Changing Concepts of Healthcare: Physical Activity, Fitness and Wellness

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Abstract

Framingham Heart Studies Group, which started their work some 70 years ago in the USA, have meticulously developed information about modifiable risks, that promote the development of cardiovascular diseases. Several studies have demonstrated, that robust management of these observed modifiable risks, will reduce or prevent premature mortality related to this number one killer worldwide. In spite of the existence of this evidence-based knowledge, there is a rapid increase in the incidence and prevalence of metabolic diseases like hypertension, excess weight, obesity, type-2 diabetes, and vascular diseases. In our view, modern medicine has failed in developing appropriate prevention strategies, and instead, has heavily concentrated in drug discovery and risk management. This approach may reduce or postpone the premature mortality, but, will not reduce, reverse, or prevent the incidence of cardiometabolic diseases. In recent years, there is a great interest and a tremendous growth, in the Health and Wellness approaches. Just about everyone talks about, Yoga, meditation, mindfulness, and a variety of fitness and wellness programs. According to the experts, this health and wellness industry is growing robustly, and has reached a targeted $95 billion market size worldwide. It is estimated, that there are more than 200,000 health clubs with over 174 million members worldwide. This unique platform, attracts individuals who are motivated to improve their health and wellness. We feel strongly, that if we can develop a well thought out training and prevention program, using this ‘motivated cohort’, we can demonstrate the importance of lifestyle changes in the prevention of cardiometabolic diseases. In this overview, we have provided a novel approach or a road map, for the development of a noninvasive screening program, for developing fitness and wellness index, risk assessment, risk prediction, and robust management of the observed risks. In presenting this ‘road map’, we have discussed the value of some of the currently available diagnostic devices, tools, and platforms including the Life Probes, a “Health Kiosk”, developed by the LD-technologies of Miami, Florida. The basic concept and approach involve, screening for fitness and wellness, development of a grading system to score the ‘health status,’ in the process, -identify any metabolic risks present, and recommend those individuals with observed risks, for further testing and triaging. In spite of the fact, that there are thousands of health clubs and millions of motivated members, there is no seamless screening, testing, and ‘evaluating package’ available. We have made a small beginning, by selection of some of the currently available diagnostic tools and platforms. We have developed a novel approach for the integration of emerging technologies for the development of newer concepts of integrated preventive healthcare. Just identifying a risk will not reduce, reverse, or prevent the disease. We need to provide a total, seamless, end to end solution, which involves, prevention of the risks from developing, early identification of the risks, and robust modification of the risks for cardiometabolic diseases.

Keywords: Healthcare; Physical Activity; Fitness; Wellness

Introduction

Concepts of health care is changing rapidly, and includes newer ideas like precision medicine, personal medicine, affordable health care, universal healthcare, fitness and wellness medicine. President Barack Obama launched a new initiative during his presidential inauguration, on the 20th of January 2015’ - “Tonight, I’m launching a new Precision Medicine Initiative to bring us closer to curing
changing Concepts of Healthcare: Physical Activity, Fitness and Wellness

diseases like cancer and diabetes, and to give all of us access to the personalized information we need to keep ourselves and our families healthier. The proposed initiative had two main components: a near-term focus on cancers and a longer-term aim, to generate knowledge applicable to the whole range of health and diseases [1]. The initiative was a top-down approach, which envisaged assembling over time, a longitudinal “cohort” of 1 million or more Americans who have volunteered, to participate in research, have consented to provide biological specimens (cell populations, proteins, metabolites, RNA and DNA- including whole-genome sequencing), behavioral data, all linked to their electronic health records. The assumption of this ambitious program was, “that such varied array of research activity, will propel our understanding of the diseases, their origins, and mechanisms, and provide opportunities for prevention, treatment, thus laying a firm, broad foundation for precision medicine. We have been thinking of a simple alternate way to the diagnosis, management, and prevention of lifestyle diseases, using a ‘bottom-up approach.’ Our approach involves, the empowerment of individuals to take care of his/her own health, by encouraging them to develop healthy diet and healthy lifestyle. Our initiative also has two components; first encourage healthy diet and lifestyle to prevent the metabolic risks from developing in the first place, secondly to identify the risks at the earliest and manage the identified risks robustly.

