

A cross-sectional study to assess the adherence to, and the perceived effectiveness of fitness apps/gadgets among users in Hubballi City

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Abstract

Background: Physical inactivity is a major concern in both the developed and developing countries. The world was introduced to health-related applications and gadgets in the year 2010. These enable monitoring of and provide feedback regarding energy expended and energy consumed.

Objectives: To assess the utilisation pattern of fitness apps/gadgets and adherence to fitness apps/gadgets among the users and the perception of effectiveness of the apps/gadgets among the users

Methodology: A cross-sectional study was conducted among 100 individuals using fitness apps/gadgets, in the age group of 18-50 years over a period of one month. A pre-tested, semi-structured, self-administered questionnaire was used to collect the data.

Results: 73% of the participants were male, 59% used fitness apps, and 18% used both the apps and bands. Majority of the users adhered to a healthy lifestyle due to constant motivation they obtained from the apps/gadgets. Majority of the users felt their stress level and fast-food consumption has decreased, their time spent on physical activity and regularity of physical activity has increased, their sleep quality and their attitude towards life has improved after using the fitness apps/gadgets.

Conclusion: Majority of the study population felt that using the fitness apps/gadgets had a positive influence in their lives in the form of increase in the time spent on physical activity, regularity and intensity of physical activity, better sleep quality, decreased stress levels, positive attitude towards life and awareness of nutrition.

Key words: Fitness apps and gadgets, Adherence, Physical activity.

Introduction

Physical inactivity is a major primary risk factor for obesity, diabetes mellitus, and a major cause of premature death from cardiovascular disease, cancer, and other chronic diseases, contributing to approximately 3.2 million deaths annually and is the fourth leading risk factor for premature death^[1-8]. In contrast, physical activity has been linked to positive health outcomes and general well-being^[9,10]. Government organizations recognize physical activity, along with a healthy diet, as playing an important role in the prevention of obesity with a recommended level of moderate physical activity for adults of at least 30 minute on most days of the week, with high-risk individuals benefiting from tailored interventions^[11-14]. Unfortunately, infrequent exercise participation is

common^[15], starting even within late adolescence^[15,16].

Despite clear and consistent guidelines establishing standards for physical activity, only half of the adults worldwide meet the recommended levels^[17]. Despite the fact that many people do not comply with physical activity recommendations, Smartphone applications (apps) that promote physical activity are popular: of the 875,683 active apps available in iTunes and the 696,527 active apps in Google Play, 23,490 and 17,756 were categorized as Health and Fitness^[18-20]. Given the proliferation of apps, it is interesting to investigate their potential for promoting healthy lifestyle behaviours in the population. Such applications or gadgets appeal to the general population through features like self-monitoring, real time feedback, social support, rewards etc. Because people carry smart phones

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and can access data anywhere and anytime, physical activity behaviour change promotion apps offer the opportunity to provide tailored feedback and advice at the appropriate time and place^[21]. Therefore, apps offer new opportunities to deliver individually tailored interventions, including real-time assessment and feedback that are more likely to be effective. Apps are relatively new tools in physical activity interventions and only very little research has been published to date on the content and the effectiveness of physical activity apps^[22]. Despite the wide use of health-related physical activity apps by millions of people, only a few studies have considered the effectiveness of these apps in impacting the factors known to influence changes in behaviour^[17]. Hence through this cross-sectional study we aim to study the effectiveness of fitness applications/ gadgets and adherence to these applications or gadgets among the users.

Objectives:

- To assess the utilisation pattern of fitness apps/ gadgets in Hubballi City
- To assess the adherence to fitness apps/gadgets among the users
- To assess the perception of effectiveness of the apps/gadgets among the users.

Material and methods

A cross-sectional study design was used to collect the data. Study was conducted in the month of May and June of 2019. The place of study was Hubballi city, a tier II city in the northern part of the State of Karnataka. The study was approved by the Institutional Ethics Committee. As there were no previous studies, for purpose of calculation, it was assumed that 50% of the population uses fitness apps/gadgets. The sample size was calculated as follows

$P=50=0.5$, $q=1-p=0.5$, $d=\text{allowable error}$

$N =$

The final sample size was calculated as 97 and it was rounded off to 100.

Inclusion criteria- Individuals aged ≥ 18 years using fitness app/gadgets for a minimum duration of three months before the study was conducted and giving consent to participate.

