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Perceived Health Outcomes On Using Wearable Fitness Trackers By Tracking And Self Managing Physical Activities

¹ Ramasamy Rajendran, ²Dr. S. Arulkumar

¹Student of Department of Business Administration, Annamalai University, Chidambaram,
Tamilnadu, India.

²Associate Professor, Department of Business Administration, DDE, Chidambaram,
Tamilnadu, India

Email: ¹ kanyax2000@yahoo.com

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ABSTRACT

The wearables industry is esteemed at US\$18 million at present and is relied upon to arrive at an estimation of US\$64 million by 2023. Lately, there has been expanding interest in arising advances and wearable sensors as self-checking apparatuses for advancing active work levels. The multiplication of wearable action trackers, just as their developing business accessibility, prominence, and far-reaching reception, presents an occasion to incorporate such advances into active work mediations. As needs be, relevant forerunners of grown-up's responsibility and discernment could be researched as a component of a more rational and thorough comprehension on wellness trackers impacts on wellbeing and prosperity. In this study non-probability sampling was used, to collect data by means of a structured questionnaire. Regression model was developed by analysing the data collected. Continuous Usage Intention is dependent on Perceived Product Satisfaction (PPST), Perceived Usefulness (PUT), Perceived Product Innovativeness (PPIT) and Perceived Enjoyment (PET) as per the relationship represented by the regression equation. In any case, neither one of the interventions was fruitful in altogether improving health outcomes or other wellbeing results. Other procedures or strategies may should be used notwithstanding wearable gadgets if the objective is to build health outcomes in this populace. The judgemental and convenience sampling methods could have been replaced by random sampling methods. Though the expertise of the researcher is

involved, further research can follow random sampling methods. This can be viewed as a limitation of this study which along with the previously discussed points can form the scope for further research.

1. Introduction

Wearable wellness trackers (wearables) have gotten a staple in wellbeing and wellness. Wearable action trackers were characterized as an electronic gadget with the accompanying highlights: intended to be worn on the client's body; utilizes accelerometers, altimeters, or different sensors to follow the wearer's developments or biometric information or both; and can give criticism by means of the screen show or through a joining forces application to evoke consistent self-observing of movement conduct. (Loomba S, Khairnar A.2018). The wearables industry is esteemed at US\$18 million at present and is relied upon to arrive at an estimation of US\$64 million by 2023. Globally, wearables produce an expected US\$26 billion in deals with more than 170 million units sold in 2018(Lui S.2019). These gadgets are in excess of a wellness frill; they are a persuasive instrument that can help improve active work. Wearables consolidate different mental procedures related with conduct change (Lewis ZH.et. al. 2014). These methods, or highlights, incorporate social help (socialization), rewards, identifications, warnings, and giving feedback. specifically, social help, personalization, prompts, and action following might be the most basic highlights to encourage change in physical activity.

2. Conceptual Framework

Analysts have discovered that wearables are legitimate and adequate when utilized in an examination mediation (Michie S et. al. 2009) These gadgets may not be the highest quality level in estimating exercise, yet they can quantify steps and inactive action to a satisfactory degree. This furnishes the wearer with a sensible gauge of their actual work conduct. This legitimacy converts into enhancements in all proportions of actual work. Tong HL, Laranjo L. (2018) evaluated the utilization of wearables in intercessions and found that, contrasted and comparator gatherings, the wearable brought about a critical expansion in every day step check, moderate and overwhelming action, and generally energy expenditure. The wearables have been demonstrated to be adequate in mediations across assorted populaces, yet they seem not to be as powerful as customary social interventions (Nelson MB. et. al. 2016) Furthermore, the usefulness of wearables could be improved with propels in usefulness and convenience to build commitment.