Metabolic risks and metabolic diseases are on the raise worldwide in epidemic proportions [2-17]. Metabolic risks include; oxidative stress, chronic inflammation, excess weight, vascular dysfunction, including altered blood flow dynamics, hardening of the arteries, endothelial dysfunction and subclinical atherosclerosis. On the other hand, metabolic diseases include, hypertension, excess weight, obesity, type-2 diabetes, and chronic vascular diseases. Since majority of these conditions are considered responses to altered lifestyle or unhealthy lifestyle, there is a great interest in the design and development of modern concepts of healthcare, which include; physical fitness, lifestyle changes, and wellness activities. In view of these observations, we feel strongly that any collaborative effort with the Global Health and Fitness programs and the public health preventive strategies, will lead to the overall improvement of the health of individuals ‘at risk’ for developing lifestyle disorders. In this overview, we have used Global Health Industry as a model platform, to develop cohorts for testing our concepts and for clinical validation studies.

Market for the Global Health Club’s industry is currently valued at close to $95 billion, with over 200,000 clubs and 174 million members worldwide (2018 IHRSA Global Report). There is a rapid growth in this sector, and IHRSA has launched a global initiative to reach 230 million health club members worldwide by 2030 (www.IHRSA.org). Although this number pales compared to the number of millions of individuals at risk for chronic metabolic diseases, yet, provides us with a large number of healthy-cohort population, that could be studied to validate the effect of physical activity and fitness programs on possible beneficial effects. It also provides us an experimental cohort for developing ways and means, to monitor the success of such programs on measurable health parameters. Apart from the health benefits, this approach will also benefit the Global Health and Wellness efforts. According to the Global Wellness Institute, the global wellness business grew 10.6% from 2013 -2015; from 3.6 trillion to 3.72 trillion market. According to the wellness experts, the health and wellness industry is experiencing a “healthy” boom, that is global anti-aging market is worth $250 billion in the US alone. We would like to explore challenges and opportunities, in this growing area and take advantage of this huge fitness and wellness market trends, to develop an integrated preventive program, that will aim at a better health, as well as a healthy aging concept.

According to the University of Wisconsin School of Medicine, Health and Wellness program, “the major challenge that one faces is, determining how hard we are working, which is often a subjective thing”. “And our bodies do not always tell us what’s happening in real time”. A common measurement of how hard you should be working is your target heart rate. Basically, the normal heart rate during the workout is around 50 - 85% of your maximum heart rate. Majority of wearable fitness trackers are centered around the target heart rate. However, the fitness centers encourage the use of the Borg Rating of Perceived Exertion (RPE), as it relates to an individual’s physiology, or how a person’s body functions. In spite of the fact, that this is the most recommended fitness grading or exercise exertions rating program, no standard method or automated analytics are available. Therefore, it is worthwhile developing a simple, useable, non-invasive platform that can take into consideration the heart rate variability (HRV) and the exercise intensity and provide an RPE index. In view of the fact that number of wearables have the ability to monitor heart rate (HR) and ‘sync’ the data into the smart Apps, it is just a question of developing software analytics and appropriate algorithms, to get the RPE for any given exercise regimen, based on the age, gender, and the type of exercise.
The US national physical activity guidelines recommend 150 minutes of moderate activity or 75 minutes of vigorous activity or high intensity activity each week, with additional muscle strengthening exercise for adults and 60 minutes for children [18,19]. Over the past 12 years, the editors of the American College of Sports Medicine’s Health and Fitness Journal, have circulated an electronic survey to thousands of professionals, including personal trainers and physical therapists, to predict the biggest health and fitness trends for the coming years. This survey, which included responses from 4,133 fitness professionals around the globe, placed ‘group training’ classes involving more than five participants in the No 2 slot, use of wearable technologies in the number 3 slot, and body weight training in the fourth- slot. Considering the popularity of the group exercises, one can develop appropriate Apps to develop ROE index for various types of work outs. Since these applications basically use HRV, one can use this common measurement or add the values for oxygen saturation as well for computing ROE index to these measurements.

