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The shield of health and covid-19 susceptibility factors: CRP, creatinine, bilirubin, VLDL, HDL, triglycerides, cortisol and thyroid function

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Abstract
The objective was to identify some of the Covid-19 susceptibility factors that are often associated with compromised immunity in search of preventative solutions that can safeguard health. Elevated C-reactive protein (CRP), creatinine, and bilirubin are consistently featured in the profiles of Covid-19 patients, indicating persistent inflammation, oxidative stress and excess toxicity. Accumulated adiposity, BMI>25, and abnormalities in VLDL, cortisol, triglycerides, and thyroid function have been mostly indirectly linked to Covid-19 by their conspicuous presence in obesity, diabetes, pulmonary defects, and cardiovascular diseases that exacerbate Covid-19 19 vulnerability and fatality rates. The Covid-19 documented affinity for ACE2 receptors which are primarily expressed in adipose tissue, heart, thyroid, and male tissues, unveils the virus' principal targets, and emphasizes the importance of striving for cardiovascular health, weight control, and metabolic stability. Exercise is universally accepted as an optimal solution, however, the expense, length of commitment, and effort involved in sustained physical activity become progressively more challenging with hormonal disharmony, and an imbalanced lipid profile, consequently multiplying the incidences of obesity. We explored the effects of an exercise alternative that demonstrated reduced visceral adiposity, lower levels of CRP, creatinine, bilirubin, cortisol, VLDL, and triglycerides, juxtaposed by upraises in HDL and Free T3. Importantly, all variables optimally increased and decreased without ever drifting into abnormality.

Keywords: covid-19 associated factors; CRP, creatinine, bilirubin, VLDL, HDL, triglycerides, cortisol, and thyroid function

Introduction

The overproduction of inflammatory cytokines by the immune system to fight against the Covid-19 pathogen induces an excess synthesis of C-reactive protein (CRP). A simple prediction is that individuals with abnormally high CRP levels will be more susceptible to the virus' provoked "cytokine storm," a defensive immune over activity going awry, as incessant white blood cells attack the host's vital organs [1-3]. Covid-19 highest mortality rate is associated with disorders clustered around low grade inflammation such as diabetes, cardiovascular disease (CVD), and respiratory defects that are often linked to obesity, measured by body mass index (BMI), abdomen circumference, and accumulation of adipose tissue [4-8]. Fatalities have increased in up to 88.1% infected individuals with a BMI>25 [9]. As expected, CRP is proportionally elevated depending on the degree of severity of Covid-19 patients [10, 11]. Liu *et al*. (2020) reported that CRP > 41.8 mg/L is usually associated with Covid-19 poor prognosis [12]. CRP elevations have been previously linked to post-stroke pneumonia [13].

Several investigators have hypothesized that estrogen, which significantly increases during pregnancy, has a protective role in Covid-19 due to its anti-inflammatory properties. This hypothesis involves a series of interactions with the immune system, including B cells that produce antibodies. This premise is supported by mortality rates which are 2.4 times higher in men than women in both Covid-19, and previous manifestations of the acute respiratory syndrome [14-17]. However, a study on 28 infected pregnant females produced no significant differences in Covid-19 severity, hospital stay or recovery time, when compared to 54 non-pregnant women [18]. A survey on 22,000 individuals found that CRP, one of the prominent markers of inflammation, is higher in females than males [19]. Independent research has confirmed that estrogen hormone replacement interventions increase CRP levels in healthy women [20, 21]. These findings can either be interpreted as a contradiction to research that features CRP as a Covid-19 marker, or as attestation that estrogen may not be a reliable variable in assessing Covid-19 risk level. Indeed there is evidence that while estrogens may exert a systemic anti-inflammatory influence, cellular metabolic processes can actually reverse this advantage and enhance a pro-inflammatory action, depending on the complexity of the body's repair mechanisms [22].

A more definitive identifier of Covid-19 risk is adipose tissue due to the virus' affinity for the angiotensin-converting enzyme 2 (ACE2) receptors which are abundantly expressed in fat cells, offering open binding invitations to the virus, thus amplifying the probability of infection [23, 24]. Patients with diabetes, renal dysfunction, hypertension, CVD, coronary artery disease and the elderly who are often treated with ACEIs and ARBs medications, which according to animal studies increase ACE2 receptors, have reportedly manifested a greater vulnerability to Covid-19, followed by exacerbated symptomatology and eventual fatality [25, 26]. A recent report that highlights the adverse effects of smoking in promoting the multiplicity of ACE2 receptors correlated the Covid-19 higher incidence of male deaths in China with an up to 50% increase in male smokers. These investigators made an early March prediction about a rising number of Indonesian male

smokers contracting the virus, which was validated a few months later, as cases started multiplying to over 200,000 in Indonesia [27].

