ANNUAL REPORT 2016

WATER AND ENVIRONMENT DEVELOPMENT ORGANIZATION

(WEDO)

KOZHIKODE

KERALA

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ANNUAL REPORT 2016

Name of the NGO: Water and Environment Development Organization (WEDO)

Address: 28 / 566, Poornima, Ayyappa Nagar, Chevayur, Kozhikode - 673 017, Kerala State, India

Details of Registration: Reg. No. KKD / CA / 1074 / 2015 Dated 15-12-2015 of the Registrar of Society, Dept. of Registration, Kozhikode, Kerala

Office Bearers

President: Dr. George Mammen
Vice President: Sri. T. Valsan
Secretary: Sri. V. Sundararajan
Joint Secretary: Sri. V. Aravindakshan
Treasurer: Sri. V. Radhakrishnan

Executive Members**:**
Sri. E. Balakrishnan Nair
Sri.Jayaprasaad. K. M.

OBJECTIVES

The main objectives of WEDO are to promote water conservation, development and management programs for ensuring adequate water of good quality for people. Awareness programs, rain water harvesting, water management for domestic / agricultural purposes, water purification, establishment and maintenance of water storage / conveyance structures, providing water literacy for children, skill development training on water resources development / management etc. are envisaged for realizing this objective.

Other objectives include promotion of sustainable organic farming, scientific environment friendly natural resources management, forestry development, scientific waste management, generation of data bank on water and other natural resources, promotion of physical and mental development of children, providing assistance to poor for treatment of chronic ailments, promoting voluntary blood donation, women

empowerment programs, development of public consciousness on social evils like drug abuse, alcoholism, AIDS etc., promotion of HRD and institution building programs, provision of health awareness programs, promotion of Yoga, Meditation, Art of living and other mind-body relaxation techniques etc.

ACTIVITIES UNDERTAKEN

The activities undertaken by WEDO during 2016 are given below

I. ORGANIC FARMING OF VEGETABLES

Concept of organic farming

Even though vegetables are available in Kerala from other states, extensive use of plant protection chemicals, including systemic insecticides like Carbofuran, Porate, Dimethoate and Dimecron on them has lot of health implications. Over use of chemical fertilizers for vegetables is also hazardous. Organic farming without chemical fertilizers and pesticides is an alternative to this. Only organic pesticides, fungicides and fertilizers are used in organic farming

In India, organic farming has been followed from ancient times mainly using organic manures available under the livestock based farming system prevalent then. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (bio fertilizers) to release nutrients to crops for increased sustainable production in an eco friendly, pollution free environment. As per the definition of the United States Department of Agriculture (USDA) study team on organic farming, it is a system, which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent possible, relies on crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection. FAO has suggested that organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil

biological activity, and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs.

WEDO undertook a demonstration on organic farming for irrigated vegetables during 2016 summer seasonfor highlighting the advantages of organic farming and efficient water management.It was conducted in a 30 cents plot of Sri Hareendranath,P.N.,located at Kizhumadu in PeruvayalPanchayat, Kozhikode District. About 650 people including students from the neighboring areas visited the demonstration plot and showed keen interest in the practices followed in organic cultivation.Thus, the demonstration plot has enabled to prove the well known extension proverb - 'seeing is believing'. This will help in effectively transferring the technology to stakeholders.

Details of Cultivation of Organic Vegetables

Trichoderma culture obtained from the ICAR Institution, namely, Indian Institute of Spices Research (IISR), Kozhikode was cultured in farm yard manure after mixing with Neem cake. This was used for raising the nursery for Brinjal, Chillies, Amaranthus and Tomato and basal dose of manures for the crops raised in the field.The field was prepared for planting Chillies, Brinjal, Tomato, Cowpea and Ladies finger.

Transplanting of seedlings was done after 30 days of sowing. The spacing adopted was 60cm x 45 cm for chillies, 60cm x 45 cm for Brinjal, 30cm x 30 cm for Amaranthus, 45cm x 45 cm for Tomato, Direct sowing of Ladies Finger was done at 30cm x 30cm spacing and Cow Pea at 45cm x 45 cm.

Fermented Neem cake, fermented Neem cake + FYM, Fish Amino acid, Cow dung fermented Amirthpani (cow dung + fresh cow urine + Honey + Ghee) and humic acid were used as organic manure. These organic manures were applied at weekly interval. Plant protection was done using Beveria and Verticillium. Plant diseases were controlled using PGPR mix II.

Irrigation was carried out thrice a week by conventional surface method from a water source located nearby the plot

Yield of Vegetables

Table 1 shows the yield obtained for different vegetables under organic farming from the plot. When compared with the yield potential of vegetables reported by VFPCK (the average value of the yield range reported is considered), it can be made out from that under organic cultivation, Brinjal, Tomato, Chillies, Ladies finger, Amaranthus and Cow pea gave yield equivalent to 72 %, 68 %, 67 %, 64 %, 58 % and 67 % of the potential yield of the crops respectively (Table 1)

This is a good trend, since, under organic farming done for the first time (as in this case), realizing a high yield is usually not feasible. Experience of farmers mostly show that it will take two or three crop seasons before a significant yield improvement can be noticed under organic cultivation.