There are a few factors that add to commitment with the gadget. These components incorporate the precision of following, social usefulness, feel, and the actual type of the device. There is some agreement that an ideal wearable would be prettier, greater, and more agreeable to wear (Evenson KR et al. 2015). Results from a journal investigation of people utilizing a wearable gadget unexpectedly found that their commitment was subject to how the information was followed, overseen, pictured, and used. To improve these elements, the creators recommend that analysts and producers ought to do the accompanying: (a) form frameworks that evoke compassionate responses to following information, (b) give clients control of their information and permit clients to help one another, (c) consolidate a symbol that reflects the client, (d) give custom fitted reports and objectives, and (e) permit the client to remember their data. These proposals are generally material to first-time clients, however the best wearable practices among proceeded with clients to inspire delayed conduct change still can't seem to be resolved (Brickwood KJ et. al. 2019)

In request to augment commitment with an end goal to significantly improve active work results, analysts need a more profound comprehension of the utility of wearables. The present observational, blended strategies study plans to investigate the joined effect of wearable plan and wearer qualities on the utility of the gadget (Lewis ZH, et. al.2015). Specifically, this investigation means to investigate wearer commitment by assessing which gadget highlights are utilized and generally accommodating. Results from this investigation will manage future exploration to streamline commitment with wearable gadgets.

3. Literature review

Actual dormancy is a worldwide pandemic and has been recognized as the fourth driving reason for death overall. Ordinary actual work assumes a basic function in forestalling antecedents to metabolic and cardiovascular infirmity in youngsters, giving various medical advantages during youth that continue into adulthood (Sypes EE et.al. 2019) Such medical advantages remember defensive impacts for bone wellbeing, just as constructive outcomes on wellness, muscle to fat ratio, and pulse. A few nations (eg, the United States, United Kingdom, and Australia) suggest that kids ought to participate in at any rate an hour of moderate-to energetic power actual work (MVPA) consistently to profit wellbeing.

Notwithstanding, most of youngsters and teenagers (characterized as youth hereinafter) don't meet these suggested levels and are in this way not adequately dynamic to gather the related medical advantages (Harrison D et.al 2015) Since actual latency is a significant, yet modifiable, hazard factor for the weight of infection, there is a requirement for viable, preventive

mediations that plan to increment active work levels in this populace. Self-observing has been recognized as a compelling conduct change procedure that has been utilized in social mediations focusing on expansions in active work levels. In fact, self-observing and criticism are basic to expanding attention to individual active work levels, which is especially significant given that adolescent is probably not going to change their conduct on the off chance that they don't have the foggiest idea how dynamic they really are and how this means government rules (Kononova A et. al. 2019). In particular, Rapp A, Cena F. (2016) found that roughly 60% of dormant young people imagined that they met actual work rules, proposing that they may see no compelling reason to change their conduct, regardless of the related medical advantages. Customarily, hip-worn pedometers have been utilized to expand people's attention to their actual work; be that as it may, members are needed to record their movement toward the finish of every day, which can be difficult for them. Lately, there has been expanding interest in arising advances and wearable sensors as self-checking apparatuses for advancing active work levels. The multiplication of wearable action trackers, just as their developing business accessibility, prominence, and far-reaching reception, presents an occasion to incorporate such advances into active work mediations (Macridis S. et. al. 2018) While possession information is not accessible for youth, it is assessed that 10% and 20% of US and Australian grown-ups, individually, own some type of wearable innovation. A necessary part of wearable action trackers, for example, Fitbit and Jawbone, is the robotization of continuous actual work following. The remote matching up of such gadgets to Web-or application-based profiles not just discredits the weight of manual information section, yet additionally empowers the wearer to self-screen against actual work proposals or set objectives (Alley S et al. 2016) Until this point in time, actual work research has fundamentally centered around building up the legitimacy and dependability of wearable movement trackers for estimating a scope of results, including steps and rest. In correlation, little is thought about the achievability and viability of these gadgets as an apparatus for expanding active work levels, regardless of whether in separation or in blend with different procedures. A new survey announced that there was some underlying proof that wearable movement trackers can increment active work levels, however just investigations directed in grown-up populaces were incorporated (Ng K et.al. 2017). Given that commitment with innovation is an exceptionally esteemed conduct for youth and assumes a significant part in various areas of their lives (eg, training, socialization, and diversion), there is a need to set up whether wearable action trackers are attainable and viable in changing active work levels in this populace. Such data is significant for advising future actual work intercessions and can possibly add to the improvement of general wellbeing direction concerning

the function of these apparatuses in actual work and wellbeing advancement practice.