Perhaps the prevalence of the Covid-19 pandemic at a time of elevated environmental toxicity, and increasing rates of obesity up to 26.6% in Asian countries like China, and 50% plus in Western countries is not coincidental [28-30]. Both subcutaneous and visceral adipose tissue (VAT) secretes the pro-inflammatory cytokine interleukin-6 (IL-6) *in vivo* that is closely associated to CRP and free fatty acids [31]. Both obesity and high CRP levels are associated with chronic bronchitis. CRP elevated concentrations are also encountered in increased concentrations of triglycerides, high low-density lipoprotein (LDL), and very-low-density lipoprotein (VLDL), but have a negative correlation with high density lipoprotein (HDL) [32].

Excess adipose tissue appears to play a critical role in atherosclerosis, avascular site-specific chronic inflammation, leading to disturbed blood flow as a result of abnormal levels of triglycerides that represent the core components of arterial plaques [33, 34]. Triglycerides are associated with low-grade inflammation. Hyperlipidemia is caused by elevations in the low-density lipoprotein (LDL) and very-low-density lipoprotein (VLDL) which is the carrier of triglycerides, and is spotlighted as one of the key predictors of atherosclerosis [35-38]. The blood transports lipids and lipoproteins to the liver, often causing lipotoxicity and insulin resistance [39]. Non-alcoholic (NA) steatosis or fatty liver, one of the consequences of visceral adiposity, is the result of an imbalance between intrahepatic triglycerides' production and export. It often progresses to steatohepatitis, fibrosis, and cirrhosis. Overall, lipotoxicity and inflammation are inherent in both subcutaneous and visceral fat, compromising health [40]. Creatinine is a waste product produced by normal muscular functioning. Cheng *et al* (2019) reported that 43.9% of admitted Covid-19 patients had protein uria and creatinine kinase at the high-risk level of 2.1 mg/dL (normal range is 0.5-1.1 mg/dL) [41]. Chan *et al* postulated that creatinine kinase appears to be one of the primary markers of Covid-19 [42]. A review analysis revealed abnormally elevated bilirubin in Covid-19 patients with mild symptomatology that proportionally increased as the Covid-19 pathology intensified [43]. Bilirubin is a waste product composite derived from haemoglobin catabolism. These findings delineate the importance of systemic detoxification in the service of health maintenance.

Early diagnosis of variables that are potentially harmful when exacerbated, and which have risen to the upper end of the normal range should be concerning before they climb into abnormality. In preventive interventions the position of a variable within the normal range has a predictive value, urging action before imbalances start engineering the foundation of a medical disorder. Concentrations of different factors should be evaluated from the standpoint of their interactions, and whether they are paused after fulfilling their objectives, rather than aimlessly continuing, as in the case of the "cytokine storm" that ends up being lethal for Covid-19 patients. There are several examples that support this premise: high HDL, the health-enhancing form of cholesterol, reflects a systemic dysfunction in coronary artery disease (CAD) cases. Angeloni *et al.* (2013) postulated that cardiovascular disease may deteriorate during increased HDL levels, demonstrating that both endothelial repair and anti-inflammatory processes were significantly compromised at higher HDL levels. They recommended exploring HDL purposeful interactions, rather than merely the amount of HDL concentrations in evaluating the effects of HDL in both CAD and diabetes [44, 45]. More instances are found in cases of hyperinsulinemia that denotes a cellular insensitivity to insulin, preluding the emergence of type 2 diabetes; and the enigma of hyperleptinemia and hyperphagia in obesity, where excessive levels of the appetite-controlling hormone, leptin, do not exert an orexigenic effect [46-49]. This paradox is based on leptin resistance, reflecting deficient intracellular signalling that fails to carry the leptin signals across the blood-brain barrier (BBB) [50, 51]. Creatine promotes muscle strength, yet, in excess it provokes oxidative stress and increases uric acid [52]. A detailed evaluation of bilirubin, otherwise known as a toxic waste product, reviews evidence indicating that optimal bilirubin levels can effectively modulate oxidative stress and inflammation [53]. In conclusion, persistent processes like the "cytokine storm" that are initially necessary, but eventually pulverise the body, or in general, any biological activity that perseveres erratically after its defensive purpose is completed, may have devastating consequences for immunity and wellbeing.