Photographs of the organically grown vegetables are shown in Plate 1and Plate 2

Plate 1. Organically cultivated Ladies finger

Plate 2. Organically cultivated Cowpea

Table 1. Yield of vegetables under organic cultivation

Sl. No	Crop	Average yield reported under good management* (Tons/ha)	Yield obtained from WEDO organic farming plot	
			On tons / ha basis	as % of yield reported by VFPCK
1	Brinjal	22	16	72
2	Tomato	22	15	68
3	Chillies	09	06	67
4	Ladies finger	17	11	64
5	Amaranthus	17	10	58
6	Cow Pea	15	10	67

*As per Vegetable and Fruit Promotion Council Kerala(VFPCK)data

II. AWARENESS PROGRAMS

Water Resources Management

WEDO conducted the following awareness programs on water resources management:

a. Artificial well recharging techniques and Wick irrigation for potted plants on 3rd July 2016 for the members of Ayyappa Nagar Residents Association, Kavu, Chevayur, Kozhikode (Plate 3). About 30 people participated
b. Artificial well recharging techniques and Wick irrigation for potted plants on 10th July 2016 for the members of Abhayam Residents Association, Palazhi Pala, Kozhikode(Plate 4). About 50 people participated

Sri T. Valsan and Sri K.M. Jayaprasad, Retired Senior Technical Officers of CWRDM, Kozhikode took classes and demonstrated wick irrigation (which works on the principle of capillarity to provide water to the soil from a water source using wick made out of glass wool) to the participants

Newspaper reports of the awareness programs are shown below

Plate 3. Awareness Program on Water Resources Management at Ayappa Nagar Residents Association, Kavu, Chevayur, Kozhikode

Plate 4. Awareness Program on Water Resources Management at Abhayam Residents Association, Palazhi Pala, Kozhikode

വാട്ടർ ആൻഡ് എൻവയോൺമെൻറൽ ഡെവലപ്പ്മെൻറ് ഓർഗനൈസേഷന്റെ ജലബോധവത്കരണ പരിപാടിയിൽ നിന്ന്

റെസി.അസോസിയേഷനുകളിൽ ജലബോധവത്കരണം

കോഴിക്കോട്: വാട്ടർ ആൻഡ് എൻവയോൺമെൻറൽ ഡെവലപ്പ്മെൻറ് ഓർഗനൈസേഷൻ (വെഡോ) റെസിഡൻറ്സ് അസോസിയേഷനുകളിൽ ജലസംഭരണത്തെക്കുറിച്ച് ബോധവത്കരണം നടത്തി. കിണർ റീചാർജ്, വിക് ജലസേചന രീതി എന്നിവയെക്കുറിച്ച് ചേവായൂർ കാവ്, അയ്യപ്പനഗർ റെസിഡൻറ്സ് അസോസിയേഷൻ, പാലാഴി അഭയം റെസിഡൻറ്സ് അസോസിയേഷൻ എന്നിവിടങ്ങളിലാണ് പരിപാടി സംഘടിപ്പിച്ചത്. വെഡോ അംഗം ടി. വത്സൻ, സി.ഡബ്ല്യു.ആർ.ഡി.എം. റിട്ട. സീനിയർ ടെക്നിക്കൽ ഓഫീസർ കെ.എം. ജയപ്രസാദ് എന്നിവർ പങ്കെടുത്തു.

Mathrubhoomi 11, July 2016

ജലസംഭരണ ബോധവൽക്കരണ പരിപാടി സംഘടിപ്പിച്ചു

കോഴിക്കോട്: ജില്ലയിലെ എൻ.ജി.ഒ. ആയ വാട്ടർ ആന്റ് എൻവിറോൺമെന്റ് ഡവലപ്മെന്റ് ഓർഗനൈസേഷന്റെ ആഭിമുഖ്യത്തിൽ ജലസംഭരണത്തെക്കുറിച്ചുള്ള ശാസ്ത്രീയ ബോധവൽക്കരണ പരിപാടി സംഘടിപ്പിച്ചു.

മഴവെള്ളം ഉപയോഗിച്ചുള്ള കിണർ റീചാർജ്ജ്, വെള്ളവും കുടിച്ചെലവും കുറയ്ക്കുന്ന 'തിരിനന' ജലസേചന സംവിധാനം എന്നീ വിഷയങ്ങളിലാണ് ബോധവൽക്കരണ ക്ലാസുകൾ നടത്തിയത്. പാലാഴിയിലെ അഭയം റസിഡന്റ്സ് അസോസിയേഷനിൽ ഇന്നലെ നടന്ന ബോധവൽക്കരണ പരിപാടിയിൽ 65 പേരും, മുന്നിന് ചേവായൂരിലെ അയ്യപ്പ നഗർ റസിഡന്റ്സ് അസോസിയേഷനിൽ നടന്ന പരിപാടിയിൽ 35 പേരും പങ്കെടുത്തു.

ഡബ്ലിയു.ഇ.ഡി.ഒ. മെമ്പർമാരായ ടി.വത്സൻ, കെ.എം. ജയപ്രസാദ് എന്നിവർ ക്ലാസെടുത്തു. തിരിനന' സംവിധാനത്തെക്കുറിച്ച്പ്രദർശനവും നടന്നു.

അദ്ധ്യാപക നിയമനം

കല്ലാച്ചി: കല്ലാച്ചി ഗവ. ഹയർ സെക്കൻഡറി സ്കൂളിൽ ഹയർ സെക്കൻഡറി വിഭാഗത്തിൽ [illegible] വസവേതനാടിസ്ഥാനത്തിൽ സോഷ്യോളജി (ജൂനിയർ) അദ്ധ്യാപകനെ നിയമിക്കുന്നതിനുള്ള അഭിമുഖം ഇന്ന് രാവിലെ പത്ത് മണിക്ക് സ്കൂൾ ഓഫീസിൽ നടക്കും.