Basic baseline fitness check includes, comprehensive medical history, any medical conditions, lifestyle, exercise history, and if possible a way to grade the performance. A good example for risk scoring would be the ‘risk calculator’, developed by the Framingham Heart Study (FHS) Group or the one developed by the Rasmussen Center for Cardiovascular Disease Prevention, at the University of Minnesota (U of M). FHS CVD-risk calculator uses the common modifiable risk factors and calculates 10-year risk for the development of CVD [20,21]. On the other hand, U of M risk assessment, uses a ten-point data from clinical diagnostic tests and grades the risk for CVD, using a grading from 0 to 20 [22]. Professor Cohn’s method includes a series of tests that numerically evaluate artery and heart health, to measure the progress of the heart disease. A score of six or higher on these tests means, that a patient likely has a plaque buildup in the arteries. A score of three to five suggests, that such a problem may be developing. Our approach to the early diagnosis of metabolic risks is similar to these efforts, except that we start off with the healthy individuals and start grading them with fitness, wellness or ‘at risk’, index using a personalized grading system and a health-portal.

Discussion

The National Health and Nutrition Examination Survey (NHANES) is a unique program of studies designed, to assess the health and nutritional status of adults and children in the United States. The survey is unique in the sense, that it combines interviews and physical examinations. Under this unique program, a one-year Youth Fitness Survey was conducted in 2012. As we have mentioned in our introduction, with over 200,000 health clubs worldwide, we have an opportunity to develop a ‘healthy cohort’ to follow the origin and progress of metabolic risks, as well as progress of metabolic and cardiovascular diseases. If developed with an integrated healthcare approach, it could serve as one of the most useful preventive medicine programs. The basic concept is simple, it combines, entrepreneurship, academy-industry partnership, and the integration of emerging mobile technologies for collection, collation, computation, and analysis of data for risk assessment, management, and prevention [23-29]. Having said that, we would like to remind the readers that there is no academy-industry partnership, and the integration of emerging mobile technologies for collection, collation, computation, and analysis of data for risk assessment, management, and prevention [23-29].

Majority of wellness programs avoid biomarker assays using blood draw or finger stick, and limit to the collection of personal health data. Some may provide access, to a personal health vault on the Internet. In the absence of data on blood chemistry, we will have to rely heavily on noninvasive technologies, to get metabolic activity related data. Fitness and wellness screening measurements, include: height and weight to calculate body mass index (BMI) as measure of obesity (we prefer Waist/Hip ratio instead of BMI); body fat percentage, - as an alternate measure of obesity (we prefer DEXA scan better than bio-impedance measurements); waist- as measure of abdominal obesity and diabetes risk; Hip- to calculate waist-to-Hip ratio, as a measure of abdominal adiposity; Neck- to calculate sleep apnea risk (we prefer activity tracker like Fitbit), Blood pressure-to calculate cardiovascular risk (we prefer arterial stiffness or endothelial dysfunction). Do we have a platform that can provide such data without a blood draw? We would like to report on a noninvasive platform, that we have been testing for further validation in health clubs and for individual and population-based studies.

Life Probes is a totally automated wellness screening ‘kiosk’ developed by LD-Technologies of Miami, Florida (www.ldteck.org). As shown in the figure 1 the individual can stand in front of the kiosk and using a touch screen go through all the tests, which are prompted by the Health Kiosk. The bottom plate serves as weighing device, and at the top is a camera, which provides information about the height of
the individual. In the second step, the individual holds the side bars and provides the data for body composition analysis by bio-impedance measurement. In the third step, the data on heart rate is obtained by photoplethysmography using an oximetry setup. The last step involves automated blood pressure monitoring. Once these steps are concluded, the test data are collected, analyzed, and the summary results, automatically printed out or sent by email. The print-out provided by this device, reports following findings: target weight, weight plan, fat plan, minimum and maximum calories, weight, body mass index (BMI), body fat, bone and muscle mass, total water, insulin sensitivity, immune sensitivity, recovery capacity, artery condition, blood pressure (systolic, diastolic), oxygen saturation, temperature, heart rate, fitness index, and wellness markers. By further fine tuning the analytics and algorithms, one can also develop additional data such as heart stroke volume, and ventricular ejection fraction, as well as endothelial dysfunction. We are validating this device at Sweden and in the USA, in independent testing facilities.