A balanced profile may turn out to be the most efficient protector against COVID-19; that would reflect a BMI well below 24, reduced visceral fat, and normal range concentrations of CRP, bilirubin, creatinine triglycerides, VLDL and HDL. In moderation, all body mechanisms are useful and purposeful. VLDL represents one of the primary transport mechanisms, carrying triglycerides that serve as an energy source. Adipose tissue stores and regulates metabolic energy playing a crucial role in body homeostasis. It consists of white, beige, and brown fat. White adipocytes serve as an energy bank and have a different ontogenetic origin than the brown and beige fat, which are thermogenic cells, involved in energy expenditure in the form of heat [54]. Oxidation of brown fatty acids is regulated by thyroid hormones, specifically T3, the active metabolite of the prohormone T4. T3 also regulates gene transcription throughout the body, accelerates resting energy expenditure, and is involved in lipolysis [55]. Thyroid dysfunction has been recently connected to both Covid-19 [56] and environmental toxicity [57]. Recent research compared 93 Covid-19 positive patients with 101 negative ones in the intensive care unit, and against 53 Covid-19 positive individuals in low intensive care. The intensive care Covid-19 positive patients were mostly men in their sixties, while the other two groups were mostly women in their seventies. The intensive care positive Covid-19 group evidenced thyrotoxicosis, a hypermetabolic condition reflecting excess thyroid hormones, which was attributed to the immune response against Covid-19. The free triiodothyronine level (Free T3) was low in all groups suggesting a conversion impairment of free thyroxine (T4) to Free T3 [58]. This was interesting because thyrotoxicosis primarily affects 2-3 times more women than men and the majority of the Covid-19 intensive unit patients were males [59]. Again, the body's defensive efforts to increase energy by an overactive thyroid, eventually disturbs hormonal functioning provoking further health deterioration. There is another, more interesting connection between thyroid and Covid-19, related to the virus' affinity for ACE2 receptors. Zhao *et al*. [60] reported increased ACE2 lung receptors in one male Asian subject – an unconvincingly small sample. However,

more detailed extensive research on 31 human tissues did not identify the lungs as one of the primary organs associated with ACE2 receptors. In fact, they found upraised ACE2 expression in the thyroid, adipose tissue, heart, kidneys, small intestine and the male reproductive gland; and only moderate ACE2 expression in the lungs, colon, bladder, liver and adrenal gland; while muscle, brain, blood vessels and bone marrow had substantially less ACE2 expression than all other organs. These investigators found no significant differences between the different groups they examined that included males, females, a "younger" group under 45 years and an "older" one over 45 years, with the exception, of course, of the male tissues that may increase Covid-19 susceptibility in men. In other words, all four groups were equally vulnerable to Covid-19, primarily via the abundance of their ACE2 receptors in their adipose tissue, heart, thyroid, etc. However, when the immune responses of the four different groups were analysed, there was evidence of negative correlations between immune processes and ACE2 expression in the "younger" and females groups; while the "older" and male groups showed positive correlations between immune activity and ACE2 expression, manifesting a higher hyperinflammatory "cytokine storm" reaction, selectively increasing mortality rates in the "older" and male groups [61]. The male/female, young/old differential immune responses, along with the identified multitude of ACE2 receptors in the heart, thyroid, adiposity and male tissues, explains the higher incidence of Covid-19 fatalities among men, older individuals, and obese patients with heart problems and diabetes, who are often diagnosed with a thyroid condition according to a large body of research [62-65].

Few papers associate cortisol directly with Covid-19, however it appears that increased cortisol decreases survival rates [66]. High cortisol concentrations have been linked to disorders conspicuously featured among Covid-19 fatalities such as diabetes and heart disease [67-69]. Recent studies that explored a new exercise alternative have reported a substantial decline in cortisol concentrations along with a significant decrease in VLDL, triglycerides, visceral adiposity and ghrelin accompanied by a normal range increase in Free T3, testosterone and leptin [70-72]. Another clinical trial on diabetic and pre-diabetic patients that utilized the same method revealed reductions in both fasting and PP insulin and glucose levels and a significant improvement in hepatic steatosis based on ultrasound imaging reports [73].

