as being popular among the bankers who have seen its potential. The SHG-bank linkage programme in micro finance is identified to work better where the credit culture is not severely damaged, particularly in Southern parts of India [Srinivasan and Sriram 2003]. Hashemi, Schuler, and Riley (1996) found that membership in Rural Banks has a significant positive effect on empowerment by contrasting program villages with non-program villages. Studies have also shown that the presence of micro finance programmes for women can increase the empowerment of landless women, whereas such programmes for men can have a negative effect [Pitt, Khandker and Cartwright, 2006].

It is against this backdrop that the present study was undertaken to identify the perception of the SHG members regarding the extent of empowerment they have achieved through access to micro finance enabled by the SHG-bank linkage.

Findings of the Study

The following form the major findings of the study:

1. Social and Economic Profile of the Respondents:

Out of the total, 76.0 per cent of the respondents were married, while 10 per cent were single and 6 per cent were widowed. As regards the education of the respondents, 26 per cent had education up to +2, while 22 per cent were graduates. The rest included 15.3 per cent who had studied till the fifth standard. Occupational status of the respondents revealed that 30 per cent were self-employed, 22.7 per cent were housewives, 16 per cent werelaried and 12.7 per cent were daily labourers. As regards the monthly income, 36 per cent of the respondents belonged to the income category of Rs. 2,000 - Rs. 3,000, while 30 per cent belonged to below Rs. 1,000 and 21.3 per cent to Rs. 1,000 - Rs. 2,000 category.

The economic status of the respondents revealed that only 4.7 per cent and 4 per cent each did not own any landed property and house, respectively. In case of financial savings and deposits, 59.3 per cent of the respondents did not have it, while 60.7 per cent of them owned no valuables or ornaments.

2. Motivations for joining SHG

The study identified that the major motivators for the respondents in joining SHGs were their friends [26.7 per cent], neighbours [24.0 per cent], personal interest [20.0 per cent], NGO officials [15.3 per cent], and other SHG members [14.0 per cent]. Refer to Table 1.

It was revealed that easy access to loans [58.3 per cent], development of skill sets [52.7], participation in economic activity [52.7 per cent], inculcation of savings habit [50.0 per cent], opportunity of social interaction [47.3 per cent] and participation in social activity [25.3 per cent] were among the major motivational factors behind the joining of the SHGs. Details are given in Table2.

3. Nature of Operations and Group Characteristics of SHGs

Regarding the nature of operations of their SHGs, the respondents reported existence of bank linkage [85.3 per cent], denial of access to books of accounts [80.7 per cent], conduct of regular meetings [78.7 per cent], improper maintenance of attendance register [56.7 per cent], occurrence of member drop-outs [55.3 per cent], improper maintenance of books of accounts [49.3 per cent], and occurrence of conflicts [48.7 per cent]. See Table 3 for details.

The opinion of the respondent SHG members regarding the nature of operations of their group revealed that feelings of trust among the group members [66.0 per cent] and group interaction between members [52.0 per cent] existed at high levels. Nearly 62.7 per cent of respondents were highly satisfied about the operations of SHGs. Leadership qualities and accountability existed at medium levels for 67.3 per cent and 46.7 per cent respectively. As regards transparency of operations, nearly 71.3 per cent agreed with medium to low levels of existence of transparency. Group cohesion was medium according to 62.7 per cent. Refer Table 4 for results.

4. Personal Empowerment after joining SHG

Personal empowerment achieved by the respondents after joining the SHGs was identified as being composed of improvements in confidence [62.0 per cent], decision-making capability [68.0 per cent], and mutual respect [47.3 per cent] at high levels, and independence [60.0 per cent], mobility [38.0 per cent], self-respect [56.0 per cent], and family acceptance [37.3 per cent] at medium levels. For 31.3 per cent, family acceptance, for 28.0 per cent, mobility and for 18.0 per cent, self-respect improved only by low levels. See Table 5[i].

The Factor Analysis performed indicated that decision making capability, confidence and mutual respect were the factors, which best explains the level of personal empowerment achieved. Results are provided in Table5[ii].

5. Social Empowerment after joining SHG

Social empowerment as achieved by the respondents after joining the SHGs were identified to be composed of improvements in participation in social programmes [61.3 per cent high improvement level and 38.7 per cent medium improvement level], organisational skill [66.0 per cent high and 28.0 per cent medium], interactive skills [48.0 per cent high and 52.0 per cent medium],

group cohesiveness [42.7 per cent high and 57.3 per cent medium], awareness on social problems [47.3 per cent high and 43.3 per cent medium] , membership in other organizations [47.3 per cent high and 29.3 per cent medium], acceptance by society [36.7 per cent high and 42.7 per cent medium], public speaking skills [28.7 per cent high and 48.0 per cent medium] and awareness on rights [42.7 per cent low and 37.3 per cent medium]. See Table 6[i].

The Factor Analysis extracted organizational skills, participation in social programmes, interactive skills, and group cohesion as the factors most explaining the variations in social empowerment of the respondents. Details are provided in Table 6 [ii].

6. Financial Empowerment after joining SHG

Financial empowerment achieved by the respondents after joining the SHGs were identified to be composed of improvements in income [85.3 per cent high improvement and 10.7 per cent medium improvement], financial security [56.0 per cent high and 23.3 per cent medium], financial management capability [48.7 per cent high and 33.3 per cent medium], living conditions [46.0 per cent medium and 39.3 per cent high], savings [76.0 per cent medium and 24.0 per cent high], and expenditure [61.3 per cent medium and 23.3 per cent high]. Table 7 gives details.

7. Micro-Finance through SHGs

The study also identified that nearly 58.7 per cent of the respondents depended on their income for sources of finance, while 52.7 per cent depended on moneylenders for external financing sources. It was also found out that 74.7 per cent of the respondents depended on SHG loans provided through the bank linkage programme as a source of finance. Among the 74.7 per cent of the total respondents who had availed of the loan facility of the SHG-bank linkage programme, 82.14 per cent utilized a part of the loan amount for their children's education, while 56.25 per cent utilized it for agricultural purposes and 43.75 per cent utilized it for marriage purposes of family members. Use of the micro finance for income generating purposes such as animal husbandry or poultry and small business ventures were limited to 11.61 per cent and 45.54 per cent, respectively. Another 34.82 per cent of the respondents employed a part of the money for repayment of other existing loans.

Conclusion

Self Help Groups of rural women can form the heart of community development activities. The pooling of minuscule and individual financial savings of the members through group activities can act as a strong back-bone for women empowerment. Supplemented by the linkages of the self help groups

with banks, thereby enabling micro-credit facilities, the financial power of these rural women gets substantially increased.

The present study evidences the existence of strong linkages of the SHGs with banks. The very reason of members, as opined by them, in joining the group is the improved chances of accessibility to loans. Also the opportunity to undertake economic activities through group efforts, and the concomitant learning of entrepreneurial and technical skill sets act as motivators for group membership. Thus, there exists strong positive relation between the reasons for joining the group, and the existence of bank linkages. The strong bank linkage that exists, can visibly enhance the opportunity of members to access loans, undertake economic activities, and develop skills.

On the realistic aspect, it is also found that the members still depend enormously on indigenous money lenders, forcing high interest payments. The high incidence of bank linkage and accessibility to finance through SHGs is still not relieving the rural population from the clutches of money lenders and exorbitant interest rates. It points to the important fact of insufficiency of funding through the bank linkage porgramme. Thus, the SHG-driven micro-finance may suffer from serious limitations, reducing its positive impact on empowerment. The lack of transparency in the SHG activities, and inaccessibility to official records may further hinder the effectiveness of the movement.

Probably, the most disappointing fact relating to financial access is the limited employment of SHG credit facilities for economic and other income generating activities. Use of finance for entrepreneurial activities is deplorably low. The vagaries of indebtedness can only increase by using SHG credit facilities for refinancing pre-existing loans or for financing marriages.

Thus, what emerges from the present study is a gloomy state of SHGs and its access to micro-finance. Insufficiency of finance, lack of transparency in activities, and poor use of finance for productive, income-generating activities act as a limiting factor in achieving the intended empowerment.