Figure 1: Life Probes (automated kiosk). Courtesy: Dr. Albert Maarek, LD-Technologies, USA.

Bioelectrical impedance (BIA) test involves running a small current of electricity through the body to gauge composition [30]. The method relies on the current’s ability to pass easily and permeate cell membrane. Resistance to the current (from water) is a function of how hydrated your body is and is correlated with your body fat%. Like other methods, BIA doesn’t measure fat directly, but rather it infers fat content from a direct measurement of something else, in this case water. As to how it works, an individual stands on a platform, wraps his hand around the two available handles. For about 20 seconds a small electric current runs up both legs and arms. Some systems (Life Probes) use only hands. When comparing methods for body composition analysis, it is important to distinguish fat (triglyceride) from visceral adipose tissue (AT), which contains approximately 80% fat, the rest being water and minerals. It is well known that the metabolic risk related to fat accumulation is strongly dependent on its distribution. Central abdominal obesity, and in particular ectopic fat are related to important metabolic risks. BIA uses electrical properties to estimate the total body water (TBW) from the body fat mass. BIA requires different model parameters, to be used depending on age, gender, level of physical activity, amount of body fat and ethnicity in order to be reliable.

Using non-invasive 3D cameras on the other hand, total body scanning can be done to capture surface data of an individual. This is accomplished with harmless infrared light, that reflects the body but is invisible for the eye. Many Gyms use 3D body scanning as a customer acquisition tool, to demonstrate the sophistication of their services. Screening in wellness programs are used to: identify participants, who would benefit from health coaching; provide validated data for results-based incentive programs; measure program outcomes over time; help participants make the right health choices. Such screening results are often combined with health risk assessment questionnaire data, about life style behaviors and health status, to provide a detailed assessment of an individual’s health. A major challenge for physical fitness and wellness programs is collecting, collating, and interpretation of the vast amounts of personal data collected, from various
screening sources, providing timely feedback, provide continuous guidance to the participants, and develop evidence-based incentive programs. Here lies the importance of developing a personal health portal that can collect, collate, compute data received from a variety of mobile apps and use a proprietary software for analytics, interpretation of risk assessment, and risk management.

In view of the fact, that number of noninvasive fitness tracking and diagnostic tools are available, we feel strongly that development of a modular integrated platform for performance tracking, risk stratification, and risk management will be valuable. The future of health care will be heavily dependent upon emerging diagnostic technologies, machine learning, artificial intelligence, software analytics, and interpretation of integrated data. Considering this futuristic possibility, let us discuss briefly some novel applications and diagnostic platforms. For instance, if we use a tool like the one described above (Life Probe), we would be able to get information on relative fitness or otherwise of an individual. The body mass index, lipid abnormalities and insulin sensitivity data will serve as indicators of good health or a predisposition for the development of metabolic risks. We can arrange for frequent monitoring of such individuals or recommend additional minimal invasive tests to determine ‘at risk’ population (Figure 2 and 3).

For determining ‘at risk’ population, we could look at the data on the BMI, body fat, and insulin sensitivity. Increase in BMI, or waist/hip ratio would serve as early indicators for the development of excess weight, obesity, prediabetes, and metabolic syndrome. In view of this evidence-based observations, if any of these values are above normal for their age and gender, they can be recommended for further evaluation. Figure 2 and 3 shows daily glucose profile of an individual with high HBA1c and from a normal individual. Since this

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**Figure 2:** Daily interstitial glucose profile of an individual with high HBA1c. Courtesy: Abbott. Diabetes Care.