Methodology

We adopted the technology used in recent studies, originally developed and built in London University by Gerald Pollock one of the co-inventors of the first pacemaker, and Donald Gilbert, a molecular biology London University professor, on the basis of extensive research on motor neurons. It has a maximum voltage of 15Vat 500Ω, 25V at 2000Ω, and 50V at 10KΩ. Any current generated by the voltage based on Ohm's law is minuscule and cannot be measured. It emits 24 unlimited resolution voltage-driven complex square waveforms, each synthesized by up to 4000 sine frequencies on the basis of a proprietary formula, with a resultant frequencies that ranges from 55Hz to 888Hz. The two waveform control knobs are manually combined to form 144 combinations, inducing 1000 full-body musculature contractions, each sustained for 8 seconds, with 2-secs rest time, mimicking slow-motion simulated exercises, or significantly faster ones that involuntarily twist and shake the body. The technology has 16 channels, isolated by separate transformers, reaching the skin via 8 three-pin din, and 8 four-pin din silver-plated tour-grade microphone cables, connected to gel pads. It complies with the EEC UK directive of electrical equipment safety applied standard EN 60601-1, and has a CE marketing directive of Class I with electromagnetic compatibility regulations applied standards EN50081-1 and EN50082-1. FDA clearance numbers are K132158 and K132179, applied to earlier versions of this technology with the same hardware design, intended for usage in physical medicine. The technology has had no known side effects in the past 20 years that it has been used in clinical practice by over 5,430 physicians and aesthetic practitioners. The only contraindication, according to the FDA, is having an implanted device like a pacemaker. The main caution is pregnancy. Adverse reactions are limited to temporary skin redness from the pads that occurs sporadically, and usually dissipates within an hour. Measuring instruments included:

1. A blood test that examined levels of VLDL, HDL, triglycerides, Free T3, cortisol, CRP, creatinine and bilirubin.
2. A conductance instrument that calculated BMI and visceral fat.
3. A measuring tape.

Procedure

The results of forty adults 27-81 years of age with an average BMI of 32.42 participated and completed the clinical trial that took place in six different private clinics in separate countries. The measurements provided by the six clinics were different. The clinic that offered the results of thirty subjects, twenty females and ten males, only provided BMI, visceral fat and before and after abdomen measurements. The blood test results on CRP, Creatinine, Bilirubin, Cortisol, Free T3, HDL, VLDL and triglycerides of the ten Caucasian female patients were derived from the remaining five participating clinics who also offered BMI and visceral fat scores but not measurements. All clinics reported that subjects were randomly selected out of a large number of individuals receiving treatments in this new exercise alternative. Inclusion criteria were:

1. BMI >25.
2. Diabetes or prediabetes under control.
3. Hypertension or other medical disorder under control.
4. No prior experience or treatments with the same technology.

The main exclusion criteria were:

1. Pregnancy or trying to become pregnant
2. An implanted device like a cardiac pacemaker.
3. Severe medical and mental disorders.
4. Operation within the past six weeks.

All subjects signed consent forms and were informed that they had the right to refuse participation at any time. Every precaution was taken to protect the subjects' privacy and the confidentiality of their personal information. Subjects were not in a dependent relationship with the technology operators, the lab and measurement technicians, or the authors. The subjects did not receive specific instructions regarding changes in their lifestyles, and there was no methodical follow up of their food consumption. None of

the technology operators, lab or measurement technicians had any known bias or personal interest in the direction of the results.

Five independent labs, (one from each private clinic that provided the blood tests), were assigned to take blood samples before and ten days after the completion of twelve one-hour treatments that took place three times a week, for four consequent weeks. Subjects were asked to fast for twelve hours prior to getting their blood tests. All six clinics had an attending physician in case any of the subjects had an adverse reaction. None of the subjects reported any adverse reactions. Following blood tests and measurements, each subject went to a private treatment room and lay on a massage table while the gel pads and cables from the 16 channels of the device were attached on to his/her body by the technology operator. The cables from ten of the channels were attached on to the gel pads of the waist, upper and lower abdomen according to a standardized diagram, and the cables from the six remaining channels were attached onto the gel pads placed along the lymphatic system pathways of the legs and arms, to enhance detoxification.

The procedure was approved by the ethical boards of all clinics and was in accordance with the ethical standards and principles for medical research involving human subjects.

Results

The raw data from all six clinics results on BMI, VAT, and abdomen measurements are given on Table 1. Average BMI reduction was -6.63%. Average VAT % decrease was -23.31%. The average Umbilicus measurement reduction was -8 cm. While average below the umbilicus measurements cm loss was -7.77 (Table 1).

Table 1: Results of 30 patients of Indian descent, 10 males and 20 females on BMI, VAT, and measurements on Umbilicus and Below Umbilicus, and 10 Caucasian females on BMI and VAT.