Hashemi, S M, Schuler S R, and Riley A P [1996]. *Rural Credit Programmes and Women's Empowerment in Bangaladesh*. World Development, 24. pp. 635.
Khandelwal, Anil K [2007]. Microfinance Development Strategy for India, *Economic and Political Weekly*, March, xlii, 13. pp. 1121.
Meenai, Zubair (2003), *Empowering Rural Women: An Approach to Empowering Women through Credit-Based Self Help Groups,* Aakar Books, Delhi.
National Bank for Agriculture and Rural Development (1999), *Task Force Report on Supportive Policy and Regulatory Framework for Micro Finance*, Mumbai, India.
Pitt, Mark M, Shahidur R Khandker, and Jennifer Cartwright [2006]. Empowering Women with Micro-finance: Evidence from Bangladesh, *Economic Development and Cultural Change,* July. pp. 791.
Rangappa, K B, Renuka Bai, and Sandesh A L, *Study on SHG-Bank Linkage Programme and Financial Inclusion: Rural Household Study in Davangere District of Karnataka.*
Srinivasan R, and Sriram M S [2003]. Micro-finance in India: Discussion, *IIMB Management Review,* June. pp. 66.
UNESCO [1997]. Position Paper No. CAB-97/WS/2, Microcredit Summit February 2-4, Washington

Table 1
Motivators for joining SHG

Motivators	No.	Per Cent
Friends	40	26.7
Neighbours	36	24.0
Personal Interest	30	20.0
NGO Officials	23	15.3
Other SHG Members	21	14.0
TOTAL	150	100.0
Source: Primary Data		

Table 2
Reasons for joining SHG

Reason	No	Percent
Easy Access to Loans	87	58.0
Development of Skill Sets	79	52.7
Participation in Economic Activity	79	52.7
Inculcation of Savings Habit	75	50
Opportunity of Social Interaction	71	47.3
Participation in Social Activity	38	25.3
Source:Primary Data		

Table 3
Nature of Operations of SHGs

Operations	Yes		No	
	No.	Per Cent	No.	Per Cent
Bank Linkage	128	85.33	22	14.67
Regular Meetings	118	78.67	32	21.33
Dropouts from SHG	83	55.33	67	44.67
Accounts Books	76	50.67	74	49.33
Conflicts	73	48.67	77	51.33
Attendance Register	65	43.33	85	56.67
Access to Books	29	19.33	121	80.67
Source: Primary Data				

Table 4
Opinion on Group Characteristics of SHG

Group Characteristics	Level of Characteristics					
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Trust between Members	99	66.00	28	18.67	23	15.33
Interaction	78	52.00	66	44.00	6	4.00
Satisfaction	94	62.67	20	13.33	36	24.00
Leadership	43	28.67	101	67.33	6	4.00
Cohesion	43	28.67	94	62.67	13	8.67
Accountability	52	34.67	70	46.67	28	18.67
Transparency	28	18.67	79	52.67	43	28.67
Source: Primary Data						

Table 5 [i]
Personal Empowerment of SHG Members

Personal Empowerment	Extent of Empowerment					
	HIGH		MEDIUM		LOW	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Confidence	93	62.00	57	38.00	0	0.00
Independence	33	22.00	90	60.00	27	18.00
Decision-making	102	68.00	48	32.00	0	0.00
Mobility	51	34.00	57	38.00	42	28.00
Self respect	39	26.00	84	56.00	27	18.00
Mutual respect	71	47.33	52	34.67	27	18.00
Family Acceptance	47	31.33	56	37.33	47	31.33
Source: Primary Data						

Table 5 [ii]
Total Variance Explained: Factor Analysis
Personal Empowerment of SHG Members

Component	Initial Eigenvalues			Extraction of Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.049	29.267	29.267	2.049	29.267	29.267
2	1.917	27.384	56.651	1.917	27.384	56.651
3	1.045	14.924	71.574	1.045	14.924	71.574
4	0.783	11.190	82.764			
5	0.514	7.340	90.105			
6	0.428	6.114	96.219			
7	0.265	3.781	100.00			
Extraction Method: Principal Component Analysis						

Table 6 [i]
Social Empowerment of SHG Members

Social Empowerment	Extent of Empowerment					
	HIGH		MEDIUM		LOW	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Organizational Skill	99	66.00	42	28.00	9	6.00
Group Cohesiveness	64	42.67	86	57.33	0	0.00
Interactive Skill	72	48.00	48	32.00	0	0.00
Public Speaking	43	28.67	72	48.00	35	23.33
Awareness on Rights	30	20.00	56	37.33	64	42.67
Awareness on Social Problems	71	47.33	65	43.33	14	9.33
Acceptance in Society	55	36.67	64	42.67	31	20.67
Participation in Social Programmes	92	61.33	58	38.67	0	0.00
Membership in Other Organizations	71	47.33	44	29.33	35	23.33
Source: Primary Data						

Table 6 [ii]
Total Variance Explained: Factor Analysis
Social Empowerment of SHG Members

Component	Initial Eigenvalues			Extraction of Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.376	26.4	26.4	2.376	26.4	26.4
2	1.645	18.27	44.67	1.645	18.27	44.67
3	1.597	17.74	62.42	1.597	17.74	62.42
4	1.138	12.64	75.06	1.138	12.64	75.06
5	0.914	10.15	85.21			
6	0.535	5.99	91.20			
7	0.360	4.00	95.16			
8	.0253	2.82	97.98			
9	0.182	2.02	100.00			
Source: Primary Data						

Table 7
Financial Empowerment of SHG Members

Financial Empowerment	Extent of Empowerment					
	HIGH		MEDIUM		LOW	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Income	128	85.33	16	10.67	6	4.00
Savings	36	24.00	114	76.00	0	0.00
Financial Management	73	48.67	503	3.33	27	18.00
Living Conditions	59	39.33	69	46.00	22	14.67
Expenditure	35	23.33	92	61.33	23	15.33
Financial Security	84	56.00	35	23.33	31	20.67
Source: Primary Data						

The role of co-operative societies in fulfilling the financial needs of village farmers and improving their living standards in Belthangady Taluk, Karnataka

Maxim Carl

Department of Commerce
St. Philomena College, Puttur, India
maximcarlo@yahoo.com

Commercial banks and co-operative banks are two major divisions of banking sector in India. When the commercial banks contribute to the growth of economy the village farmers are neglected although they pool good chunk of the financial growth of the nation. Co-operative banks have emerged to fill the gap. It is a study on the role of co-operative societies in fulfilling the financial needs of village farmers and in providing their standard of living in Belthangady Taluk, in Dakshina Kannada district, Karnataka state, India. The results show that 75% of the members of Co-operative Societies are agriculturists among whom 80% had taken loan from the Co-operative Society. The Co-operative Societies helped those farmers to improve the standard of living and multiple schemes were planned for farmers' benefit. More than 16 types of financial help is provided by such societies.

Introduction

India is a land of villages. Villages in India are not self sufficient and self reliant. Agriculture and allied operations are the occupations of the majority of the village residents. They mainly depend on money lenders and the like financial providers to carry on their operations regularly and are exploited. To save and protect those farmers co-operative movement was formed.

Commercial banks cater to the requirements of the highly organized industries and commercial undertakings and organizations. But the requirements of highly disorganized agricultural sector of the country are neglected by the commercial banks. So the co-operative societies and banks came into being to help the agricultural sector. Commercial banks and co-operative banks are the two major divisions of the banking sector in India. Commercial banks play a significant role in achieving economic progress through numerous ways, such as capital formation and financing various sectors like industry, trade, agriculture, transport and self employment. On the other hand, co-operative banks and societies promote savings habits of the farmers and other weaker sections of the community and meet their credit needs. Co-operative societies concentrate more on the rural areas.

Broadly speaking, the main function of a co-operative society is to accept deposits and give loans. Loans are generally sanctioned to the farmers for short term, medium term and long term. Short term loans are given for seasonal agricultural operation such as purchase of seeds, fertilizers, insecticides, pesticides etc. medium term loans are required for purchase of cattle, pump sets, agricultural implements, cattle sheds etc. long term loans are required by the farmers either for the redemption of old debts or for effecting permanent improvement and development of lands, for the purchase of lands for machinery, construction of permanent irrigation channels etc. short term loans are given for periods ranging between 6 months and one year, medium term loans for periods ranging between 3 and 5 years and long term loans for periods ranging between 15 years and more.

Today the financial needs of the village farmers have increased to a great extent. They need the finance not only for agricultural purpose but also for other household purposes which lead them to live a luxurious life and improve their standard of living. So the co-operative societies now a day are required to cater to the diverse financial needs of the village farmers.

Growth Of Co-operative Movement:
In India:

i) The co-operative movement was started in India with a view to provide funds for agricultural operations at a low rate of interest and protect them from the clutches of money lenders.
ii) In India it was initiated as a State Policy and owes its origin to the enactment of the Co-operative Societies Act 1904.
iii) To revitalize the co-operatives the government of India has introduced a comprehensive strategy which contained the following:
a) Formation of a National Co-operative Policy.
b) Formation of a Model Co-operative Act to democratize the working of co-operatives.
c) Strengthening Primary Agricultural Co-operatives.
d) Enhancing the involvement of the rural poor in the co-operative movement by organizing them into self help groups and activating membership of co-operatives.