**Figure 3:** Daily interstitial glucose profile of an individual with an average value of 154 with a normal HBA1c value (Courtesy: Abbott Diabetes Care).
Changing Concepts of Healthcare: Physical Activity, Fitness and Wellness

is a minimally invasive, cost effective test, it can be recommended to obtain information about glucose metabolism. Since both Freestyle Libre as well as the Dexcom G6 glucose monitors, use glucose sensors that monitor glucose for two weeks at regular intervals (15 mins or 5 mins respectively), one can get a real time data on glucose metabolism. These devices also can be used to empower those with altered glucose metabolism to monitor the effect of diet or treatments on daily real-time glucose profiles. Metabolic risks such as hypertension, excess weight, oxidative stress, chronic inflammation and obesity could also lead to the development of altered blood flow, endothelial dysfunction (ED) and hardening of the arteries. Indeed, Prof Jay Cohn of the University of Minnesota is of the opinion, that there is no CVD, without the underlying endothelial dysfunction and subclinical atherosclerosis of the arteries. In view of this observation, which emphasizes the early diagnostic importance of ED, we should recommend screening of the ‘at risk’ population for noninvasive assessment of ED.

There are several diagnostic tools available for monitoring ED. One of which is the CV-Profiler used at the University of Minnesota (Figure 4). This device was developed by the joint efforts of the research staff of the University of Minnesota and the Hypertension Diagnostics of Minneapolis, Minnesota. (www.hypertensiondiagnostics.com). The device uses pulse wave analysis and computes the arterial stiffness with proprietary algorithms. Kelly and associates at the Minneapolis Heart Institute have demonstrated, that in overweight children and adolescents, C-reactive protein (a measure of inflammation) is associated with fasting insulin. According to them, just eight weeks of aerobic exercise improves fitness, HDL cholesterol, and endothelial dysfunction [31]. There are other devices that can also monitor endothelial dysfunction or arterial stiffness (Hardening of the arteries).

Genesis Medical Systems of Hyderabad, India, have developed Periscope, which monitors pulse wave at four different regions of the body (limbs). LD-technologies of Miami, Florida have developed a noninvasive platform, that can compute the arterial function. Genesis Medical System of Hyderabad, India, has developed a variety of medical devices to profile vascular dysfunction (Figure 5). They include, Diabetes risk profiler, PeriScope (Vascular Pulse wave analyzer) CanWin (autonomic nervous system), (SpiroWin (Pulmonary), ThesioWin (Digital VPT analyzer), VibroSense (digital biothesimeter). Ravi Kasliwal and associates at the Medanta Hospital, New Delhi, India, have used pulse wave analysis methodology, to demonstrate early diagnosis of prehypertensives, as well as for studies monitoring the effect of pistachio consumption on glycemic load and endothelial dysfunction [32]. We are working in Bengaluru, India, on a much simpler device to monitor the regional blood flow dynamics, as well as endothelial dysfunction, using pulse wave and blood pressure data, with a proprietary analytics and algorithm. One approach is to use sensors that provide pulse wave forms at various pulse points, so that flow dynamics for regional vascular beds can be calculated. Such sensor-based devices, could be used as wearables to obtain continuous readings. A second approach we are considering, is by making modifications in the currently used ‘ultrasound probes’, for monitoring flow conditions of peripheral arteries and veins. Development of such a devices will be useful for monitoring changes in the flow dynamics in diabetics, especially as the severity of the disease progresses.

Noninvasive diagnostic platform developed by the LD-technology, uses a novel approach to compute a variety of metabolic risks. Since we are reviewing novel approaches, for the early diagnosis of metabolic risks in health and ‘at risk’ population, it is worth discussing the advantage or otherwise of this novel methodology. We can extend screening for metabolic risks as well as clusters of such risks, using a novel noninvasive platform developed by LD-technologies called, TM-Oxi, SudoPath, and ES Complex systems. Basically, this noninvasive system comprises of an oximeter, blood pressure monitor, and a galvanic skin response monitor (Figure 6 and 7). TM-Oxi system detects diabetic or cardiac autonomic neuropathy and endothelial dysfunction; SudoPath system detects, early stages of peripheral autonomic neuropathy and alterations in microcirculation, whereas ES-Complex system focuses on diabetes management and detection of diabetes-related complications. Since it is noninvasive, cost effective, one can use this system, to obtain information on a variety of early metabolic risks as well as cluster of risks and develop risk score.