There are five inspirations of this exploration study. The principal inspiration is to concentrate on Consumer-Based Wearable Activity Trackers Increase Physical Activity Participation (Jarrahi MH et.al. 2018). The multiplication of robotization and innovative progressions has given enough a lot of leisure time to individuals, anyway numerous individuals exploit the time recoveries to reliably submit time to proactive tasks for by and large health. To stay solid, individuals should require significant investment routinely psychical exercises. The examination planned to approve compelling and predictable wellness trackers use for general proactive tasks. The subsequent inspiration is, there been restricted exploration accessibility on how individuals see these new wellness trackers are dependable, trustable and usable, and estimation and precision of wellness trackers.

The third spark is, the way these convenient gadgets fill in as close to home help to help responsibility on normal proactive tasks.

The fourth helper is, emotionally utilizing the wellness trackers overseeing persistent conditions, in view of 'Wearable Technology and Physical Activity in Chronic Disease: Opportunities and Challenges' (Organization WH. 2013). Furthermore, the fifth inspiration is, the examination the new advancements in wellness trackers, their item includes, which are persuasive to allure and settle on buy choices.

Under the above context, the researcher believes that need of a comprehensive detailed study on overall physical and mental wellness outcomes on wearable fitness trackers and addressing specific chronic health conditions. Chronic conditions are health conditions, carried by heredity or caused by environmental or unhealthy diets. By virtue, Chronic ailment conditions which do not have complete cure, however manageable by life style changes like committing to regular physical fitness. And, there are not many studies combining the health outcomes with fitness tracker product's innovative features, usability and trust people develop with the trackers along with health outcomes (Vos T. et. al 2013)

Such a comprehensive study on combining health outcomes on physical and mental wellness, and product adaption influencers like trust, usability and product innovations, will help to understand the wearable fitness trackers usage for health insurance companies to recommend, work with and measure personalized health metrics on regular basis.

4. Background of the Study

Standard exercise has shown physical and mental prosperity. Absence of consciousness of normal exercise just as checking exercise levels been significant difficulties for individuals. In spite of the fact that there developing

pattern of consciousness of actually remaining sound, worldwide, more than 70 % of passings are because of ongoing sicknesses, "Persistent Disease Prevention and Health Promotion (Lee I-M et. al. 2012; World Health Organization [WHO] 2013). The Chronic infections incorporate conditions, for example, coronary illness, stroke, malignant growth, diabetes, respiratory conditions, and joint pain. All around the world, Chronic and noncommunicable infections represent 66% of the general illness trouble, expected to ascend to 75% by 2030.

World Health Organization (WHO) concentrate in 2013, characterizes "work out", is a subcategory of actual work. Per Who definition, "Exercise" is an arranged, organized, redundant, and expects to improve or keep at least one parts of actual wellness. Customary actual work of moderate force –, for example, strolling, cycling, or doing sports – has huge advantages for wellbeing. By getting more dynamic for the duration of the day in generally basic manners, individuals can undoubtedly accomplish the suggested action levels (Garcia-Aymerich J et. al. 2006).