Kerala Koumudhi 11, July 2016

ബോധവൽക്കരണ ക്ലാസ് നടത്തി

കോഴിക്കോട് ● ചേവായൂർ കാവ് അയ്യപ്പ നഗർ റസിഡന്റ്സ് അസോസിയേഷനും പാലാഴി അഭയം റസിഡന്റ്ഡ് അസോസിയേഷനും വാട്ടർ ആൻഡ് എൻവയേൺമെന്റ് ഡവലപ്പ്മെന്റ് ഓർഗനൈസേഷന്റെ നേതൃത്വത്തിൽ ജല സംഭരണത്തെക്കുറിച്ച് ബോധവൽക്കരണ ക്ലാസ് നടത്തി. ടി .വൽസൻ, സിഡബ്ല്യുആർഡിഎം റിട്ട. സീനിയർ ടെക്നിക്കൽ ഓഫിസർ കെ.എം.ജയപ്രസാദ് എന്നിവർ ക്ലാസെടുത്തു. തിരിനന സംവിധാനം പ്രദർശിപ്പിച്ചു.

MalayalaManorama 11, July 2016

ആരോഗ്യബോധവത്കരണ ക്ലാസ്

ചേളന്നൂർ: വാട്ടർ ആൻഡ് എൻവയോൺമെൻറ് ഡെവലപ്പ്മെൻറ് ഓർഗനൈസേഷൻ നടത്തിയ ആരോഗ്യ ബോധവത്കരണ ക്ലാസ് വാർഡൻ യോഗ ഡയറക്ടർ ഗോവിന്ദൻ ഉദ്ഘാടനം ചെയ്തു. വാർഡ് അംഗം വി.എം. ഷാനി അധ്യക്ഷത വഹിച്ചു. ഡോ. കെ. മാധവചന്ദ്രൻ പ്രഭാഷണം നടത്തി. പി. ശോഭീന്ദ്രൻ, ടി. ജയാനന്ദൻ, സുന്ദർജി, അനിൽകുമാർ എന്നിവർ സംസാരിച്ചു.

Mathrubhoomi 31/12/16

c. Soil and water conservation - under an awareness class for 150 people organized on 27th December 2016 by BJP Wayanad District Committee at Town Hall, Kalpetta, under the JalSwaraj program of the party

Plate 5.Awareness class on Soil and Water Conservation at Town Hall,Kalpetta

YOGA AND HEALTH

WEDO organized the following programs on Yoga

a. Awareness cum demonstration program on Yoga for the members of "Tarangam", the cultural organization of the research institution- Centre for Water Resources Development & Management (CWRDM), Kozhikode during the International Yoga Day on 21st June 2016 (Plate 6)

Sri. V. Sundararajan, Yoga instructor and Secretary, WEDO conducted the program

Plate 6. Awareness cum demonstration program on Yoga for the members of "Tarangam", the cultural organization of CWRDM, Kozhikode

b. Awareness class on yoga and health at Chelannur - organized under the auspices of Sri. V. Sundararajan, Secretary, WEDO and Member, Walden Yoga Centre, Chelannur, Kozhikode on 30th December 2016 (Plate 7)

WALDEN Yoga Centre Director, Sri Govindan Master inaugurated the program. Ward member Smt. V. M. Shani presided. Dr K MadhavaChandran, Social Scientist and researcher on yoga delivered a lecture on the effect of yoga on human beings. Sri. P. Shobeendran, Sri T. Jayanandan, Sri. V. Sundararajan and Sri. M.T. Anil Kumar spoke on the occasion

Plate 7. Awareness class on yoga and health at Chelannur

III. ASSOCIATION WITH "ECOCONSORT", A CONSORTIUM OF NGOs

WEDO is associated as a member of "ECOCONSORT", a consortium of NGOs formed under the leadership of the NGO - ArshaBharath, Wayanad. ECOCONSORT has submitted the Concept Note of a project on Water Resources Conservation / Management in Kerala under the Green Climate Fund (GCF) Program, in which NABARD is involved in funding. The project has been submitted to the State Environment and Climate Change Dept., Govt. of Kerala for initial clearance.

Once the concept note is approved by the Central Committee of GCF, Detailed Project Report (DPR) will be prepared and submitted by ECOCONSORT for funding

IV. RESEARCH ON YOGA

WEDO was involved in carrying out studies on yoga among yoga practitioners of Kozhikode District

The assistance of Dr. K. MadhavaChandran, Social Scientist based at Kozhikode was obtained for these studies. Sri. V. Sundararajan, Yoga Instructorand Secretary of WEDO was also associated with the studies.

The details of research on yoga carried out are given below

1. **Title**: **Effect of yoga in overcoming menstrual problems in adolescent girls**

Concept

Adolescence among girls is a stage of transformation from childhood to womanhood. Many physical, mental and emotional changes happen during this period. During this stage, most often, they are not properly guided, advised or counseled. The parents themselves are not equipped for counseling. Most of them cannot afford to go to a doctor or counselor due to financial reasons or because this is not the practice in the society they live in. Further, in general, the subject is not openly and freely discussed about.

In this context,WEDO carried out a study on the effect of Yoga on menstrual related problems among adolescent girls of a School in Kozhikode District. Consent was obtained for the study from the students and their parents.

Methodology

The sample of students in the Yoga group (experimental group) and control group were in the age group of 16 to 17 years. The experimental group of 142 students from the School was exposed to yoga classes by the school authorities, while the control group of 56 students (who were not given yoga class) was drawn from a nearby school.

Data was collected on various effects of yoga related to adolescence (menstrual periods) using the interview schedule prepared for the purpose. The schedule contained details related to the socio economic profile of the students, knowledge on menstrual aspects and problems related to menstrual periods. Before giving yoga exercises, survey was carried out among the experimental group using the interview schedule. This was the pre test. This was followed by yoga classes

given to them by the school for three months. After this, they were again interviewed using the schedule (post test). The control group was also subject to pre and post tests using the same interview schedule at the same time as students of the experimental group.

Data collected on the problems related to menstrual periods has been presented in this report in the form of frequency tables. All the tables depict the pre and post test survey results of the yoga experimental group and the control group.