The entire battery of tests just take a few minutes and the data collected is computed, analyzed, and printed out both in digital as well as graphic manner (Figure 7). The risks are color coded with green color indicating low risk, yellow color-mild risk, orange color- moderate risk, and red color for high risk (numbering will be 0-5 green, 5-10 yellow, 10-15 orange and 15-20 red). The figure 7 shows the data of a typical run, in which one can see that cardiometabolic risk score (CMR Score) is in red (high risk), whereas, autonomic nerve response score (ANR Score) is shown in yellow (moderate risk). These kinds of tests, although not clinically validated by independent laboratories, can still be used to follow effect of dietary patterns, exercise or treatment regimens. Dr Pratiksha Gandhi, chairperson IPC Heartcare, Mumbai, India, has evaluated over thousand patients using TM-Oxi SudoPath systems. For further details about this methodology we urge readers to refer to our earlier publications [33-36]. The TM-Flow Data System on the other hand, is a Non-Invasive Cardiometabolic Point of Care Integrated System, put together with well-tested FDA approved medical devices like, pulse oximeter, blood pressure monitors, and galvanic skin response monitors, which can access variability in functionalities of body functions and responses, to electrical and mechanical stimulations, collect typical outputs, compute, analyse, and diagnose cardiometabolic risks and diseases with cardiovascular and autonomic nervous systems.

A typical TM-Flow Report, includes information on microvascular and autonomic assessments, sudio motor tests, nitric oxide peaks (representing vasodilation), C-fiber activity. Results of parasympathetic tests, sympathetic reflex tests, lower artery markers, which include right and left leg artery stiffness, vascular and endothelial homeostatic markers are reported. For additional details, please refer to our earlier publication [37]. Figure 8 shows, a collective summary of tests and data in a diagrammatic way, to illustrate various risk scores, such as autonomic nervous system score (AN Score), vascular score, cardiometabolic score, and life score (diet and fitness score). Data for computing AN Score comes from following tests; microcirculation functions, C-fiber density and activity, cardiac innervation, cardiac function, adrenergic response, noradrenergic response, parasympathetic response, sympathetic response. Vascular Score is computed from data including; inflammation, immune responses, insulin resistance, lipid profile, vascular tone, blood pressure, coagulation, and arterial brachial index.

An Internet search on “Physical activity, fitness, and wellness monitoring in health clubs and sports facilities” shows very scant information. For instance, a US Patent (US 7,507, 183B2) describes about a “Health Club Exercise Records System”. They discuss about the possibilities of developing two basic approaches; toward the goals of recording exercise activity into digital medium: “active network systems” and “scripted training systems.” There is considerable interest in developing a software driven, recording platform for exercise related activity using a PDA or similar handheld device. A second reference that appears is about a book on “University campus setting
and the promotion of physical activity in young adults: lessons from research in Australia and the USA (https://doi.org/10.1108/09654280110387980.2013). The third reference is a Health Club Management Handbook -2017. King’s College, London, - has a page on ‘King’s Move’, an online platform, that rewards you for doing physical activity. It is free for the members, all you need to do is sign up and connect a fitness tracker or a wearable - app on your phone to your account. However, you do not see any novel approaches to monitor your physical activity, fitness or wellness index.

Figure 8: Represents a diagrammatic representation of collated data using TM-Flow data system (Courtesy: Dr. Albert Maarek, LD-Technologies, Miami, Florida).

Just about every recording system, health vaults, and health portals, more or less serve as an e-record system for health information. None of them are capable of integrating the data, analyzing the data, interpretation of results, or developing a summary report. Majority of mobile technologies, although are capable of acquiring data and forwarding them by ‘Bluetooth’ technology to ‘sync’ data to smart apps., are incapable of integrating with any other existing data on the portal. In other words, all data collected from various diagnostic devices, tools sit as independent entities in the data base. Our approach to this is, to develop a health portal, which can accept such data from various sources, integrate them with the existing data, and develop risk assessment, risk prediction and risk prevention strategies. It is not just a wild suggestion any more. Consider the novelty of LD-technologies’ TM-flow platform for instance, which uses just three data collection sensors, oximeter, blood pressure monitor, and a galvanic skin response monitor. The data collected from these sources are collected, computed, analyzed and interpreted in terms of cardiometabolic risks, although none of these tests directly measure any of the risks that we talk about; such as hypertension, excess weight, obesity, endothelial dysfunction, prediabetes, diabetes, and vascular diseases. It is nothing but collection of a theme-based information, analytics and training of the algorithms. Having said that, we insist that all such data need rigorous clinical validation by independent testing facilities to be valid.