Tools of data collection

A pre-designed, semi structured piloted questionnaire was used for the study, consisting of the following sections:

1. Socio demographic profile
2. Usage pattern of fitness app/gadget
3. Perceived effectiveness of using app/gadgets

- Physical and psychological
- Lifestyle modification

4. Barriers associated with usage of fitness app/ gadget

Methods of data collection

The sample population included participants from offices, colleges, decathlon sports complex. Prior permission was taken from the heads of the institution and a self-administered questionnaire was given to all participants after obtaining written consent.

Statistical method

The data collected was entered in Microsoft excel and analyzed using SPSS software version 21. Appropriate descriptive statistics and inferential statistics were used for analysis.

Results

Table1: Socio-demographic profile

	Variables	Percentage
Gender	Male	73
	Female	27
Education	High school	1
	Intermediate/Diploma	11
	Professional degree	88
Occupation	Unemployed	33
	Skilled worker	11
	Clerical/Shop/Farm	1
	Semi professional	4
	Professional	51
Religion	Hindu	91
	Muslim	6
	Christian	2
	Others	1
Type of family	Nuclear	63
	Joint/ Three Generations	37
Habits	Alcohol	9
	Tobacco	3
	Others	1
	None	87

Majority of the study population were male (73%) with professional degree (88%), belonging to nuclear family. Only 13% had habits such as alcohol, tobacco etc. (Table 1).

Usage pattern:

Majority of the study population used fitness app (59%) followed by fitness band (23%) and both (18%). 42% of the participants got the information regarding the fitness apps/gadgets through family/friends,

44% through online advertisements, 99% offline advertisements and 24% through app stores.

20% of the participants have been using the app/gadget for more than 2 years, 17% for 1-2 years and 63% for 3-6 months.

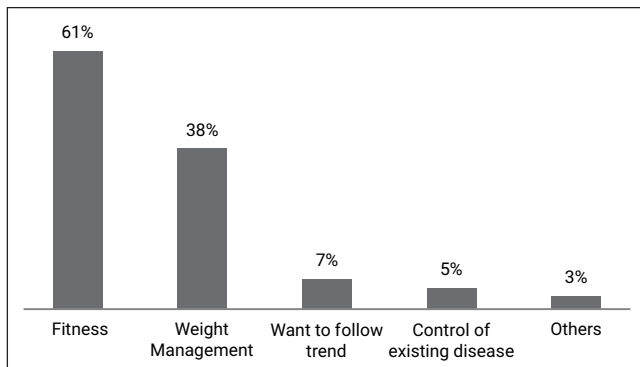


Figure 1: Reasons for the usage of apps/gadgets

Majority of the study population (61%) used the apps/gadgets for improvement in general fitness followed by weight management (Figure 1).

The main function of the app/gadget which the users looks for, includes: physical activity monitoring (62%), weight management (44%), calorie monitoring (32%), heart rate monitoring (25%), sleep monitoring (9%) and others (3%).

Barriers for usage:

46% responded that there were no barriers associated with usage of the apps. Others identified excessive pop-ups, technical issues, stress caused by reminders as barriers to usage.

Self monitoring (33%), easy accessibility (23%), prompt goal setting (16%), providing information or feedback (14%), cost-effectiveness (12%) etc. were the user friendly features of the fitness apps/gadgets which the users looked for in the apps/gadgets

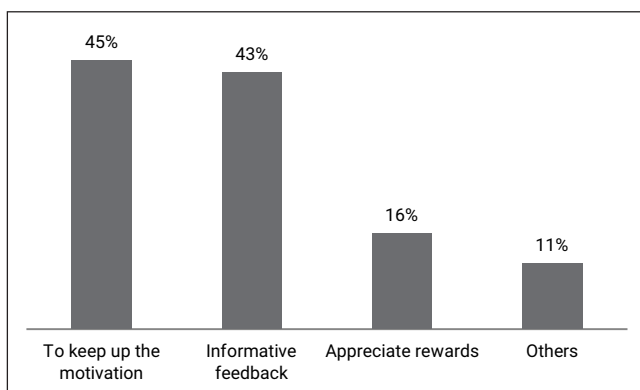


Figure 2: Reasons for adherence to the app/gadgets

Majority of the study population adhered to the apps/gadgets in order to keep up the motivation (45%), followed by informative feedback (43%) (Fig.2).

41% of the participants responded that they had discontinued using the app at some point of time. The reasons being; lack of desired features (32.5%), battery drainage (25%), achieved the desire goals (22.5%), mistrust on apps/gadgets (7.5%) and others (8%).

Table 2: Physical outcomes

Body Mass Index		
Category	Percentage	
	Before	After
< 18.5	10.9	7.8
18.5-22.9	35.9	54.7
23-24.9	20.3	10.9
>25	32.8	26.6

A positive change in the BMI was seen after using the fitness apps/gadgets (Table 2).