Results and Discussion

Table 1 shows the duration of menstrual cycle of the students. It can be made out that after giving yoga (post test stage), the interval of menstrual cycle of 59.2% of the students in the experimental group has become once in 28 days (which is the usual interval observed in a healthy person), while before doing yoga, only 29.6% of the students in the experimental group were having the interval of 28 days.

However, as far as the control group is concerned, 23.2% of the students had this interval of menstrual cycle during pre test, which has further reduced to 21.4% in the post test stage. This finding indicates the beneficial effect of yoga in maintaining proper menstrual cycle in children under this study.

Table1. Duration of menstrual cycle of the students

Duration	Yoga experimental group				Control group			
	Pre- test[a]		Post test[b]		Pre- test[c]		Post test[d]	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
25- 30 days	32	22.5	20	14.1	24	42.9	26	46.5
28 days	42	29.6	84	59.2	13	23.2	12	21.4
30 days	21	14.8	21	14.8	7	12.5	12	21.4
> 30 days	20	14.1	6	4.2	8	14.3	4	7.1
No response	27	19	11	7.7	4	7.1	2	3.6
Total	142	100	142	100	56	100	56	100

a- Conducted before giving yoga class to the students

b- Conducted after giving 3 months of yoga class to the students

c- Conducted during the pre test done for yoga experimental group students

d- Conducted during the post test done for yoga experimental group students

Data presented in Table 2 does not show any perceptible influence of yoga on the no. of days of bleeding for the students in the experimental group, in comparison with the control group. It may be noted from the table that, by and large, the trend of increase or decrease in the proportion of students reporting different days of bleeding is not very much different between the experimental and control groups.

Table 2. Days of bleeding during periods

Days	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
3 - 5 days	94	66.2	115	81	27	48.2	35	62.4
6 - 8 days	37	26.1	25	17.6	25	44.6	20	35.8
9 - 12 days	5	3.5	1	0.7	3	5.4	1	1.8
13 - 15 days	1	0.7	0	0	1	1.8	0	0
No response	5	3.5	1	0.7	0	0	0	0
Total	142	100	142	100	56	100	56	100

Table 3 shows that there is an increase of 3.5% students using 3 pads in the post test stage (29.6 % increases to 33.1%), compared to pretest stage for the yoga group. However, this increase is only 1.8% in the case of the control group for the 3 pads category. However, the proportion of students using 4 pads per day increases in the post test stage for yoga group, when compared to the pre test stage for the group , while it decreases from 17.8% in the pretest stage to 10.7 % in the post test stage for the control group.

Hence, no perceptible influence of yoga can be inferred from the data on the no. of pads used by the experimental group.

Table 3. Use of pads during menstruation

no. of pads used per day	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	%	no.	no.	%	no.	%
2	82	57.8	73	51.4	29	51.8	32	57.1
3	42	29.6	47	33.1	16	28.6	17	30.4
4	9	6.3	16	11.3	10	17.8	6	10.7
>4	7	4.9	5	3.5	1	1.8	0	0
No response	2	1.4	1	0.7	0	0	1	1.8
Total	142	100	142	100	56	100	56	100

It may be inferred from Table 4 that the proportion of experimental group students reporting regularity of menstrual cycle increases by 16.2% from 55.6 % to 71.8% (pre test to pot test stage). But, this increase is only 10.7 % (76.8 % in pre test to 87.5% in post test stage) in the case of control group. However, as mentioned in the previous sentence, since the control group is also showing an increase in the no. of students reporting, the inference that may be drawn is that yoga might have probably influenced the regularity of menstrual cycle in the students under study.

Table 4. Regularity of menstrual cycle

Menstrual cycle is regular	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	79	55.6	102	71.8	43	76.8	49	87.5
No	61	43	40	28.2	13	23.2	7	12.5
No response	2	1.4	0	0	0	0	0	0
Total	142	100	142	100	56	100	56	100

Table 5 gives details of absence from schools reported by the students. The data shows that due to practice of yoga, 94.4% students do not absent themselves from school due to menstrual problems, when compared to 83.1% reporting absence

from school before practicing yoga (pre test). However, in the case of the control group, this difference in percentage of students is comparatively less (87.5 % students in pre test stage increases to only 89.3% in the post test stage).

Hence, yoga has helped the students to prevent abstaining from classes due to menstrual problems.

Table 5. Absence from school during periods

Absent	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	22	15.5	8	5.6	7	12.5	6	10.7
No	118	83.1	134	94.4	49	87.5	50	89.3
No response	2	1.4	0	0	0	0	0	0
Total	142	100	142	100	56	100	56	100

It can be inferred from the data presented in Table 6 that, with respect to the following two problems, namely, irregular menstrual cycle with more bleeding, and continuous severe bleeding, yoga has been able to reduce the number of students reporting these problems. However, in the control group, the percentage of students reporting these problems have either remained the same or increased in the post test stage, when compared to the pre test stage. Similarly, due to practice of yoga, more number of students is reporting the condition of less bleeding, while the number of students in the control group reporting less bleeding in the post test stage is reducing, when compared to the pre test stage.

Hence, the results testify the influence of yoga in reducing menstruation related bleeding problems in children.

Table 6. Bleeding problems during menstruation

Details	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Regular menstrual cycle with more bleeding	6	4.2	8	5.6	1	1.8	2	3.6
Irregular menstrual cycle with more bleeding	27	19	13	9.2	6	10.7	6	10.7
Continuous severe bleeding	1	0.7	0	0	0	0	1	1.8
Less Bleeding	29	20.4	41	28.9	12	21.4	7	12.5
No. bleeding problem	66	46.5	77	54.2	27	48.2	39	69.6
No response	13	9.2	3	2.1	10	17.9	1	1.8
Total	142	100	142	100	56	100	56	100

No perceptible influence of yoga on the problem of abdominal pain two weeks before periods is evident from the results given in Table 7.