What we have tried to do in this overview is bring to the readers, a totally new concept of healthy living. We have described our point of view on this new concept of healthcare and put together an ‘imaginary model’ to record and validate the benefits or otherwise of physical activity, fitness, and wellness. We feel confident, that by incorporating all the available mobile emerging technologies, we can develop a
better health portal, that will empower the user to his/her health goals, performance evaluation, risk development as well as progress or regress of observed risks. We have just used a few available noninvasive devices and platforms to illustrate our line of thinking. All of the devices that we have discussed have capabilities for connectivity to smart applications such as smart phones, iPads or computers. If the operation is large enough, they can even develop a cloud-based database, that can store the information, do the analytics, summarize the reports and make it available to trainers, personal doctors, or healthcare providers. We have mentioned in our earlier writings, that the future of the health care is more or less integration of emerging technologies, to provide an integrated healthcare, which is holistic and encompasses, healthy diet, healthy lifestyle, and over all wellness concepts [38-43]. We are happy to report that Government of India has announced that Health Ministry has set up a target, to transform nearly 150,000 (1.5 Lakh) primary health care centers and sub centers, as ‘Health and Wellness’ centers by 2022, to provide comprehensive and quality primary care to the community. In this connection, we emphasize, that trained preventive medicine staff and health coaches are the future of modern healthcare. As discussed in this overview, we will try to build such an IT-supported, web-enabled, health portal as part of an industry/academia partnership, to test some of the novel ideas, presented in this article. Since this is a major novel undertaking, we welcome newer ideas, comments, criticisms, and constructive collaboration.

Conclusions

Altered metabolism results in the development of metabolic risks, such as oxidative stress, low grade chronic inflammation, excess weight, obesity, altered blood flow, endothelial dysfunction, hardening of the arteries, and subclinical atherosclerosis of the blood vessels. In the last three decades, metabolic diseases like hypertension, obesity, type-2 diabetes, and vascular diseases have increased to epidemic proportions worldwide. Cardiovascular disease has been recognized as the number one killer and has remained in that position for the last 100 years. In spite of the fact, that there is an ongoing research for over 7 decades, about the modifiable risks that promote vascular diseases, modern medicine has failed to stop, reverse, or prevent the increase in the incidence of metabolic diseases. Metabolic diseases are basically diseases of lifestyle. Of all the preventive strategies proposed, implementation of lifestyle change is the hardest to achieve. In this overview, we have proposed a novel approach, to the early detection, reversal, or prevention of metabolic diseases. Our proposal involves recruitment of a cohort, who are engaged in fitness or wellness programs. Since these individuals are well motivated to improve their health and wellbeing, we feel that they may very well be interested in achieving the goals that we hope to achieve.

As to the novelty of our approach, we intend using noninvasive diagnostic devices, tools or integrated platforms, to obtain the fitness or wellness index of participants. The information about the family history, performance data, any observed risks, improvements, and recommendations will be stored, analyzed, and summarized on a ‘cloud-based’ personal HealthVault. Only those devices, tools, integrated platforms, which have ‘Bluetooth’ capability will be selected for this novel approach of preventive project. The information from various tests will be collected, collated, computed, and analyzed by a proprietary software, to be designed for implementation. We envision, that the software analytics and algorithms will consider, that as the research work progresses, additional test results will be added for further fine tuning of the prediction, and risk assessment capabilities, of our integrated platform. Since our major interest is in the area of cardiometabolic health, the selection of the diagnostic devices, tools, and noninvasive platforms will focus on risks associated with these disorders. We have started initial work on this project using the Life Probes’ Health Kiosk. We will add other devices, tools and technologies as we make progress in our assessment and analytical capabilities. We have made no attempt to provide all the answers or suggestions for the prevention of this public health menace. We have made an honest attempt, to provide a guideline or a road map to preventive care, using a ‘cohort’ that is motivated enough to accept that lifestyle changes are the key to the reduction, reversal, or prevention of metabolic diseases.

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Changing Concepts of Healthcare: Physical Activity, Fitness and Wellness

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