Karnataka:
a) The Co-operative Societies Regulation Act III was passed in the erstwhile princely State of Mysore in June 1905.
b) The first Primary agricultural society was founded in 1905 at Kanaginahal, Gadag District.
c) The co-operative structure in Karnataka is federal in nature and follows the Three tire system- consisting Primary Agricultural Societies at grass root

level, co-operative Central banks at the District level and State co-operative banks at the State Level.

Dakshina Kannada District:

a) The Co-operative Movement in Dakshina kannada District was started in 1909.
b) The First Co-operative Societies called "Amitha" was started in October 1910 at Puttur.
c) On 30th Nov 1913, Puttur Credit Society was established. Now it is functioning under the name South Canara District Central Co-operative Bank.
d) In the beginning of First Five Year Plan, there were 349 Agricultural Credit Societies covering 520 villages in the District. At the end of First Five Year Plan, the number of societies increased to 448.
e) In 1973 CAMPCO was formed. After 1973 there was a sharp upward trend in the co-operative sector of Dakshina Kannada.
f) During the successive plan period a good number of new verities of co-operatives like Marketing & Processing Societies, Milk Societies, Fisheries, Industrial Co-operatives, teachers co-operatives, Co-operatives of Beedi Workers have flourished.

Co-operatives in Belthangady Taluk:

Co-operative Movement in Belthangady Taluk is in a rapid speed in recent years. Almost all the villages are covered by the Co-operative Societies thereby facilitated the farmers to make use of the various schemes. There are 23 Primary agricultural Co-operative Societies in the taluk. They are Dharmasthala, Ujire, Belthangady, Keyyoor, Belalu, Nidle, Venur, Guruvayanakere, Alangady, Machina, Thannirupanth, Bharya, Padmunja, Kaliya, Madanthyar, Hathyadka, Mundaje, Pandangady, Bangady, Perady, Sulkeri and Kokkada. In addition to this there are other co-operative societies and banks which help the members in providing various services.

A study is conducted on the role of co-operative societies in fulfilling the financial needs of village farmers and in providing their standard of living in Belthangady Taluk. The findings of the study are given below:

1. Co-operative Societies are mostly used by the farmers because more than 75% of the members of the Co-operative Societies are agriculturists by profession.
2. Majority of the members of the Co-operative Societies are lower and middle income group people. Among the respondents 79% of the member's annual income is below Rs. 1, 00,000.
3. The main reason of becoming the member of a Co-operative Society is to get agricultural financial assistance. 55% of the respondents joined the co-operative societies to get agricultural loan.

4. Initially the membership fee of Co-operative Societies was very low. But later it was increased to Rs. 250 and Rs. 500/=. But majority of the members feel that the membership fees was reasonable.
5. Different financial facilities are provided by the Co-operative Societies to its members. The members avail these facilities according to their needs.
6. Majority of the members availed agricultural loan facility. And this facility is availed many times.
7. Other financial facilities are also used by the members, but at a low percentage.
8. Majority of the members who take financial help from the Co-operative Societies feel that the financial help received from the society is sufficient for their purpose.
9. After using the financial facility from the Co-operative Society majority of the members feel that their income is improved.
10. Almost all the members are aware of the rate of interest charged on the loan taken by the members.
11. Most of the members of the society feel that the rate of interest charged for the loan is high.
12. Most of the members of the Co-operative Societies take medium term loans for their requirements. Totally 80% of the respondents took loan for a period of 1 to 5 years.
13. Almost all the members of the Co-operative Societies are satisfied with the financial help provided by the societies.
14. The attitude or response of the employees towards the members is very important for the success of the society. When the respondents are asked about the attitude and response of the employees towards the members, all the members are satisfied with the attitude of the employees and they said that the employees are friendly towards the members.
15. Normally the employees of the Co-operative Societies are the local people. They know the members very well. So the attitude of the employees towards them is friendly.
16. Majority of the members of the Co-operative Societies are aware of all the facilities provided by the society. Only a very few members are unaware of the facilities provided by the societies.
17. All the financial needs of the members of the Co-operative Societies are not fulfilled by the societies. Only 30% members feel that their full financial needs are satisfied by the co-operative societies.
18. Majority of the members i.e. 67.5% of the members feel that their financial needs are fulfilled by the societies only to some extent and not fully.
19. There is some relationship between financial help from societies and the standard of living of the members. The standard of living of the members of the society who have taken the financial help has improved.
20. With the financial help, the members have improved their agriculture, irrigation facility, purchased vehicles i.e. two wheelers, purchased

luxurious furniture & fixtures, electronic appliances, computers etc and thereby their standard of living has improved.

21. All the societies interviewed expect to have the branches. It shows the necessity of the societies to the farmers in the rural areas.
22. Every Co-operative Society conducts its Board meetings regularly in a year. On an average the society conducts 12 board meetings in a year.
23. Every society interviewed in Belthandady Taluk has more than 1000 members. There is increase in no. of members in every society every year.
24. More than 16 types of financial help is provided by the Co-operative Societies to its members.
25. Most of the Co-operative Societies in Belthangady Taluk, which are interviewed, have sanctioned more than Rs.6 crores each as loan to its members. Thus the Co-operative Societies fulfill the financial needs of its members and thereby help to improve the standard of living of the members.
26. The members of Co-operative Societies are also prompt in the repayment of the loans. In majority of the co-operative societies, interviewed, the recovery of loans is more than 90%.
27. Government is providing various schemes to the farmers through Co-operative Societies. But, some of the members are unaware of these schemes.
28. Government is providing subsidy to the farmers through some of the schemes of finance. This is not known to some of the members.

Hajela T N, (1973). *Principles, Problems & Practice of Co-operation* - Agra : Shivalal Agar Wala & Company.

Abdul Aziz & Mahadeva M, (2003). *Co-operation at Cross Roads* – Mysore : Chethana Book House & Publishers

Dileep AS, Harikumar V, (2010). *Customer service in Co-operative Banks* New Delhi : Sonali Publications.

Bedy R D, (1971). *Theory History and Practice of Co-operation -8th edition* Meerut : Loyal Book Depot.

Sharada V, (1984) *The theory of Co-operation, first edition*, Himalaya Publishing House.

Jain P C, *(*1956*). Agriculture and Co-operative in India*. Allahabad.

Choubey BN, (1968). *Principles and Practice of Co-operative Banking in India* Asia Publishing house.

Mathur D S *(*1994*) Co-operation in India*. Agra : Shahithya Bhavan.

Government of Karnataka- Development of Co-operation-Annual report.

Dakshina Kannada District Central Co-operative Bank- Annual report

Annual Reports of Co-operative societies of Madanthyar, Venoor, Kaliya, Thanneerupantha.

A study on socio-political empowerment among women representatives (members) of Gram Panchayat in Puttur Taluk

Rohith AR

Total Sanitation Programme
Dakshina Kannada Zilla Panchayath
rohithanthibettu@yahoo.in

Prasanna Kumar C

P G Department of social work
Center for Post Graduate Studies and Research,
St. Philomena College, Puttur, India
cpksmsw@gmail.com

It is commonly observed fact that women, half of the human resource, have been deprived of the opportunities. Recognizing the need of involving women in the political system and ensuring their participation in political process the introduction of reservation policy in favour of women in the Panchayati Raj Institutions has, therefore, been an important government intervention for maximizing the women participation and thereby to improve their status. Hence this paper examines the role awareness, participation process of elected women members, familial support received, the way they manage their household responsibilities, possible areas of blocks and constraints in performing their roles, the awareness on the local self governance and various developmental programmes/schemes, exposure to the capacity building and its impact on their role performance, the nature of public relationship established by them in the public and also their vision on the developmental aspects and suggestions to improve their functioning. 50 women representatives (members) drawn from various Gram Panchayaths in Puttur Taluk are taken through the simple random sampling method for the study. The study revealed that most of the women representatives joined politics who lack previous experience in this domain and there by find it difficult to make balance between the household chores and tasks at Panchayath. Inadequate political knowledge in roles and communication skill deficiency add to the problem. Better political orientation and training are suggested.

Introduction :

Women constituting half of the population of our country have been an integral part of our social structure principally due to their contribution to the socio-economic sphere of life. Notwithstanding the fact, the dominant patriarchy has denied women equality of status and opportunities in socio-economic and political spheres. Rural Indian Women have still been treated as “Object” of development rather than the “Subject” of development.