Table 7. Abdominal pain two weeks before periods

Abdominal pain	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	26	18.3	28	19.7	4	7.1	7	12.5
No	113	79.6	113	79.6	49	87.5	48	85.7
No response	3	2.1	1	0.7	3	5.4	1	1.8
Total	142	100	142	100	56	100	56	100

However, yoga is found to have a positive effect in reducing muscle cramps in the children during periods. This is highlighted from the data presented in Table 8, which shows that after practicing yoga, about 60% students are reporting no muscle cramps, when compared to about 51% students reporting the same during the pre test stage in the experimental group. But, the percentage of farmers reporting no

muscle cramps in the pre test stage (55.4%) reduces to 53.6% in the post test stage in the case of the control group.

Table 8. Muscle cramps during periods

Muscle cramps	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	65	45.8	55	38.7	19	33.9	25	44.6
No	73	51.4	85	59.9	31	55.4	30	53.6
No response	4	2.8	2	1.4	6	10.7	1	1.8
Total	142	100	142	100	56	100	56	100

The effect of yoga on abdominal pain during periods cannot be established from the data presented in Table 9.

Table 9. Abdominal pain during periods

Abdominal pain	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post- test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	107	75.4	93	65.5	41	73.2	35	62.5
No	32	22.5	47	33.1	14	25	20	35.7
No response	3	2.1	2	1.4	1	1.8	1	1.8
Total	142	100	142	100	56	100	56	100

But, yoga is found to have an influence on the no. of days of abdominal pain observed in the children. This is evident from the analysis of data in Table 10, which reveals that the number of students having pain for two and three days actually reduces in the post yoga period, compared to before doing yoga. The table also shows that more students (52.8%) report lesser period (one day only) pain after doing yoga, when compared to 46.5% students reporting one day pain before doing yoga (pre test of the experimental group). However, in the control group, the proportion of students reporting pain for three days remains more or less the same

in the pre and post test stages (7.1% and 7.2% respectively), while the proportion, who mention 2 days pain actually increases from 26.8% in the pre test to 32.1% during the post test stage (Table 10).Further, in the control group, the number of students reporting one day pain is decreasing from 44.6% in the pre test stage to 41.1% in the post test stage.

Table 10. No. of days of abdominal pain during periods

No. of days of abdominal pain	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post- test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
1	66	46.5	75	52.8	25	44.6	23	41.1
2	45	31.7	32	22.5	15	26.8	18	32.1
3	16	11.3	11	7.8	4	7.1	4	7.2
All days	2	1.4	1	0.7	1	1.8	0	0
No response	13	9.1	23	16.2	11	19.7	11	19.6
Total	142	100	142	100	56	100	56	100

From the data seen in Table 11, it can be inferred that only 36.6% students report leg/back pain after doing yoga, compared to 47.9% students reporting it in the pre yoga stage (pre test stage). But, the proportion of control group students reporting leg/back pain remains more or less the same during pre and post test stages (51.8 and 50% respectively). Further the increase in percentage of students reporting no such pain from the pre to post test stages is higher in the case of the yoga experimental group of students, when compared to the increase seen in the case of the control group of students.

Hence, the effect of doing yoga on reducing the leg/back pain of students during periods is evident from this study

Table 11. Leg/back pain during periods

Leg/back pain	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	68	47.9	52	36.6	29	51.8	28	50
No	70	49.3	84	59.2	24	42.9	26	46.4
No response	4	2.8	6	4.2	3	5.3	2	3.6
Total	142	100	142	100	56	100	56	100

The effect of yoga in controlling nausea among children can be inferred from the data in Table 12. While only 14.8% students in the yoga experimental group report nausea in the post test stage, the figure during the pre test stage for this group of students is 18.3%. However, in the control group, the number of students reporting nausea is actually increasing in the post test phase, as compared to the pre test stage.

Table 12. Nausea during periods

Nausea	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	26	18.3	21	14.8	14	25	15	26.8
No	107	75.4	119	83.8	38	67.9	41	73.2
No response	9	6.3	2	1.4	4	7.1	0	0
Total	142	100	142	100	56	100	56	100

From the data presented in Table 13, it is not possible to arrive at a definite conclusion on the influence of yoga in reducing vomiting among the students.

Table 13.Vomiting during periods

Vomiting	Yoga experimental group				Control group			
	Pre- test		Post- test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	17	12	12	8.5	8	14.3	5	8.9
No	122	86	129	90.8	46	82.1	50	89.3
No response	3	2	1	0.7	2	3.6	1	1.8
Total	142	100	142	100	56	100	56	100

Yoga is found to have a profound positive influence on anxiety reduction of students.

Table 14 reveals that after doing yoga, about 83% of the students are free from anxiety problem occurring before menstruation, while the only 72% students report freedom from anxiety before they were exposed to yoga exercises. The effect of yoga in reducing tension and anxiety among people is already well established. This is reportedly due to secretion of more endorphine hormones, especially, beta endorphine, which results in happiness in individuals.

Table 14. Anxiety before menstruation

Anxiety	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	30	21.1	23	16.2	12	21.4	13	23.2
No	103	72.5	118	83.1	44	78.6	43	76.8
No response	9	6.4	1	0.7	0	0	0	0
Total	142	100	142	100	56	100	56	100

The results presented in Table 15 highlights that as in the case of anxiety, yoga is helping the experimental group students in reducing anger. This is because 81% of these students who have done yoga mention that they do not get angry, when compared to 70. 4% students who had mentioned the same during the pre test stage. It should also be noted that in the control group, there is an increase in only

1.9% students in the post test stage, who report that they are not getting angry compared to the students in this group who give the same response during the pre test stage (66 % becomes 67.9% students).