Ordinary and sufficient degrees of proactive tasks can include:

- Improve strong and cardiorespiratory wellness
- Improve bone and utilitarian wellbeing
- Reduce the danger of hypertension, coronary illness, stroke, diabetes, different sorts of malignant growth (counting bosom disease and colon malignancy), and despondency
- Reduce the danger of falls just as hip or vertebral cracks
- Fundamental to energy equilibrium and weight control

The "Worldwide Recommendations on Physical Activity for Health", distributed by WHO in 2013, center around overseeing Chronic conditions through actual work. It proposes distinctive strategy alternatives to arrive at the suggested levels of active work around the world, explicitly pertinent to our examination is, "the reconnaissance and observing of activities to advance actual work".

Consistent administration of proactive tasks to stay aware of best-fit wellbeing has consistently been challenge. Nonetheless, innovation and computerized developments presented wearable, wellness trackers to follow and oversee every day proactive tasks.

"Wearable gadgets sensors for protected and sound living" (Pedersen BK, Saltin B. 2016) shows the accessibility and utilization of wrist-worn wellness movement trackers have encountered a huge development over the most recent 5 years. New brands of wellness trackers and models delivered all the more frequently with improved highlights and capacities. The ease of use of these wearable gadgets has advanced client appropriation of these individual wearable wellness GPS beacons (Organization WH. 2010). Less examinations have explored the legitimacy of standard wrist-based action trackers in sound more established grown-ups, and a large portion of these

were predominantly identified with step-checking, which is a crude report. Given the significance that active work has on grown-ups to improve cardiorespiratory and solid wellness, bone and practical wellbeing, and decrease the danger of sadness and psychological decay, movement trackers might be advantageous in advancing an expansion in actual work in more established grown-ups (Morgan PJ et. al. 2016). Be that as it may, in view of the writing survey, there was insufficient compressive investigation on effect of wellness trackers on physical and mental prosperity, tracker's plan and highlight impact on worthy of the trackers, insight and inspiration on routinely wearing the trackers (WHO. 018). Foundation and objective of this investigation is to assemble itemized effects and insights on physical, rest and mental wellbeing to characterize and assess the wellness tracker wearer's general wellbeing by overseeing and controlling constant conditions like pulse, diabetic glucose level, heart sicknesses, weight the board, Sleep levels, and individual impression of mental and actual wellbeing upon consistently wearing these tracker gadgets , enabling individuals with innovation instrument, wellness trackers and deal with individuals' wellbeing result proactively.

5. Statement of the Problem

The effect of actual exercise on human prosperity investigated all the more regularly. "Actual work for wellbeing: More dynamic individuals for a more advantageous world: draft worldwide activity plan on active work 2018–2030", (WHO . 2018) study uncovers normal actual work is related with diminished dangers of coronary illness, stroke, diabetes and bosom and colon malignancy, and with improved psychological well-being and personal satisfaction. The investigation suggests in any event 150 minutes of moderate-force active work every week, anyway 80% of grown-up populaces doesn't meet the proposals.

Innovation based wellness trackers can help to screen and fill the holes and lacking of standard proactive tasks, by persistently following, cautioning and refreshing, reminding proactive tasks. In spite of the fact that huge numbers of mindful of the staying aware of every day actual work needs, we can't keep with actual timetable as we proceed to diverted with everyday self-administration (Bock C. 2014)

In light of the Research Basics, the issue of seeing how well the wellness trackers are valued, seen and incorporated into day-by-day schedule plan inside grown-up's populace to be with regards to in general physical and mental health. As needs be, relevant forerunners of grown-up's responsibility and discernment could be researched as a component of a more rational and thorough comprehension on wellness trackers impacts on wellbeing and

prosperity. The following area tends to the examination question and basic goal of this exploration.