Gender	Age	Medical History	Medication	BMI Pre	BMI Post	Visceral Fat Pre	Visceral Fat Post	Umbilicus Pre	Umbilicus Post	Below Umbilicus Pre	Below Umbilicus Post
F	54	Hypothyroidism, Stroke	tb. Thyroxin 50mg, tb. Rosovastin 20, tb. Clopidogrel 75	35.9	34.6	30	23	138	130	137	131
F	43			34.6	33.4	21	18	110	104	120	105
F	49	Hypertension, Hypothyroidism	eltroxin 50mcg	25.2	24.4	7.5	7	102	95	105	98
M	47	Diabetes; Fatty Liver		37.6	33.4	30	21	136	126	139	128
F	39			37.8	36.7	23	20	124	111	127	112
F	28			30.7	29.4	11	8	102	95	104	97
M	45	Hypothyroidism; Hypertension	thyronorm 75mcg	26.4	24.9	13	11	103	96	99	95
M	27			34.1	31.2	17	14	115	100	118	107
F	34	Insulin Resistance	Metformin 500mg TDS	29.8	27.9	11	8.5	100	92	105	99
M	81	Diabetes; Hypertension	Nefrosore-(BD) istamet-(OD) Ecosprin AV-75(OD)	34.8	32.2	31	26.5	119	113	117	114
F	47	Hypertension	Prolomet	25.8	24.5	8	7	96	86	108	102
F	63	Hypertension, Hypothyroidism, Gout	Thyronorm 125mcg	42.8	40.3	28	23	135	127	144	136
F	57	Hypothyroidism, Hyperlipidemia	Thyronorm 100mcg	41.9	38.7	32	26	125	116	138	127
F	27			24.1	22.5	4.5	4	92	83	97	91
M	37			26.3	24.5	11	7	100	94	99	94
F	43			34	31.7	24.5	20.4	101	94	111	100
M	27	Insulin Resistnace	Metformin 500mg TDS	29.5	28.2	11	9	110	104	112	105
F	35	Hypothyroidism	Thyronorm 75mcg	36.2	34.0	19	15.5	118	113	129	122
M	61			29.5	28.8	19.5	17.6	106	99	108	100
M	55			27.7	26.7	9.5	8	105	99	101	97
F	38	Hyperlipidemia		37.1	34.5	20.5	14.5	121	116	126	118
M	36			37.1	34.0	18	13.5	124	118	123	118
F	34			29.6	27.8	11	9	96	90	106	100
F	46			31	30.0	14	11.5	110	100	115	109
F	43	Hypothyroidism, PCOD	Thronorm 125mcg	46.8	45.5	30	25	141	135	143	136
F	32			29.4	26.8	15.5	12	100	88	105	95
F	39			27.4	25.2	14.5	10	95	85	104	95
M	68	Hypertension, Fatty Liver	Telmisartan, Metaprolol	28.2	27.3	19.5	17.2	113	108	104	99
F	36	Diabetes, Hypothyroidism	Thyroxin 50mg Metformin500OD, Tenegliptin -OD	33.5	32.1	18.5	16.5	115	106	114	105
F	42	Diabetes, Hypothyroidism	Thyroxin 50mcg OD, Tab Metformin500OD, Tenegliptin - OD	23	20.3	9.5	8	97	86	101	91
F	56	Diabetes Fatty Liver	Metformin500OD, Tenegliptin - OD	32.6	29.7	29.6	21.6				
F	52	Prediabetes Fatty Liver		36.5	33.9	31.2	23.3				
F	49	Hypertension Hypothyroidism	eltroxin 50mcg	28.6	25.4	27.9	16.1				
F	63	Hypertension Fatty Liver		34.9	31.8	30.4	22.8				
F	51	Prediabetes Hypertension Hypothyroidism	eltroxin 50mcg	34.2	32.7	30.9	23.6				
F	55	Prediabetes Fatty Liver	tb.Thyroxin 50	35.4	33.9	32.2	27.6				

		Hypothyroidism									
F	48	Prediabetes Fatty Liver Hypothyroidism	eltroxin 50mcg	30.9	28.2	27.5	17.2				
F	61	Hypertension Fatty Liver	tb.Thyroxin 50	32.7	29.9	28.4	20.9				
F	46	Heart Disease		29.5	24.3	26.1	16.7				
F	58	Prediabetes Fatty Liver Hypothyroidism	tb.Thyroxin 50	33.8	29.5	30.2	21.9				
			Mean Total	32.42	30.27	20.67	15.85	111.63	103.63	115.3	107.53

Total BMI % Reduction: -6.63% | Total Visceral Fat % Reduction: -23.31% | Umbilicus total average cm loss: -8 cm | Below Umbilicus average cm loss: -7.77 cm