Women Participation and Empowerment

In other words it refers to the process by which women acquire due recognition on par with men, to participate in the development process of the society through the political institutions as a partner with human dignity. Empowerment of women is essentially the process of upliftment of economic, social and political status of women, the traditionally underprivileged ones, in the society.

Vanessa Griffin (1987:117-18) identifies, some components to illustrate what the term empowerment indicates: Having control or gaining further control; Having a say and being listened to; Being able to define and create from women's perspective; Being able to influence social choices and decision affecting the whole society; Being recognized and respected as equal citizens in human beings with a contribution to make.

Need for Socio-Political Empowerment of Women

Political empowerment for women is regarded as a key driver for economic and social empowerment. There can be no true democracy, or no true people's participation in governance and development without equal participation of men and women at different levels of decision making. Participation of women in political life is integral to the advancement of women. The 73rd and 74th Constitutional Amendments brought about significant changes in the political scenario of the country with regard to women's participation in politics.

G. Palanthurai (2001) in his Study of Tamilnadu observed that women have come to positions in the local bodies as provisions have been made in the constitution. The outlook of the society towards the women has started changing. Author from his experience suggests that women need orientation, sensitization, capacity building, information and counselling continuously through organizations.

Amal Mandal's book ``Women in Panchaythi Raj Institutions'' (2003), is a report of a fact finding mission on women panchayath members of a district in West Bengal. The study indicates that the participation of women in panchayath process has allowed them to emerge as effective leaders and to act as catalytic agents by infusing confidence, assertiveness and providing stimulus for social change among other women. At the grass root level only beginning has been made and wholesome acceptance of women in every facet of life is still to come.

The Problem

In India, women have been deprived of various kinds of opportunities and advantages by our traditional society for the past several centuries.

Restrictions are imposed on participation of women in certain social and cultural programmes and even in moving outside the households for certain purposes.

Recognizing the unsatisfactory progress that has been achieved in improving the socio-economic status of women in the past it has increasingly been felt desirable that involving rural women in the political system and ensuring their participation in the activities of its institutions, including in matters related to decision making process would be instrumental in improving the socio-economic status and political empowerment of women.

Therefore, it is imperative to study all aspects of the social problems being faced by the women while discharging their responsibilities as a member (representative) in Gram Panchayath. With new scenario of providing recent administrative and financial backup and coordination, women's present mode of working as shown by their initiative, administrative acumen, leadership strengths and weaknesses, decision making and ability etc. need to be investigated in detail so as to make recommendations to ameliorate the existing deadlock and to facilitate empowerment of women as a whole.

In this light, this study has attempted to examine various issues related to the knowledge level of women members, the nature of participation of women members in decision making activities and their family responsibilities, exposure for capacity building, their vision on various development programmes of Gram Panchayaths and welfare activities.

Objectives of the study

The main objectives of the study are to investigate the Empowerment of Women Representatives in Gram Panchayaths, that this study was undertaken. Among other objectives, the specific objectives of the study are as under:· To understand the socio-political background of the elected women representatives at Gram Panchayaths of the area under study.

- To study the participation of elected women members in Local Self Governance and to understand their role performance.

- To understand the familial support as well as the way of managing the household responsibilities being elected members.

- To enquire possible areas of blocks and constraints of women in performing their roles.

- To study and assess the level of awareness of the elected women members about the Local self governance and various development programmes/schemes

- To elicit the exposure on the capacity building and its impact on their role performance as well as the nature of public relationship, being members.

- To draw out the prescriptions done by the women members regarding their vision on the developmental aspects in Grama Panchayath and measures improving their functioning.

Methodology

The main study was conducted on a sample of 50 women representatives (members) drawn from various Grama Panchayaths in Puttur Taluk through the Simple Random Sampling method. Primary data is collected by researcher directly from the field. Researcher also collected Secondary data from books published by various publications, and the material available in internet etc. For systematic processing of data the researcher has followed both manual and mechanical systems of data processing. As the study is limited to Puttur Taluk in which the findings may not fit to have comprehensive implication and also the sample size is limited to fifty respondents, where there is possibility of the results not being accurate. The analysis is based on the opinion of the respondent and the perception of the respondents which may be biased.

Results

Socio-political background of the elected women representatives at Gram Panchayaths of the area under study

As age and educational qualification of women representatives being important factors which has greater influence on affecting political participation, majority of the respondents are middle aged women actively involved in the political system.

As far as educational qualification is concerned 58% of the respondents have attained only primary education. Caste is another parameter to guess the empowerment level among women members. Even today Caste has its hold in the Indian politics. It is evident from the study that the participation of the category OBC has been increased considerably as more than half of the respondents are from OBC caste category.

Participation of elected women members in Local Self Governance and to understand their role performance

In order to understand the empowerment process among women

representatives it is crucial to concentrate on their political background. The pre-existing political experience of women has a greater relevance with the role they perform as people's representative in political system especially at grassroot level.

As far as political background of the women representatives is concerned it has been seen that most of the women representatives joined politics particularly in the time of Panchayath elections. It is evident from the study that majority of the respondents (74%) had no previous experience as members in Grama Panchayath. Even majority of the respondents have no family history of having Panchayath membership as peoples representatives. The above table shows that as many as 64% of the respondents have contested the election by compulsion of others. This shows that the reservation policy made women members to contest election forcefully and the political parties or others have influenced on the decision of members to contest for local elections.

To understand women members' empowerment level, it is important to study the participation pattern of women representatives in Grama Panchayath activities such as meetings, Grama Sabhas and also their mode of participation in meetings, their satisfaction level etc. Most of the members informed that they always try to attend general meeting and other meetings called by Gram Panchayaths but it becomes very difficult for them due to their household activity. Time is another factor. But it is an appreciable fact that majority of them find time to attend to it. It also depends on the distance, transport cost and other cost of refreshment etc. which does not allow them to attend the meetings regularly. Sometimes this may be also due to the forced entry into politics which is against their interest.

Familial support as well as the way of managing the household responsibilities being elected members

In order to assess the empowerment of women representatives of the Panchayath and to enable them to discharge their function as Grama Panchayath members obtaining family support is crucial factor. The very attitude of their family members and their response while permitting them to contest election as well as their stand after being member, freedom in the family to take decisions etc. are essential elements in this study.

As far as the kind of family response received while contesting the election is concerned, 94% of the respondents' opined that their family members were very supportive to them which shows that these women representatives have backup from the family which is also an encouraging fact to be noted in the process of women empowerment. Again it is found out from the respondents

that most of the women members receive every support from their family to discharge their responsibilities as members in the panchayath.

Being able to influence social as well as choices and decisions in the household is a major factor in the process of women empowerment. This study investigates into women's influence in decision making and access to family resources has increased or not after being people's representatives while we look into their empowerment level. More than half of the representatives opined that they are consulted and provided good space in making family decisions and also increased their accessibility to the family resources. Though this is an encouraging reality it is also evident from the study that regardless of being people's representatives still a segment of woman members are lacking their say in the family business which is disgraceful fact to know.

The study also makes an attempt to understand how far the women representatives have been able to provide justice to their household activities as well as family responsibilities. The more over-burdened by the household duties less the performance as a member can be shown. But in the study the respondents were able to discharge their role in household activities and were able to provide justice to the family.

Inquiry on possible areas of blocks and constraints of women representatives in performing their roles

As far as major blocks to role performance of the women members in Grama Panchayath is concerned it is significant aspect to know the factors affecting/influencing/blocking their role performance, kind of cooperation received from their counterparts, the major hurdles encountered during their participation etc. From the study it is found that majority of the women members are receiving very good support from their male counterparts while performing their role as members in the Panchayath. Majority of them have attributed to the lack of sufficient knowledge as major block to perform their duty. It has also been investigated the interference of their husbands in discharging their duties. 78% respondents answered negatively indicating no such occurrences have been experienced by them. But another group answers positively by admitting the above fact. It may be concluded that, still female members either depend on their husbands or they were not able to keep out of their inference.

Again as far as gender based discrimination aspect is concerned it is clear that majority of respondents have not encountered such irregularities. But still there are respondents who admit the prevalence of gender based discrimination in panchayat system which has become an impediment to perform their duty effectively. As a matter of fact 19(38%) respondents agreed

that they are experiencing gender discrimination. These are the indications where male dominated society continues to control the subaltern i.e women.

Again obtaining constructive response from their officials is a significant element to be considered in assessing women's participation in Panchayaths thereby empowerment. Majority of the respondents receive good cooperation from the bureaucracy at Grama Panchayath.

Another interesting fact to know that majority of the respondents were unwilling to continue their political career. Only less than half of the respondents expressed their desire to contest for another term. It can be analysed that a majority of female members have no interest to be in politics. This may be due to the fact that they might have entered politics by force and not by their own conviction.