6. Research Question and Objective

Given the foundation of the investigation and review of the exploration issue, there appears to be an inescapable need and occasion to investigate the viability of wellness tracker in following, observing and overseeing proactive tasks towards physical and mental wellbeing. Thus, the principal research question to be tended to in this proposed study is:

Effectiveness of Wearable Fitness Tracker on Health Outcomes

To address the above examination question, the point of this investigation is to create and test a thorough reasonable exploration system which survey the relationship with wearable wellness trackers and wellbeing results dependent on the pertinent hypotheses and the definite audit and examination of accessible writing. The particular goal is to research the different quantifiable elements of wellbeing like circulatory strain, glucose level, heart conditions, and BMI (Body Mass Index), rest level, and proactive tasks strolling, running, cycling, wellness trackers highlights following advances, Active proactive tasks, hear rates, calories consumed, wellness trackers utilization period, impact of configuration, highlights and developments in trackers and generally fulfilment of the trackers in keeping up physical and mental being. The goal is conceptualized into testable theories in the third section of this investigation. Notwithstanding, the proposed structure is introduced in the accompanying area to give a summed-up perspective on the exploration. To recognize the components impacting the wearable wellness trackers appropriation for individual self-wellbeing the board and to decide the relationship among them.

7. Methods

7.1 Data Collection Process

The survey prospects and locations were identified first, then the survey respondents were explained the purpose of the study in brief and handed over them the questionnaire, given them a week duration to complete and return the survey questionnaire. (Patnode CD et. al. 2017). The purpose of giving them the questionnaire for one week was to give them enough time to understand the questions and respond properly. At the end of the week timeframe, the completed questionnaires were collected back. The data was collected from 4 locations within Centene Corporation, Tampa city, Florida, USA location, during the period of November 2019 to February 2020.

7.2 Sampling Method

The study is carried out in one company, Centene Corporation, Tampa city, Florida, USA, at 4 locations within the city, with diverse ethnic group of people comprising White American, African American, Indian American and Chinese American. In this study researcher considered, all the users who use wearable fitness tracker as identified as sampling unit for the purpose of the study. Those people who are not using wearable fitness tracker were excluded from the study. In this study non-probability sampling was used. Two steps were used to sample the population for this study: Firstly, the selection of the sampling units, that is to say the places where the interviews were to be conducted. Thus, judgmental sampling was used to select the study area (Cradock KA . 2017). This method was necessary as the places which are believed to be representative of the target population had to be chosen subjectively. Because the respondents of these places were very much aware and have more chance to use the internet shopping. Hence, it was important for the interviewer to be present at each of these different places. Secondly, to select the respondents who were to be interviewed for that the convenience sampling method was used. Convenience sampling is a sampling technique that attempts to obtain a sample of convenient elements (Goode AD. et. al. 2012). The selection of sampling units is left primarily to the interviewer. It is the least expensive and least time consuming of all sampling techniques. The sample elements are easily accessible, easy to measure, and co-operative. Chosen the sample size determinization approach with USA population size, data confidence level and wearable fitness tracker penetration rate in USA population (De Vries HJ et. al. 2016).

8. Data Analysis and discussion

On collection of paper-based questionnaire data, as such the raw data cannot be used. Advanced statistical analysis require data in spreadsheet format. The collected data was input into Microsoft Excel spreadsheet to digitize and normalize for data storage, management, and interpretive analysis. The paper-based questionnaire data required strenuous preparation like adding number coding for questions like for example gender male, female to be encoded 1 for Male, 2 for Female, and verifying accuracy, and completion of response items.

The completed excel spreadsheet is processed through various statistical analysis tools including Regression

Dimension: Perceived Support of Health Outcomes (PSHO) - Statistical analysis shared All dimensions for reference

CUIT - Continuous Usage Intention

PUT - Perceived Usefulness

PEOUT - Perceived Ease of Use

TRUSTTT - Trust

PET - Perceived Enjoyment

PAT - Perceived Aesthetics

PPIT - Perceived Product Innovativeness

PSHOT - Perceived Support of Health Outcomes

PPST - Perceived Product Satisfaction

The data was tested for reliability and the Cronbach's alpha measure of reliability was 0.951 and it is considered as good.