Table 15. Anger without any cause

Gets angry without any cause	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	39	27.5	26	18.3	17	30.4	18	32.1
No	100	70.4	115	81	37	66	38	67.9
No response	3	2.1	1	0.7	2	3.6	0	0
Total	142	100	142	100	56	100	56	100

Even though no perceptible influence of yoga in reducing head ache is evident from the data presented in Table 16, it can still be made out from the table that while the percentage of students reporting head ache in the control group increases in the post test phase, when compared to the pre test phase, the proportion of students reporting head ache after doing yoga is actually decreasing to 16. 2% compared to 17.6% of the yoga group students reporting the problem during the pre test stage.

Table 16. Headache during menstruation

Head ache	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	25	17.6	23	16.2	7	12.5	12	21.4
No	114	80.3	115	81.0	47	83.9	44	78.6
No response	3	2.1	4	2.8	2	3.6	0	0
Total	142	100	142	100	56	100	56	100

Similar to head ache, the number of students reporting no fatigue during menstruation is increasing during the post yoga (post test) phase than the students

who report fatigue during the pre test stage in the experimental group (Table 17). However, the number of students having fatigue problem is remaining more or less the same during pre and post test phases in the control group (51. 8% and 50 % respectively).

Once again, this finding reinforces the medical effect of yoga in terms of reducing fatigue among children during menstruation periods.

Table 17. Fatigue during menstruation

Fatigue	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	63	44.4	46	32.4	24	42.9	28	50
No	73	51.4	95	66.9	29	51.8	28	50
No response	6	4.2	1	0.7	3	5.3	0	0
Total	142	100	142	100	56	100	56	100

The effect of yoga in reducing breast pain before menstruation is evident from the data presented in Table 18. About 90% of the experimental group students have no breast pain before menstruation after exposed to yoga exercises, while the figure is 88.7% students before they did yoga. But, this trend is not seen in the case of the control group, since the percentage of students who have no breast pain is actually decreasing in the post test stage, when compared to the pre test stage in this group (Table 18).

Table 18. Breast pain before menstruation

Breast pain	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	13	9.2	13	9.2	5	8.9	8	14.3
No	126	88.7	128	90.1	50	89.3	48	85.7
No response	3	2.1	1	0.7	1	1.8	0	0
Total	142	100	142	100	56	100	56	100

Yoga also helps the students to prevent diarrhea during periods. This is confirmed from the data in Table 19, which shows that about the proportion of students, who do not have diarrhea problem increases from about 90% in the pre test stage to about 95% in the post test stage in the yoga experimental group, while in the case of the control group, the number of students is decreasing in the post test stage.

Table 19. Diarrhea during menstruation

Diarrhea	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	11	7.8	6	4.2	2	3.6	2	3.6
No	128	90.1	135	95.1	54	96.4	53	94.6
No response	3	2.1	1	0.7	0	0	1	1.8
Total	142	100	142	100	56	100	56	100

Significant effect of yoga on constipation cannot be established from the results presented in Table 20.

Table 20. Constipation during menstruation

Constipation	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	6	4.2	7	4.9	4	7.1	2	3.6
No	129	90.8	133	93.7	48	85.7	53	94.6
No response	7	5	2	1.4	4	7.2	1	1.8
Total	142	100	142	100	56	100	56	100

The effect of yoga in maintaining appetite of the students during periods time can be seen from Table 21. Compared to about 56% of students reporting no loss of appetite during periods before practicing yoga, the figure increases to about 70%

students after practicing yoga. But, in the case of the control group, the proportion of students remains the same during both the pre test and post test stages (71.4%).

Table 21. Lack of appetite during menstruation

Lack of appetite	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	58	40.9	41	28.9	14	25	16	28.6
No	79	55.6	99	69.7	40	71.4	40	71.4
No response	5	3.5	2	1.4	2	3.6	0	0
Total	142	100	142	100	56	100	56	100

Similarly, yoga is found to have a great influence on reducing the loss of interest of the students during menstrual period time. The data presented in Table 22 shows that almost double the number of students, who have done yoga (86) are of the opinion that they do not have the problem of losing interest during periods, when compared to the students giving the same response during the pre-yoga period (44 numbers). It may be noted from Table 22 that the increase in the number of students reporting the same from pre to post test in the case of the control group is only 2 (23 increases to 25 students). This small increase in the control group may be due to other reasons.

Table 22. Lack of interest during menstruation

Lack of interest	Yoga experimental group				Control group			
	Pre- test		Post test		Pre- test		Post test	
	Respondents		Respondents		Respondents		Respondents	
	no.	%	no.	%	no.	%	no.	%
Yes	95	66.9	55	38.7	31	55.4	31	55.4
No	44	31	86	60.6	23	41	25	44.6
No response	3	2.1	1	0.7	2	3.6	0	0
Total	142	100	142	100	56	100	56	100

Conclusions

The results of the study on effect of yoga on menstrual problems in adolescentchildren have revealed the following:

Yoga is found to positively influence 14 out of 22 menstrual problems analyzed in this study. The details are given below

a. Yoga has a beneficial effect in maintaining proper menstrual cycle in children
b. Yoga has helped the students to prevent abstaining from classes due to menstrual problems.
c. Yoga helps to reduce menstruation related bleeding problems in children
d. Yoga is found to have a positive effect in reducing muscle cramps in the children during periods
e. Yoga helps to reduce the number of days of abdominal pain observed in children during menstrual periods.
f. Practice of yoga results in less of leg/back pain of students during menstrual periods
g. Yoga controls nausea among children during menstrual periods
h. Yoga is found to have a profound positive influence on anxiety reduction of students.
i. As in the case of anxiety, yoga is helping the experimental group students in reducing anger.
j. The results of the study reinforce the medical effect of yoga in reducing fatigue among children during menstrual periods.
k. The effect of yoga in controlling breast pain before menstruation is evident from the study
l. Yoga also helps the students to prevent diarrhea during menstrual periods.
m. Practice of yoga helps the students to maintain appetite during the time of menstrual periods
n. Yoga is found to have a great influence on reducing the loss of interest of the students during menstrual periods.
o. Yoga could have probably influenced the regularity of menstrual cycle in the adolescent children under this study

Suggestions

Detailed randomized controlled studies should be carried out by experts undertaking research on yoga among a large sample of adolescent children, taking in to consideration factors such as age, family background, general health etc. of the children.