Awareness on local self governance and exposure to capacity building prgrammes

The knowledge of women representatives on local self governance system as well as their exposure towards capacity building programmes are also significant aspects in the study . Most of the women elected were attended to primary classes and above all the majority of women declared themselves as homemakers. The process of empowerment includes self-confidence, political awareness and affirmation of information. The first step towards the empowering process is to become aware about the roles, responsibilities and various development programmes.

It is true that with respect to different programmes, policies of the panchayat women members need to equip deep knowledge so as to initiate programmes on their own and thereby perform their role effectively. Government introducing the reservation policy for women could be an important initiative of awareness for maximizing the role, responsibilities and participation of women in Gram Panchayath.

Majority of respondents know all the schemes/facilities available in the Panchayath. Again they have the insight to their roles and responsibilities being political representatives.

It is observed that women have come to positions in the local bodies as provisions have been made in the constitution. They lack sufficient orientation and guidance. There is a need to ensure their effective participation in the functioning and decision making process at the grassroots level. Therefore women need orientation, sensitization, capacity building, information and counselling continuously through organizations. Periodical training; orientation and sensitization can help the women leaders to perform the

assigned role in a better way. Training being an important part in women empowerment process, the study reveals that majority of the members have received some sort of trainings and in turn, that has increased their participation level as well as their awareness also.

From the study it is found out that majority of the respondents have not gone on any exposure visits which clearly indicates that those respondents either have not utilised the opportunity or deprived from the exposure part.

Being people's representative women members' ability to speak publicly and there by communicate the issues/schemes pertaining to their ward to public is crucial from people's development point of view. Of course initially they may be hesitant to speak in front of public gathering particularly in Grama Sabha but slowly it may give them courage and increase their confidence level paving the way for their empowerment. But it is evident from the study that majority of the representatives were not able to speak out in public. Only a few opened their mouth in the public.

Prescriptions done by the women members regarding their vision on the developmental aspects in Grama Panchayath and measures improving their functioning.

It is well understood fact that in the village after being elected the people honour them. People recognise them as their leaders and people approach them for help. Still it is important to study the nature of the contact established by these women leaders and the mode of contact.

In addition to the above it is also crucial to understand what is there in their mind as people's representatives, which is their priority sector, their vision in the people's development etc. are also can be seen in this part.

96% respondents have established very close relationship with the public. It is also important to mention the fact that while they are engaged in domestic works, their husbands or family members take responsibility to talk with the visitors and try to meet their requirements. So their counterparts also try to establish good relationship with the public which ultimately goes into the credit of women members. As far as the mode of contact with the people is concerned all of them have direct contact with the people which is also a encouraging fact.

It is noted from the study that majority of women representatives have given importance to the activities in the panchayath which contributes to the empowerment. A large proportion of them, keen to prioritise the 'empowerment of women' as most concerned area of their involvement which is an encouraging fact to understand.

Regarding the plan and thought of the women members as responsible panchayath leaders' respondents have vision for the development of weaker section of society which is also an encouraging fact to know.

Based on the findings and experience gathered from the present study the following suggestions can be made for the empowerment of women through their effective participation in political processes. Political awareness programmes should make women understand their rights and the benefits. There is the need for regular orientation and training programmes that will help to increase the political and management skills of women in Panchayaths. Being politically skilful, they will be able to understand and assimilate diverse political opinion, participate intelligently in political debates and analyse issues to make useful decisions. Long-term solution to women's participation in political activities rests in greater awareness about their role, responsibilities and entitlements. Expansion of information, education and development of communication skills of women, Exposure Visit and Exposure Speech can enhance the confidence level as well as the capability level of the women functionaries.

Empowerment as a process requires multi-dimensional efforts and holistic interventions. This requires concerted and sustained efforts by all concerned-policy makers, Governments, NGOs, Training Institutions and by the women and men themselves. Sensitisation of men, both officials and elected members is very essential for women to be able to function effectively in PRIs. Contribution by women members should be recognized and appreciated in public spheres. Reservation for women should be continued to ensure their empowerment through greater participation in political administration and decision making.

Following few suggestions may be considered to improve future research. A larger sample size could bring in more satisfactorily, accurate findings that can be confidently generalized. Study could have been more elaborative adding some more Panchayaths of Puttur Taluk through which effect the studies more applicable. If time and economy permit, appropriate scales can be developed for future studies.

In the conclusion an integrated approach is necessary to make the panchayaths truly democratic and strengthen good governance. Despite the many problems and limitations, women have proved that given an opportunity they are capable of becoming equal partners in the development process.

Political empowerment can be better sustained if women have at least a degree of economic independence. Women have gained better status both in

family and outside. Family members and men in many instances perceive women in a more positive way. In the context of gram panchayath, more reforms and structural changes are needed that would actually delegate powers and responsibilities to elected women members. Women need to gain greater role clarity and strike a balance between their household and official responsibilities.

While men have to be sensitized to be supportive in this, women need to bring about shifts in their attitudes and outlook. There is a lot of scope and potential for women to emerge as leaders and decision makers and play a key role in the development and good governance of local institutions. It requires dedicated and committed efforts by all concerned.

Andal N, (2002). *Women and Indian Society – options and constraints*. Jaipur : Rawat Publications.

Bhargava B S (1982). *Panchayathi Raj System in Karnataka*. New Delhi: Jackson Publications.

Bhargava B S (1998). *Emerging Leadership in Panchayathi Raj System*. Bangalore : ISEC.

Bandyopadhyay D, Amitava Mukharjee, (2004). *New Issues in Panchayathi Raj*. New Delhi : Concept Publishing Company.

Desai and Krishnaraj, (1990). *Women and Society in India*. New Delhi : Ajanta Publications.

Jain, Devaki, (1996). *Indian Women.* Publication Division of Ministry of Information and Broadcasting, Government of India.

Joshi R P (1998). *Constitutionalization of Panchayathi Raj - A Reassessment*. Jaipur: Rawat Publications

Kaushik, Susheela, (1993). *Women and Panchayathi Raj*. New Delhi: Anand Publications.

Mahta G S, (2002). *Participation of women in Panchayathi Raj System*. New Delhi : Kanishka Publishers.

Manikyamba P, (1989). *Women in Panchayathi Raj Structure*. New Delhi: Gyan Publications.

Mathew George, (2002). *Panchayathi Raj: From Legislature to Movement*. New Delhi: Concept Publishing Company.

Mehta G S, (2002). *Participation of Women in the Panchayathi Raj system*. New Delhi: Kanishka Publishers.

Rajesh Tandon, Mohini Kak, (2007). *Citizen Participation and Democratic Governance: In our hands.* New Delhi: Concept Publishing Company.

Shankar Rao C N, (2004). *Sociology of Indian Society*. New Delhi: S Chand & Company Pvt. Ltd.

Vidya K C, (1997). *Political Empowerment of Women at the Grassroots*. New Delhi: Kanishka Publishers.
Publication by Care organization - www.care.org/newsroom
Empowerment of Governments - a Loksatta report, Hyderabad, Foundation for democratic research
http://ap.loksatta.org/documents/advocacy/empowerment-report.pdf
Document on Panchayati Raj - http://www.pageglance.com/panchayat.gov.in
Document on Panchayati Raj - http://en.wikipedia.org/wiki/Panchayati_raj
Nayana P, UGC sponsored Minor Research Project on *Empowerment of Women Representatives in Gram panchayats – a case study of Udupi District* http://msrscollege.org/Nayana-P-final-thesis.pdf

Psychiatric Social Work Intervention in Prolonged Grief Disorder; Case study in Indian context

Prince C P

P G Department of Social Work
Center for Post Graduate Studies and Research,
St. Philomena College, Puttur, India
cpprincepsw@gmail.com

Loss of a loved one is always painful. When the relationship is deep it is difficult to accept the death of the dear one and it remains unresolved grief. In the West Grief Therapy is widely practiced. In Indian context where the family support system is stronger than the western countries, the incidents of unresolved grief is rare. However of late, the number of unresolved grief is on the increase as per the news reports of increasing suicides among those suffering from unresolved grief. Unfortunately several such cases indicate the symptoms of Affective Disorder or Psychotic Disorders. Only a clear diagnosis could identify the unresolved grief and do proper therapeutic intervention. This study narrates two case studies one of a teenager who lost his father and another is a mother who lost her son. Both showed the symptoms of pathological grief which were falsely diagnosed as Bipolar Affective Disorder and Psychotic symptoms respectively by two different psychiatrists. In the 1st case after two and half years and in the second after one year they were re-diagnosed as pathological grief and proper grief therapy was given by which the affected individuals could come back to normalcy. The need of multidisciplinary assessment and psychiatric social worker's intervention are stressed as suggested.