Table 1.0 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
1 (Constant)	1.669	.576		2.897	.004			
PPST	.397	.016	.791	25.155	.000	.791	.791	.791
2 (Constant)	-.691	.525		-1.315	.189			
PPST	.233	.019	.464	12.279	.000	.791	.535	.328
PUT	.245	.020	.461	12.196	.000	.790	.532	.325
	-.945	.528		-1.790	.074			

3	(Constant)	.205	.021	.409	9.682	.000	.791	.447	.256
	PPST								
	PUT	.234	.020	.439	11.483	.000	.790	.510	.303
	PPIT	.072	.026	.104	2.833	.005	.640	.145	.075
4	(Constant)	-.853	.524		-1.626	.105			
	PPST	.213	.021	.423	10.039	.000	.791	.460	.263
	PUT	.249	.021	.469	11.918	.000	.790	.524	.312
	PPIT	.105	.028	.152	3.774	.000	.640	.191	.099
	PET	-.062	.022	-.109	-2.811	.005	.545	-.144	-.074

The Regression model is as follows:

$$\text{CUIT} = -0.853 + 0.213 * \text{PPST} + 0.249 * \text{PUT} + 0.105 * \text{PPIT} - 0.062 * \text{PET}$$

Continuous Usage Intention is dependent on Perceived Product Satisfaction (PPST), Perceived Usefulness (PUT), Perceived Product Innovativeness (PPIT) and Perceived Enjoyment (PET) as per the relationship represented by the regression equation.

The R and R² levels for this regression model are 0.86 and 0.74 respectively and are found to be good in explaining the variations in the model.

The ANOVA table indicates that the model fit is good enough.

Table 2.0 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2
1	.862	.743	.740	1.523	.005	7.904	1	375

Table 3.0 ANOVAa

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	2116.316	1	2116.316	632.766	.000 ^b
Residual	1264.239	378	3.345		
Total	3380.555	379			
2 Regression	2473.985	2	1236.992	514.407	.000 ^c
Residual	906.571	377	2.405		
Total	3380.555	379			
3 Regression	2492.930	3	830.977	352.003	.000 ^d
Residual	887.625	376	2.361		
Total	3380.555	379			
4 Regression	2511.253	4	627.813	270.826	.000 ^e
Residual	869.302	375	2.318		

Total	3380.555	379			
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- a. Dependent Variable: CUIT
- b. Predictors: (Constant), PPST
- c. Predictors: (Constant), PPST, PUT
- d. Predictors: (Constant), PPST, PUT, PPIT
- e. Predictors: (Constant), PPST, PUT, PPIT, PET

9. Conclusion

Continuous Usage Intention is dependent on Perceived Product Satisfaction (PPST), Perceived Usefulness (PUT), Perceived Product Innovativeness (PPIT) and Perceived Enjoyment (PET) as per the relationship represented by the regression equation.

This when validated simply indicates that the Continuous Usage Intention for various values of the independent predictor variables as per the Regression model, will be neutral or not affected much as per the relationship linking themselves and the constant read along with the sign along with the magnitude of values.

In any case, neither one of the interventions was fruitful in altogether improving health outcomes or other wellbeing results. Other procedures or strategies may should be used notwithstanding wearable gadgets if the objective is to build health outcomes in this populace. Future examinations should hope to assess the viability of various techniques notwithstanding the utilization of wearable advances for improving physical action and other wellbeing results in these populaces. There is as of now an enormous group of proof encompassing the legitimacy of these wearable trackers yet the writing inspecting their effect on actual work and the length of that effect is insignificant and stays a zone of interest for further examination. This investigation adds to the developing group of writing inspecting the adequacy of wearable innovation in affecting or improving health outcome levels in a very under explored populace.

The judgemental and convenience sampling methods could have been replaced by random sampling methods. Though the expertise of the researcher is involved, further research can follow random sampling methods. This can be viewed as a limitation of this study which along with the previously discussed points can form the scope for further research.

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