Yoga institutes, NGOs etc., who are interested in propagating such mind-body relaxation techniques should make people aware of the results of such studies in order to motivated people to make their children practice yoga for overcoming menstrual related problems. This assumes significance, since these problems may affect the children in their studies as well.

2. Title: Influence of yoga on maintenance of well being among people

Concept

Under the fast, hectic and stressful conditions of life, wherein, people find it difficult to adjust, leading to various health problems and medical treatment with harmful drugs, de-stressing for achieving a sense of well being is extremely important to reduce psycho-somatic disorders. Personal wellbeing has been conceptualized as optimal functioning rather than merely absence of pathology. Research into wellbeing has centered on the term subjective wellbeing, measured by overall satisfaction with life and by satisfaction across various life domains. The degree to which one experiences control over one's response to life events (perceived control) is considered to have a buffering effect for adverse life events and will enhance wellbeing. Subjective wellbeing indicates how people evaluate their lives in terms of feelings of wellbeing or the lack of it.

Yoga is considered to be one of the effective tools available to overcome various physical and mental problems. Yoga aims at an integrated and harmonious development of all the potentialities of man, with significant reduction in stress, and consequently, better feeling of wellbeing. The influence of yoga and meditation on subjective wellbeing of people have been reported

As study was carried out by WEDO in order to analyze the effect of yoga on subjective well being of people

Methodology

A random sample of 100 people from Kozhikode, who practice yoga, was selected for the study. The sample consisted of people practicing yoga for a period of up to ten years and above. They were interviewed using a questionnaire consisting of 13 subjective well being parameters (OECD, 2013). The responses to improvement / reduction in the parameters through the practice of yoga, namely, very much, slight, no improvement / reduction were scored as 3, 2 and 1 respectively. The total score of all the parameters was worked out to quantify the subjective well being index of the respondent. The data was analyzed through analysis of variance (ANOVA). The data has been presented in this report as scores for the subjective well being parameters, subjective well beingindex and as percentages.

Results and Discussion

The data on subjective well being parameters and index are presented from up to two years to more than 10 years of yoga practice categories. The Analysis of Variance (ANOVA) for the mean scores of various parameters under different periods of yoga practice is shown in Table 1.

When comparing the subjective well being of people based on period of yoga practice through analysis of variance, the F value is found to be significant for the difference in mean score of the parameters, namely, happiness, calmness, relaxation, enjoyment in life, tiredness, tension and loneliness (Table 1). It can also be seen that, for happiness, relaxation, tiredness and loneliness, the maximum score of 3 (indicating very much improvement / reduction in the parameter) is observed for all the respondents having more than 10 years of yoga practice. Life enjoyment also shows a very high score of 2.80 for this group.

Table 1. ANOVA of subjective well being parameter scores

Duration of yoga practice (years)	Mean score for happiness	Mean score for calmness	Mean score for relaxation	Mean score for life enjoyment	Mean score for tiredness	Mean score for tension	Mean score for loneliness
Up to 2	2.50	2.38	2.44	2.31	2.38	2.50	2.68
2 - 4	2.75	2.25	2.58	2.50	2.33	2.42	2.25
4 - 6	2.89	2.56	2.89	2.22	2.22	2.00	3.00
6 - 8	2.33	3.00	2.33	3.00	3.00	3.00	2.67
8 - 10	2.60	2.80	2.40	3.00	3.00	2.80	2.60
> 10	3.00	2.60	3.00	2.80	3.00	2.60	3.00
	F = 1.498 Sig. p < 0.20	F = 1.625 Sig. P < 0.20	F = 1.545 Sig. p < 0.20	F = 3.02 Sig. p < 0.01	F = 3.995 Sig. P < 0.01	F = 2.824 Sig. p < 0.05	F = 2.073 Sig. p < 0.10

Table 2 shows the ANOVA for the mean subjective well being index of various yoga practice categories.It can be made out from Table 2 that the mean subjective well being index of yoga practitioners is mostly improving with the years of yoga practice. More than ten years of yoga practice gives an index of 37, equivalent to about 95% of the maximum possible index of 39, while 6 to 10 years of yoga contributes to an index of about 34, which is equivalent to about 88% of the maximum possible index. The analysis of variance is significant at $p > 0.05$ (Table 2). Considering the CD value of 1.68 (Table 2), it can be inferred that up to 2 years of yoga practice gives a subjective well being Index (SWBI), which is significantly different from that of the respondents having 6 to 8 years, 8 to 10 years and more than 10 years of yoga practice. Similarly, 2 to 4 years contributes to a SWBI, which is significantly different from the SWBI of 6 to 8 years, 8 to 10 years and more than 10 years categories. 4 to 6 years shows a SWBI, which is significantly different from 6-8 years, 8 to 10 years and more than 10 years. 6 to 8 years and 8 to 10 years of yoga practice contribute to a SWBI, which is significantly different from the SWBI of people practicing yoga for more than 10 years (Table 2).

It may be inferred from the CD value shown in Table 2 that there is no statistically significant difference in SWBI of people falling within various yoga practice categories up to 6 years. Similarly, the SWBI of 6 to 8 years and 8 to 10 years also do not differ significantly.