Introduction

Disasters are unforeseen whether natural or man made. Disaster preparedness helps to reduce casualties and for effective immediate intervention. However in the post disaster phase the survivors' exhibit abnormal reactions which are considered normal in any abnormal situation. But if the abnormality is prolonged it can be a psychotic symptom or a bipolar affective disorder or it is a prolonged grief reaction. Unless careful diagnosis is done, severe damage could be resulted. This study is exploring two cases which were wrongly diagnosed as mental illness by the psychiatrists and later happened to re-diagnose as prolonged grief reaction and consequently given prolonged grief therapy by the psychiatric social worker and by which the symptoms are remitted.

As per the study of Maciejewski et al (2007) Bowlby (1969) was the first to propose a stage theory of grief for adjustment to bereavement that included 4 stages: shock-numbness, yearning searching, disorganization-despair, and reorganization.

Ku¨bler-Ross (1969) adapted Bowlby's (1969) theory to describe a 5-stage response of terminally ill patients to awareness of their impending death: denial-dissociation-isolation, anger, bargaining, depression, and acceptance. In the current study both the clients were fixed upon the denial stage. There was an overlap of depression and manic symptoms in the first case and of psychotic like symptoms in the second.

Lichtenthal et al (2011), studied grief and mental health service use among 86 bereaved caregivers of advanced cancer patients. Sixteen percent of the bereaved sample met criteria for prolonged grief disorder, which was significantly associated with suicidality and poorer health-related quality of life, but not with mental health service use. The majority of bereaved caregivers with prolonged grief disorder did not access mental health services. In multivariable analysis, having discussed psychological concerns with a health care professional when the patient was ill was the only significant predictor of mental health service use during bereavement

The majority of bereavement research is conducted after a loss has occurred. Thus, knowledge of the divergent trajectories of grieving or their antecedent predictors is lacking. In a study Bonanno et al (2002) gathered prospective data on 205 individuals several years prior to the death of their spouse and at 6- and 18-months post loss. Five core bereavement patterns were identified: common grief, chronic grief, chronic depression, improvement during bereavement, and resilience. Common grief was relatively infrequent, and the resilient pattern most frequent. The authors tested key hypotheses in the literature pertaining to chronic grief and resilience by identifying the preloss predictors of each pattern. Chronic grief was associated with preloss dependency and resilience with preloss acceptance of death and belief in a just world.

Only recently have psychotherapeutic interventions for complicated grief been developed and evaluated in randomized controlled trials (Supiano, 2012). These trials have reported significant reductions in complicated grief and related symptoms in response to treatment relative to control groups. However, little is known about the long-term outcomes of these treatments. Wagner et al (2007) present an evaluation of a 1.5-year follow-up of an Internet-based cognitive–behavioral intervention for complicated grief. Treatment group patients (n = 22) were administered various assessments of complicated grief indicators, including the Impact of Event Scale, the anxiety and depression subscales of the Brief Symptom Inventory, and the SF-12. Results indicate that the reduction in symptoms of complicated grief observed at post treatment was maintained at 1.5-year follow-up.

According to Malkinson (2001) the application of cognitive therapy to the acute phase of grief and to prolonged dysfunctional grief are highly effective. He also gives guidelines and specific strategies for assessment and intervention are offered for social work practice with the bereaved. Research studies have set the stage for differentiating complicated grief (obsessional preoccupation with the deceased, crying, persistent yearning, and searching for the lost person) from depression (clinical signs of depression with preoccupation with self) (Prigerson et al., 1995). The implications of these findings lend themselves to differential treatment interventions for grief (psychotherapy with a focus on caring and support) and for depression (combined psychotherapy and psychopharmacology) (Malkinson, 2001).

According to the cognitive approach, psychopathological grief takes the form of distorted thinking, where an excessive emotional reaction (such as depression) is related to negative cognitive evaluations (automatic thoughts) of oneself, the world, and the future. For example, bereaved persons with distorted thinking may interpret loss as an intended rejection (How could he or she have done this to me) (Beck, 1976) or as a confirmation of being worthless (I am guilty and a worthless person for not saving his or her life) (Malkinson & Ellis, 2000). During stressful life events, people often use maladaptive cognitive processes, referred to by Beck (1976, 1989; Beck, Wright, Newman, & Liese, 1993) as cognitive distortions and by Ellis (1962) as irrational beliefs. According to rational-emotive behavior therapy (REBT), overreaction and lack of reaction to the death of a loved one are not in themselves "right" or "wrong," or preferred or undesirable, rather are related to a specific set of beliefs (cognitions) that are functional or dysfunctional (adaptive or maladaptive). In the case of loss through death, negative emotional reactions (e.g., sorrow, sadness) may be regarded as relating to adaptive cognitions (e.g., "Life has changed forever, and it's sad and painful;" "The doctors did all they could do to save my child; I don't blame them;" "I know we did everything to keep him alive, but it didn't help, and he died"). Complicated grief, on the other hand, is seen as a negative emotion related to and maintained by maladaptive cognitions (e.g., "Life is not worth living without my loved one," "I can't stand my life without my loved one"). In the case of the boy narrated in this case study as a result of the death of his father he felt that 'life is meaningless' and therefore he stopped schooling.

Thus, from a cognitive perspective, complicated grief is defined as persistence over time of distorted, irrational beliefs as the dominant set of cognitions affecting the emotional consequences in the form of depression or anxiety (Malkinson & Ellis, 2000).

The REBT perspective distinguishes between healthy and unhealthy consequences of one's belief system in reaction to loss. Grief is a normal and

healthy reaction to a very stressful event. As distinguished from depression, grief is a process of experiencing the pain of the loss and searching for a new meaning to life without the dead person, and it is also a process of restructuring one's irrational thinking into a more rational, realistic mode. Unlike depression, it is a process of searching for alternatives to life without the loved one who is the center of the pain and yearning. It is oscillation between grieving the loss and having to make choices regarding the reality of the loss (Neimeyer, 1999; Neimeyer et al., 2000; Stroebe & Schut, 1999). Grief within the REBT conceptual framework is a process that helps the bereaved person organizes his or her disrupted belief system into a form of healthy acceptance. Grief that has a healing effect and that adapts to the sad reality, which no longer includes the deceased, involves pronounced negative emotions such as sadness, frustration, and pain. Yet, it minimizes unhealthy, self-defeating feelings of depression, despair, horror, and self-deprecation. A detailed assessment of the client's perceptions of the activating event (A) will assist the social worker in identifying the client's loss-related irrational beliefs (B) that underlie specific emotional consequences (C) (Malkinson, 1996) and will also enable the social worker to distinguish between functional and dysfunctional responses (B, C) to the death. This distinction is especially pertinent to sudden, traumatic events, which are characteristically negative and overwhelming. As Ellis (1994) emphasized, dysfunctional thoughts about the adverse event ("How could she have done it to me? I will never forgive her for leaving me," "It shouldn't have happened to me," "This absolutely shouldn't have happened at all," or "I should have prevented it") coexist with functional, healthy thoughts ("It's so painful, but I did all I could to help her"). In addition, exploring the death event in detail may have a cathartic effect because telling the "story" includes one's interpretation of the event and how one feels about it, offering an opportunity to express irrational thoughts the client may have, about the event itself or thoughts about the self, others, or the circumstances surrounding the loss (Malkinson, 1996). It is essential to explore with the client the personal meaning of the loss event (e.g., "She was all my life; my life is worthless without her") and of the lost person (e.g., "He was the only one that cared for me") (Freeman & White, 1989). This includes how the loss is verbalized and what specific words (e.g., "I am tired of life") do or do not mean to the client. These will assist the social worker in proposing alternative interpretation, paying special attention to the person's linguistic style

Malkinson (2001) points out that REBT based for the acute-phase interventions has four aims:

1. Identifying irrational beliefs (demandingness directed to self, others, and the world) and their emotional (e.g., anxiety), behavioral (e.g., avoidance), and physiological (e.g., breathing difficulties, heart palpitations) consequences;

2. Explaining and teaching the connections between beliefs (B) and consequences (C);

3. Identifying and assessing individual specific consequences, (i.e., specific language to describe emotions, behaviors, and specific physiological reactions);

4. Teaching and practicing appropriate, healthier (rational) cognitive, emotional, behavioral, and physiological grief responses (Ellis, 1994; Ellis & Dryden, 1997; Malkinson, 1996).

The above given literature indicates pathological grief needs diagnostic clarity and psychotherapeutic intervention particularly cognitive. In this study two prominent cases are studied which were misdiagnosed as mental health disorders and were unresponsive to treatment until they were correctly diagnosed as pathological grief and psychotherapeutic intervention along with cognitive restructuring and a host of related therapeutic methods were used. Each case with a brief history and treatment modality adopted is narrated.