Table 2: Blood Test Results on C-reactive protein (CRP) and Cortisol on 10 Caucasian Subjects

Gender	Age	Medical History	BMI PRE	CRP PRE mg/dL	CRP POST mg/dL	Normal Range mg/dL	Cortisol Total, Serum ug/dL, PRE	Cortisol Total, Serum ug/dL, POST	Normal Range ug/dL
F	56	Diabetes Fatty Liver	32.6	1.56	1.02	<1.00	18.44	15.66	3.09-25.0
F	52	Prediabetes Fatty Liver	36.5	1.09	1.06	<1.00	21.89	20.12	3.09-25.0
F	49	Hypertension Hypothyroidism	28.6	2.31	1.15	<1.00	24.98	18.47	3.09-25.0
F	63	Hypertension Fatty Liver	34.9	1.93	1.06	<1.00	23.43	21.98	3.09-25.0
F	51	Prediabetes Hypertension Hypothyroidism	34.2	1.43	1.22	<1.00	18.46	15.34	3.09-25.0
F	55	Prediabetes Fatty Liver Hypothyroidism	35.4	1.64	1.01	<1.00	19.33	14.75	3.09-25.0
F	48	Prediabetes Fatty Liver Hypothyroidism	30.9	1.04	0.86	<1.00	9.67	8.23	3.09-25.0
F	61	Hypertension Fatty Liver	32.7	1.08	0.74	<1.00	14.76	10.65	3.09-25.0
F	46	Heart Disease	29.5	1.84	0.98	<1.00	17.22	13.95	3.09-25.0
F	58	Prediabetes Fatty Liver Hypothyroidism	33.8	2.11	1.03	<1.00	21.28	17.24	3.09-25.0
MEAN TOTAL				1.60mg/dL	1.01 mg/dL		18.95 ug/dL	15.64 ug/dL	
Mean Average CRP % Decrease				-36.87 mg/dL		Mean Average Cortisol % Decrease		-17.47% mg/dL	

CRP: <1.0 mg/dL. Low cardiovascular risk according to AHA/CDC
CRP: 1.0-3.0 mg/dL Average cardiovascular risk according to AHA/CDC
CRP: >3.0-10.0 mg/dL High cardiovascular risk according to AHA/CDC

Table 3: Blood Test Results on Creatinine and Bilirubin on 10 Caucasian Females.

Gender/ Age	BMI	Medical History	Creatinine Serum PRE mg/dL	Creatinine Serum POST mg/dL	Creatinine Normal Range mg/dL	Bilirubin PRE mg/dL	Bilirubin POST mg/dL	Bilirubin Normal Range mg/dL
F/56	32.6	Diabetes Fatty Liver	1.15	0.94	0.5-1.10	2.13	1.09	0.3-1.2
F/52	36.5	Prediabetes Fatty Liver	1.03	0.87	0.5-1.10	2.76	1.63	0.3-1.2
F/49	28.6	Hypertension Hypothyroidism	1.37	1.05	0.5-1.10	1.27	0.93	0.3-1.2
F/63	34.9	Hypertension Fatty Liver	1.23	0.96	0.5-1.10	2.35	1.78	0.3-1.2
F/51	34.2	Prediabetes Hypertension Hypothyroidism	1.14	1.02	0.5-1.10	2.18	1.03	0.3-1.2
F/55	35.4	Prediabetes Fatty Liver Hypothyroidism	1.04	1.01	0.5-1.10	2.23	1.16	0.3-1.2
F/48	30.9	Prediabetes Fatty Liver Hypothyroidism	0.97	0.82	0.5-1.10	1.53	0.83	0.3-1.2
F/61	32.7	Hypertension Fatty Liver	1.18	0.98	0.5-1.10	1.93	0.95	0.3-1.2
F/46	29.5	Heart Disease	1.11	0.87	0.5-1.10	1.22	1.07	0.3-1.2
F/58	33.8	Prediabetes Fatty Liver Hypothyroidism	1.96	1.23	0.5-1.10	2.17	1.26	0.3-1.2
Mean Total			1.22mg/dL	0.98 mg/dL		1.98 mg/dL	1.17 mg/dL	
Mean Average Creatinine % Decrease			-19.67 mg/dL		Mean Average Bilirubin % Decrease			-9.23 mg/dL

Table 4: Blood Test Results on VLDL and Triglycerides on 10 Caucasian Subjects.