Table 2. ANOVA of subjective well being index of the yoga practitioners

Duration of yoga practice (years)	Mean subjective well being index (SWBI)
Up to 2	31.35
2 - 4	32.17
4 - 6	32.11
6 - 8	34.33
8 - 10	34.20
> 10	37.00
F = 2.494 Sig. p <0.05 CD = 1.68	

Table 3 gives the proportion of yoga practitioners reporting very much improvement / reduction in subjective well being parameters. Reduction applies to tiredness, tension, worry, anger and loneliness only. ANOVA of the percentage of respondents reporting very much improvement / reduction in various parameters under two categories of yoga practice, namely, up to 2 years and more than 2 years is shown in Table 4.

Table 5 and 6 respectively show the proportion of yoga practitioners experiencing slight improvement / reduction in subjective well being parameters, and ANOVA of the percentage of respondents reporting slight improvement / reduction in various parameters under two categories of yoga practice, namely, up to 2 years and more than 2 years

It may be noted from Table 2 that even up to 2 years of yoga practice is contributing to a very promising condition of well being for people, since the SWBI of this category of yoga practitioners is 31.35, which is equivalent to about 80% of the maximum possible subjective well being index. The maximum index will be obtained only when the yoga practitioner is able to achieve very much improvement / reduction for all thewell being parameters. Similarly, even though there exists statistically significant difference in the proportion of people experiencing very much improvement / reduction in subjective well being parameters between up to 2 years and more than 2 years yoga practice categories (Table 4), it can be made out from the data presented in Tables 3 and 5 that, more than 89% of people, who have practiced yoga for a period of up to 2 years, experience either very much or slight

improvement / reduction in all the well being parameters. This is a positive trend, indicating that lesser period of yoga practice can also help the practitioner in attaining a good sense of well being. This information could help in correcting the outlook of some people, who feel that a very long period of yoga practice is required to attain benefits (personal observation of the author)

The analysis of variance of the respondents reporting slight improvement / reduction in the subjective well being parameters under the up to 2 years and more than 2 years yoga categories also shows a significant F value, even though comparatively more people report so under the first than the second category (Table 6). This may be because more number of people with more than 2 years yoga experience have reported very much improvement / reduction in the subjective well being parameters, when compared to up to 2 years (Table 4)

Table 3. Respondents reporting very much improvement / reduction in subjective well being parameters through yoga practice

Sl. No.	Subjective well being parameter	Respondents (%) reporting very much improvement / reduction* in the parameter with	
		Up to 2 years yoga practice	> 2 years yoga practice
1	Happiness	64.2	77.3
2	Contentment	71.4	90.9
3	Calmness	33.3	68.2
4	Relaxation	57.1	72.7
5	Enjoyment in life	42.9	63.6
6	Enthusiasm	60.7	68.2
7	Concentration	39.3	50.0
8	Memory	42.9	50.0
9	Tiredness	35.7	72.7
10	Tension	46.4	50.0
11	Worry	32.1	45.5
12	Anger	39.3	31.8
13	Loneliness	64.2	86.4

*Reduction applies to the parameters, namely, Tiredness, Tension, Worry, Anger and Loneliness

Table 4. ANOVA of respondents reporting very much improvement / reduction in subjective well being parameters through yoga practice

Years of yoga practice	Respondents (%*) reporting very much improvement / reduction in subjective well being parameters	F
Up to 2	47.7	9.23 Sig. $p < 0.01$
> 2	65.9	

*Mean percentage considering all the subjective well being parameters

Table 5. Respondents reporting slight improvement / reduction in subjective well being parameters through yoga practice

Sl. No.	Subjective well being parameter	Respondents (%) reporting slight improvement / reduction* in the parameter with	
		Up to 2 years yoga practice	> 2 years yoga practice
1	Happiness	32.1	22.7
2	Contentment	25.0	09.1
3	Calmness	63.0	31.8
4	Relaxation	35.7	27.3
5	Enjoyment in life	53.6	36.4
6	Enthusiasm	28.6	31.8
7	Concentration	53.6	50.0
8	Memory	53.6	50.0
9	Tiredness	64.3	22.7
10	Tension	53.6	45.5
11	Worry	64.3	40.9
12	Anger	53.6	59.1
13	Loneliness	27.3	13.6

*Reduction applies to the parameters, namely, Tiredness, Tension, Worry, Anger and Loneliness

Table 6. ANOVA of respondents reporting slight improvement / reduction in subjective well being parameters through yoga practice

Years of yoga practice	Respondents (%*) reporting slight improvement / reduction in subjective well being parameters	F
Up to 2	46.8	4.87 Sig $p > 0.05$
> 2	33.9	

*Mean percentage considering all the subjective well being parameters

Conclusions

The results of this study confirm the effect of yoga in achieving a feeling of well being among people, which is in line with similar studies carried out by other researchers. This will also contribute to better physical health, considering the fact that the lack of wellness and peace at the mental level is an important factor influencing the incidence of many diseases. Hence, the occurrence of many psycho-somatic disorders in our society can be reduced considerably through the practice of relaxation techniques such as yoga. This assumes relevance in the present day context, where people mostly lead a fast, hectic and tense life as an outcome of the unavoidable necessities of family / social commitments, work pressure etc.

Suggestions

For achieving peace and health in the society, it will be useful if yoga centres, recreational clubs, residents' associations, schools, offices and similar institutions take initiative in popularizing mind - body relaxation techniques such as yoga, meditation etc. through awareness programs. It will also be good to include information generated from research done on the techniques as proof for validation of their theoretical concepts, which are explained in the awareness classes. This is important, since, only a very small proportion of people only practice such relaxation techniques. One of the reasons for this is that many are not actually aware of the future health consequences of their tense, hectic life styles, and hence, do not bother to relax. Hence, along with the popularization of yoga, meditation and similar relaxation techniques, it is also required to create awareness among the public about the health hazards of a stressful life, in order to make them realize the relevance of the techniques for long term health benefits.