Tragedy of a teenager

Mr. Ashok(fake name), 17 year old boy was brought to National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore, India, as referred by a district mental health practitioner that he had been on treatment for bipolar affective disorder but with no sign of improvement. Taking his detailed history it is understood that the precipitating factors of illness is accidental death of his father when the boy was 14 and half years old. The detailed analysis of the symptoms showed that following the death of his father, the boy had anger outbursts, violent behaviour, and absenteeism in the class, imitating the behaviour of his father, preserving the materials used by his father, loss of sleep and loss of appetite. All these symptoms indicate of grief reaction was falsely diagnosed as bipolar affective disorder. He was on mood stabilizers. They were tapered and stopped. He was observed over a period of two weeks. Psychotherapy for pathological grief was started. There was amazing response. Various therapeutic techniques were used. Directed imagery in empty chair method was much helpful to mourn upon the death of his deceased father.

Use of symbols like photos, the articles used by his father and stories father used to tell him and his brother were helpful in the intervention. Evocative language was used by the psychiatric social worker who was the chief therapist under the guidance of the resident psychiatrist. His mother gave useful information regarding the stories he wrote following the death of the father. If depicted a voyage in which his father was the rower. Deep in the middle of the sea the father disappeared. The boy was left alone… father was his guide….friend….philosopher and all. During the therapy the boy rewrote the story as he himself picks up the row and rowing towards the shore. He was weeping… but a sigh of joy glittered on his face. The grimace that clouded his face disappeared. As the sea is calm his mind too reached serenity.

Cognitive restructuring which was done helped in generating positive and hopeful thoughts about future. All the negative thoughts he entertained previously were rewritten to positive thoughts. A structured ABC analysis was done for assessment as well as intervention. It helped him to emotionally relocate the deceased father. Gradually he recovered. He dreamt a bright future. He wants to lead a responsible life which probably his father would have expected from his son as he grows in age and maturity. Thus the therapeutic intervention was successful. Follow up was done for a period of six months. However the sad part of the story was that the boy fell into drug induced bipolar disorder as a result of wrong diagnosis and medication that lasted for two and half years until we re-diagnose him having pathological grief.

Mother in unresolved grief

Catherine John(fake name), 48 year old married lady having three children, two elder girls and youngest boy, lost the youngest in Thattekkad Boat tragedy, a manmade disaster that took place in Bhoothathankettu Reservoir in Periyar Valley Hydro-electric project, Kerala, India way back in February 2007. The mother could not accept the loss of her beloved son. She lost her sleep, complaint of heaviness of head, having no personal care showed abnormal behaviours by which the family people took her to a psychiatrist. He diagnosed her as having psychotic symptoms as post traumatic and put her on antipsychotic drugs. Her abnormal situation persisted over a period of one year until the psychiatric social worker took up the case. He assessed her history and re-diagnosed it as pathological grief which is unresolved. With the help of her husband she was shifted to a short stay home and started grief therapy. In the initial stages she was not responding.

Complicated grief involves processes that do not move progressively toward assimilation or accommodation but, instead, lead to stereotyped repetitions or extensive interruptions of healing ((Malkinson& Witztum, in press). It was evident with her behaviour that very often she fell into unrealistic preoccupation with her son recalling all happy and sad moments she had with her son. Initially she was made free from the drugs. In the therapeutic intervention imagery of the past life incidents were used. Empty chair technique was highly useful and effective. Cognitive restructuring was done although she was not co operating initially. Gradually she accepted the loss of her dear son and started reinvesting her attention on husband and two other girl children. In a later stage she requested to visit the site of her son's mishap. It gave the result of exposure to the past tragic event. She was taken to Bhoothathankettu to show the site were her son got drowned. Seeing the site she turned into violence and collapsed into unconsciousness. But it was effective to make her believe the truth of the loss of her son. Gradually she got into the awareness of the loss of her son and grieving worked out.

Once she recovered from the abnormality she set out her daily routine and back home happy as she was prior to the loss of her son. She was encouraged to find a job for herself and it helped her to be away from the ruminations of the memories of her lost son. Within three months she recovered fully and was back into normalcy. The follow up was done for a period of six months to one year during which she was trying to reinvest her time and energy upon the education and future plans for the elder daughters.

Future plans for the better world

Primarily in the case one the grief intervention was after two and half years of actual loss. In the second case the intervention was done after one year of the unfortunate loss. However in both the cases the clients were falsely diagnosed by the registered psychiatric practitioners and were on medication. In Indian context the human right issues of these clients were not taken up. The family members were happy that the clients are recovered finally with the psychiatric social work intervention. However in the first case the unfortunate tragedy of the client that he was affected by drug induced bipolar affective disorder is a matter of grave concern that it should be brought to the awareness of psychiatrists' community. A multidisciplinary setting there are feeble chances of false diagnosis.

Secondly if there is an eclectic approach of right therapeutic intervention with psychotherapy along with cognitive and behavioural intervention the chances of recovery are high and fast. Re-grieving and bringing the client back into normalcy should be carefully planned out. In both the cases the medication was tapered and stopped. It helped to find out the importance of non pharmacological modalities of treatment in the redemption of pathological grief. In a few cases medication may be necessary. Careful diagnosis will help to plan proper intervention that includes psychiatric and psycho social intervention methods.

Thirdly ignorance of the medical community along with the ignorance of the general public upon complicated grief and pathological grief made the situation bad to worse. Hence public awareness as well as professional community awareness of the grief and its treatment is urgent need of the time. Media should take up such cases to highlight the fact that the complicated grief could be intervened and resolved. It also helps in generating public awareness to save the mental health of several unfortunate persons who fell into unresolved grief.

Fourthly social workers have a major role in the intervention in terms of assessment, therapeutic intervention, rehabilitation and generating community awareness on how to deal with complicated grief. Social work

education institutions are recommended to conduct symposiums and workshops to prepare the budding social workers to learn the skills of handling the grief cases particularly complicated grief cases.

Finally more research is to be done in the area of grief and its therapeutic intervention particular to Indian cultural context. It should be a part of the curriculum in psychiatry, clinical psychology and psychiatric social work. The psychiatric nurses should be given adequate awareness on how grief cases are different from other forms of psychiatric disorders in patient management.

Conclusion

The goal of grief therapy is to resolve the conflicts of separation and to facilitate the completion of the grief tasks. The resolution of these conflicts necessitates experiencing thoughts and feelings that the patient has been avoiding. The therapist provides the social support system necessary for all successful grief work and essentially gives the patient permission to grieve.

In any unresolved grief diagnostic clarity is important. Detailed history of the death of the near one and history of the type of relationship between the deceased and the survivor should be collected to plan out the intervention in more scientific and accurate manner. Although, it is difficult to get diagnostic clarity in pathological grief, there is higher chances of success in intervention, when the diagnosis is more accurate and detailed. In the Indian context family ties and kin support system should be effectively made use of secondary to therapeutic intervention. Effective grief management should be part of the curriculum in medical and paramedical training services.

Beck A T (1976). *Cognitive Therapy and the Emotional Disorders*. New York: International University Press.
Beck A T (1989). Cognitive therapy. In A Freeman, Simon K M, L E Beutler, & H Arkowitz (Eds.), *Comprehensive Handbook of Cognitive Therapy,* 21. New York: Plenum.
Beck A T, Wright F W, Newman, C. F., & Liese, B. (1993). *Cognitive Therapy in Substance Abuse*. New York: Guilford.
Birgit Wagner and Andreas Maercker. (2007, August). A 1.5-year follow-up of an internet-based intervention for complicated grief. *Journal of Traumatic Stress, Special Issue: Highlights of ISTSS 2006 Annual Meeting*, 20,(4), 625.
Bonanno, George A, Wortman, Camille B, Lehman, Darrin R, Tweed, Roger G, Haring, Michelle, Sonnega, John, Carr, Deborah, Nesse, Randolph M (2002, November) *Journal of Personality and Social Psychology*, 83(5), 1150.
Bowlby, J (1969). *Attachment. Attachment and Loss, 1).* New York: Basic Books