Gender/ Age	BMI	Medical History	VLDL PRE mg/dL	VLDL POST mg/dL	VLDL Normal Range mg/dL	Trigly cerides PRE mg/dL	Trigly cerides POST mg/dL	Trigly cerides Normal Range mg/dL
F/56	32.6	Diabetes Fatty Liver	39.64	27.33	5.0-40.0	144	137	<150
F/52	36.5	Prediabetes Fatty Liver	43.49	35.77	5.0-40.0	169	146	<150
F/49	28.6	Hypertension Hypothyroidism	27.44	18.28	5.0-40.0	129	114	<150
F/63	34.9	Hypertension Fatty Liver	45.22	32.86	5.0-40.0	163	152	<150
F/51	34.2	Prediabetes Hypertension Hypothyroidism	39.42	31.67	5.0-40.0	159	150	<150
F/55	35.4	Prediabetes Fatty Liver Hypothyroidism	42.55	36.20	5.0-40.0	173	159	<150
F/48	30.9	Prediabetes Fatty Liver Hypothyroidism	37.52	29.38	5.0-40.0	153	139	<150
F/61	32.7	Hypertension Fatty Liver	41.87	36.24	5.0-40.0	175	148	<150
F/46	29.5	Heart Disease	14.76	9.23	5.0-40.0	136	129	<150
F/58	33.8	Prediabetes Fatty Liver Hypothyroidism	43.92	37.56	5.0-40.0	182	157	<150
Mean Total			37.58	29.45		158	143.1	
Mean Average % Decrease			-8.13% mg/dL		Mean Average % Decrease			-14.9% mg/dL

Triglycerides Normal Range: <150 mg/dL. Boderline high: 150 to 199 mg/dL
Hypertriglyceridemia: 200 to 499 mg/dL High risk for pancreatitis : > or = 500 mg/dL

Table 5: Blood Test Results on HDL and Free T3 on 10 Caucasian Subjects.

Gender/ Age	BMI	Medical History	HDL PRE mg/dL	HDL POST mg/dL	HDL Normal Range pg/mL	Free T3 PRE pg/mL	Free T3 POST pg/mL	Free T3 Normal Range pg/mL
F/56	32.6	Diabetes Fatty Liver	53	61	>60	2.29	2.89	2.30-4.20
F/52	36.5	Prediabetes Fatty Liver	39	57	>60	2.12	2.68	2.30-4.20
F/49	28.6	Hypertension Hypothyroidism	61	79	>60	1.32	2.49	2.30-4.20
F/63	34.9	Hypertension Fatty Liver	46	64	>60	1.97	2.69	2.30-4.20
F/51	34.2	Prediabetes Hypertension Hypothyroidism	41	55	>60	1.18	2.25	2.30-4.20
F/55	35.4	Prediabetes Fatty Liver Hypothyroidism	43	51	>60	1.43	2.36	2.30-4.20
F/48	30.9	Prediabetes Fatty Liver Hypothyroidism	63	76	>60	1.63	2.11	2.30-4.20
F/61	32.7	Hypertension Fatty Liver	52	71	>60	1.96	2.95	2.30-4.20
F/46	29.5	Heart Disease	59	68	>60	2.25	2.33	2.30-4.20
F/58	33.8	Prediabetes Fatty Liver Hypothyroidism	38	52	>60	1.37	2.16	2.30-4.20
Mean Total			49.5mg/dL	63.4 mg/dL		1.75	2.49	
Mean Average % Increase				+28.08% mg/dL		Mean Average % Increase		+42.28 pg/mL

High-Density Lipoprotein (HDL) Normal Range: Men > 60 mg/dL; Women > 60 mg/dLHigh-Density Lipoprotein (HDL) At Risk: Men: <40 mg/dL; Women < 50 mg/dL

Table 6: T-Tests Statistical Significance Results on Blood Tests and Measurement Variables

	Mean	S^2 =SS/df	S2*M* = S2/N	SM= √S^2M	T Value	p Value	Probability
VLDL	-8.13	6.23	0.62	0.79	-10.3	<0.00001	P<0.00001
Triglycerides	-15.2	54.4	5.44	2.33	-.652	0.00005	P<0.0001
Free T-3	0.74	0.11	0.01	0.1	7.19	0.00003	P<0.0001
Bilirubin	-0.08	0.12	0.01	0.11	-7.26	0.00002	P<0.0001
Creatinine	-0.24	0.04	0	0.06	-4.06	0.00143	P<0.01
CRP	-0.59	0.16	0.02	0.13	-4.72	0.00055	P<0.001
Cortisol	-3.31	2.52	0.25	0.5	-6.59	0.0005	P<0.001
HDL	13.9	18.99	1.9	1.38	10.09	<0.00001	P<0.00001
Visceral Adipose Tissue	-4.59	8.34	0.21	0.46	-10.05	<0.00001	P<0.00001
BMI	-2.15	1.06	0.03	0.16	-13/21	<0.00001	P<0.00001
Umbilicus, cm	-8	6.28	0.21	0.46	-17.49	<0.00001	P<0.00001
Below Umbilicus, cm	-7.77	8.81	0.29	0.54	-14.34	<0.00001	P<0.00001

CRP and cortisol decreases were -36.87% mg/dL and -17.47% ug/dL respectively (Table 2). Prior to treatment, CRP was above the normal range for all subjects. It descended into the borderline normal range after the 12 treatments. Cortisol decreased within the normal range (Table 2).

Seven out of ten subjects had abnormal levels of creatinine prior to treatments. All subjects manifested creatinine concentrations within the normal range after treatment. The average percentage decrease of creatinine was -19.67% (Table 3). Bilirubin was at the upper end of the normal range prior to treatments and decreased towards the middle

part of the normal range after the twelve procedures. The significance of being at the upper part of the normal range is the high probability of rising into abnormality, increasing health risk. The mean average percentage decrease of bilirubin was -69.23% (Table 3).

VLDL and Triglycerides percentage decreases were -8.13% mg/dL and -14.9% mg/dL respectively (Table 4). Triglycerides that was within the borderline risk range before treatment, descended into the normal range after treatment. HDL and Free T3 increases were +28.08% mg/dL and +42.28% pg/mL, respectively (Table 5). The mean average level of HDL and Free T3 that were previously below normalcy, were elevated into the normal range. The data was statistically analysed by the T-test for dependent means. Results for all variables along with the statistical significance are given on Table 6.

Discussion

The scope of this project was to identify health risks that could potentially exacerbate vulnerability and symptomatology in this pandemic. The focus was on prevention and protection rather than treatment, since the clinical trials were conducted on patients with disorders often associated with Covid-19, like diabetes, hypertension and hypothyroid who had tested negative for the virus. We explored the interactions between VLDL, triglycerides and HDL, before and after an exercise alternative that has been previously shown to enhance health. Results revealed a robust decrease in VLDL and triglycerides juxtaposed by upraised HDL, but without HDL being overly elevated that could also pose a health risk as previously discussed [44, 45]. BMI decreased but without entering the risk-free range, suggesting that twelve treatments, completed within three weeks, may not be enough to reduce BMI from an average of 32.42 to below 24. Tape measurements delineating a significant cm reduction, appeared to corroborate the evidence of visceral fat reduction. Consistent with this configuration, Free T3 values were significantly elevated, but without rising above the normal range. BMI/visceral fat reduction and optimal Free T3 concentrations are important in light of the documented affinity of Covid-19 for ACE2 receptors that are reportedly abundant in adiposity. This may be the reason why a BMI>25 escalates Covid-19 susceptibility and fatality [9]. Weight management appears to be one of the necessities in containing the virus. Lockdowns and social distancing encourage inactivity and food consumption, which consequently accumulate adiposity along with inflammation and toxicity due to limited opportunities for movement and lymphatic drainage. The current results replicate and provide reliability for previous studies [70-73] and provide evidence for reduced inflammation and toxicity by the statistically significant reductions of the CRP, creatinine and bilirubin. However, not all subjects' CRP descended within the normal range, suggesting the requirement for more treatments or adding exercise and nutrition to secure a more optimal health status. Bilirubin and creatinine that were initially abnormal, demonstrated a mean average that appeared to settle within the normal range after twelve treatments, suggesting that this method can be utilized to enhance detoxification as a health enhancement technique that can either temporarily replace or be an added aspect to an active lifestyle and proper nutrition.

Unfortunately, the sample of 10 females that provided the results on CRP, creatinine and bilirubin was small and did not include males. A larger more diverse sample is imperative to substantiate and generalize these findings. Ultrasound or magnetic resonance imaging techniques would also be useful in assessing the progress of patients with hepatic steatosis and more accurately validate the visceral adipose tissue reduction that was consistently observed in all forty patients.

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Conflict of Interest

The author declares no conflict of interest. This study was conducted by independent operators that were not employed or contracted by the author.

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Ethical Standards

Statement of Ethical Approval

This study was performed in accordance with the ethical standards of medical research involving human participants as cited by:

1. Ethical Principles for Medical Research involving Human Subjects
2. American Psychological Association (APA)
3. IELLIOS Research department for Development and invention of Innovative Technology

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