Ellis, A (1962). *Reason and Emotion in Psychotherapy*. Secaucees, N J: Lyle Straut.
Ellis A (1994). General Semantic and Rational Emotive Behavioral Therapy. In P P Johnson, D D Burland & U. Klien (Eds.), *More e-prime,* 213. Concord, CA: International Society for General Semantic.
Ellis A, & Dryden, W (1997). *The Practice of Rational Emotive Behavior Therapy*. New York: Springer.
Freeman A, & White D M (1989). The Treatment of Suicidal Behavior. In A Freeman, K M Simon, L E Beutker, & H Arkowitz (Eds.), *Comprehensive Handbook of Cognitive Therapy,* 231. New York: Plenum.
Kubler-Ross E (1969). *On Death and Dying.* New York, NY: MacMillan.
Lichtenthal Wendy G, Matthew Nilsson, B S; David W Kissane, William Breitbart, Elizabeth Kacel, Eric C Jones, Holly G Prigerson, (2011). Underutilization of Mental Health Services Among Bereaved Caregivers With Prolonged Grief Disorder. *Psychiatric Services* 2011, 10,1176.
Neimeyer R A (1999). *Lessons of Loss: A Guide to Coping*. New York: Mc Graw-Hil Neimeyer R A, Keese N J, & Fortner B V (2000). Loss and Meaning Reconstruction: Proposition and Procedures. In R Malkinson, S Rubin, & E Witztum (Eds.), *Traumatic and Non-traumatic Loss and Bereavement,* 197. Madison, C T: Psychosocial Press.
Paul K Maciejewski, Baohui Zhang, Susan D Block, Holly G Prigerson, P(2007). An Empirical Examination of the Stage Theory of Grief. *Journal of American Medical Association*, February 21, 2007, 297(7).
Malkinson R (1996). Cognitive Behavioral Grief Therapy. *Journal of Rational-Emotive & Cognitive Behavioral Therapy*, *14*(4), 156.
Malkinson R, & Ellis A (2000). The Application of Rational Emotive Behavior Therapy (REBT) in Traumatic and Non-traumatic Grief. In R Malkinson, S Rubin, & E Witztum (Eds.), *Traumatic and Non-traumatic Loss and Bereavement,* 173. Madison, C T: Psychosocial Press.
Malkinson Ruth (2001, November) Research on Social Work Practice, 11 (6), 671. Sage Publications.
Prigerson H G, Frank E, Kasl, Reynolds S V, C F, III, Anderson B, Zubenko G S, Houck P R, George C J, & Kupfer D J, (1995). Complicated Grief and Bereavement-related Depression as Distinct Disorders: Preliminary Empirical Validation in Elderly Bereaved Spouses. *American Journal of Psychiatry*, *152*,22.
Stroebe M S, & Schut H (1999). The Dual Process Model of Coping with Loss. *Death Studies*, *23*, 1.

General Guidelines

The Journal invites submission of articles in the following disciplines

1. Commerce and Accounting Management
2. Physics
3. Social Work

Guidelines for contributors

1. The manuscripts could be in any of the following four categories

➢ Abstract	200 word limit
➢ Journal Articles	4000 word limit
➢ Professional and practice forum	3000 word limit
➢ Research briefs	2000 word limit
➢ Book Reviews	1500 word limit

2. The manuscripts should be prepared in Microsoft word format with Times New Roman font double spaced in A4 page format. Title should be in sentence case format font 14 pt bold, body 12 pt and authors' names must be accompanied by affiliation and personal Email Id. The manuscript should be emailed to the editor Email : pearljournal@spcputtur.org.

3. Each manuscript should be accompanied with a declaration by all the authors that:

   They are the authors of the manuscript in the order in which listed

   The manuscript is original, has not been published earlier, and has not been submitted for publication elsewhere.

4. If the author has quoted more than 500 words/a table/a figure from a published work, in the manuscript, a copy of permission obtained from the respective copyright holder needs to be enclosed.

5. The manuscript will be peer reviewed by two anonymous reviewers and the editorial board will take the final decision to accept or reject it.

The criteria for peer reviewing will be as follows:

- Contemporary relevance and contribution to respective knowledge field
- Clarity in thinking and content with logical analysis

- Methodology for research papers and appropriate references
- Originality
- Language

6. The copy right of the manuscript will be exclusively assigned to the Journal once the manuscript is accepted for publication. Reprint of the same requires written permission from the executive editor.

7. **Reference:** The citation or paraphrasing from other works should be supported by the author's explanation and logical continuation should be maintained throughout. Using the works of others without citing the source is plagiarism and fraud and author will be solely responsible for any act of such plagiarism which would be legally binding upon him/her.

8. **Reference format:**

a. Book: Author's last name, initials, year of publication, title of the book (underlined/italicised), place of publication and name of the publisher.

   For example: Kurtz L F (1997). *Self-help and support groups: A handbook for practitioners.* Thousand Oaks, CA: Sage Publications.

b. Edited book : Author's last name, initials, year of publication, name of the article, initials and last name of editors, Ed./s. in parentheses, title of the book (underlined/italicised), place of publication, name of the publisher and page numbers. For example: Merta R (1995). Group work. In Ponterotto J, Casas J, Suzuki L, and Alexander C, (Eds.), *Handbook of multicultural counseling,* Thousand Oaks, CA: SAGE. 567.

c. Journal articles: Author's last name, initials, year of publication, name of the article, name of the journal (underlined/ italicised), volume number, issue number in parentheses, and page numbers. For example: Kim T Mueser, David P Vabutines and Julia Agresta (1997), Coping with negative symptoms of schizophrenia, *Schizophrenia Bulletin*, 23(2): 329.

d. Institutional report: Write full name of the institute as the author.

   For example: National Mental Health Association (2001), Mental Health center, Alexandria.

e. More than one author. List all the authors' names. For example: Mueser K T, Valentiner D P, Agresta J, (1997). Coping with negative symptoms of schizophrenia: patient and family perspectives. *Schizophrenia Bulletin*. 23(2):329.

f. More than one reference of the same author: list the earlier publication before the later publication. For example:

Lefley H P (1990). Culture and chronic mental illness, *Hospital and Community Psychiatry*, 41(3): 277.

Lefley H P (1992). Expressed emotion; conceptual, clinical and social policy issues. *Hospital and Community Psychiatry*, 43(6): 591.

g. More than one reference of the same author in the same publication year are arranged alphabetically by the title, and suffixes a, b, c and so on are added to the year. The same suffixes should be added in the text also. For example:

Lefley H P (1987a). Aging parents as caregivers of mentally ill adult children: An emerging social problem. *Hospital and Community Psychiatry*, 38: 1063.

Lefley H P (1987b). Culture and mental illness: The family role. In Hatfield A B and Lefley H P (eds.), *Families of the mentally ill: Coping and adaptation*, New York: Guilford Press, 30.

h. When a reference has no author type the first two to three words, ellipses and year and the name of the work and publisher could be followed. For example

The problems of respite… (1997). *Stepping stone crisis respite program*, NEC Newsletter, 10.

I. When a reference has no year, state 'no date' in place of the year. For example Murthy Srinivasa R.(ed.) no date Mental health in India, People's Action for Mental Health, Bangalore

9. Colour art work: Please make sure that artwork files are in acceptable format and with the correct resolution

10. Figure captions: Ensure that each illustration has a caption. A caption should comprise a brief title and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

11. Tables: Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters.

PEARL
Multidisciplinary Journal

(A Bi annual Multidisciplinary Peer Reviewed Research Journal)
PEARL- St Philomena's Exclusive Academic Research and Learning
St Philomena College, Philonagar, Darbe P O,
Puttur, D.K., Karnataka -574 202
E-mail: pearljournal@spcputtur.org www.spcputtur.org

St Philomena College, Puttur established in 1958 having six under graduate and six post graduate departments is reaccredited by NAAC at 'A Grade'. The Centre for Post Graduate Studies and Research of St Philomena College Puttur, from its inception is pursuing relentlessly to excellence. The hard work of the scholars and the faculty encouraged by the management brings forth substantial contributions in terms of academic brilliance and scholastic achievements. The departments of Commerce, Physics and Social Work contribute to the growth of the scholars as well as the scientific community at large. The Journal is an attempt to link this scholastic community to the academic hub of the respective disciplines. Research outcome should contribute to the substantial growth and development of any scientific society and the journal is expected to reach out to the larger world in the process of knowledge exploration.

For Subscription :

The Circulation Manager, Pearl Journal
Centre for PG Studies and Research
St Philomena College
Philonagar, Darbe
Puttur - 574 202
D.K. Karnataka, India

Subscription Tariff :

Single Copy	₹ 60/-
For Individuals per year	₹ 100/-
For Institutions per year	₹ 250/-

Cheque in favour of The Principal, St Philomena College, Darbe, Puttur
Outstation Payments in Banker's draft

Printed & Published by Antony Prakash Monteiro for
St. Philomena College, Darbe, Puttur
Design & Graphics by AARVI Intergraphics, Puttur
Printed at Prakash Offset, Mangalore