Table 3: Perceived effectiveness after the usage of the apps/gadgets.

Variables	Increased (%)	Same (%)	Decreased (%)
Fast food consumption	9	38	53
Fruits and vegetable consumption	54	42	4
Regularity of meals	21	65	14
Consumption of bottled beverages	10	42	48
Sugar and fat intake	4	43	53
Alcohol consumption (n=9)	2	35.1	62.9
Smoking (n= 3)	7.7	30.8	61.5
Time spent on physical activity	65	33	2
Regularity of physical activity	58	38	4
Intensity of physical activity	47	50	3
Enrolling for group programmes	27	66	7
Time spent on leisure activity	19	69	12
Sleep quality	55	39	6
Stress level	6	41	53
Attitude towards life	62	37	1
Enjoying daily work	56	39	5
Improvement in concentration and retention	48	49	3

Table 3 describes the perceived effectiveness after the usage of the apps/gadgets. Using diet and physical activity apps influenced sleep quality, stress level,

attitude towards life, self-education about nutrition and social lives of users.

App usage facilitated healthy eating, increased regularity and intensity of physical activity and exercise, as well as maintenance of healthy behaviour. There was decrease in consumption of fast food (53%), bottled beverages (48%), sugar and fat (53%), alcohol (62.9%), smoking (61.5%). There was increased consumption of fruits and vegetable (54%), time spent on physical activity (65%), regularity of physical activity (58%), intensity of physical activity (47%), improved sleep quality (55%) and positive attitude towards life (62%).

Association between types of digital devices used and lifestyle changes

Time spent on physical activity was found to be the same for people using fitness apps. Regularity and intensity of physical activity has decreased for users of both apps and bands. Time spent on leisure activity has decreased in users of fitness app, the stress level remained same for users of fitness app however it increased in users of fitness band. Sleep quality has increased in users of both fitness app and band. None of the above associations was found to be statistically significant. Enrolling in a group programme has increased in users of both fitness app and band however it remains same for users of fitness app alone and it was found to be statistically significant.

Discussion

The study was carried out in Hubli city to assess the adherence to, and perceived effectiveness of fitness apps/gadgets among the users.

In our study, 73% were males and 27% were females whereas in a similar study conducted by Elizabeth L.Murnane et.al, 56% were males and 44% were females^[23].

In our study source of information about the apps/gadgets was mainly through offline advertisement (99%), followed by online advertisement (44%), family/friends (42%), and app store (24%). In a study conducted by Elizabeth L.Murnane et.al, the source of information was mostly through family/friends^[23].

The reason for usage was mainly to improve the general fitness (61%) and weight management (38%), similar to findings in the study conducted by Elizabeth L.Murnane et.al^[23].

We found that the main function of the devices used was physical activity monitoring (62%), weight management (44%), calorie management (37%), heart rate monitoring (25%), and sleep monitoring (9%). The ways in which fitness app/gadget helped

to achieve goal was self monitoring in 55%, easy accessibility in 38%, prompt goal setting in 27%, providing information in 24%, cost effectiveness in 20% and providing instructions/feedback in 4%. The other studies did not look at these variables.

Reason for adherence in our study was to keep up the motivation (45%), informative feedback (43%), rewards points (16%) and others (11%). In the study conducted by Elizabeth L.Murnane et.al, the reason was identified as help in boosting energy in 49.1%^[23].

The reason for discontinuation was lack of desired features in 32.5%, battery drainage in 25%, achieved desired goal and therefore no longer needing the app in 22.5%, no faith in the app in 7.5%, and others 8%. In Elizabeth L.Murnane et.al study, the reason for discontinuation was battery drainage in 13.4%, mistrust of app developers in 6.1%, lack of desired features in 25.5% and no longer needing app for 10.3%^[23].

In our study it was found that there was decrease in fast food consumption in 53%, increased fruits and vegetables consumption in 54%, decreased consumption of bottled beverages in 48%, decreased sugar and fat intake in 53%, increased time spent on physical activity in 65%, increased in the intensity of physical activity in 47% after using the app/gadget. Whereas in the study conducted by Qing Wang et.al, there was decreased in the fast food consumption in 62.9%, increased fruits and vegetables consumption in 71.5%, decreased consumption of bottled beverages 57%, decreased in the fat intake in 48.9%, increased time spent on physical activity in 72.4% and increased in the intensity of exercise in 67.2% after using the app/gadget^[24].

Conclusion

Our study shows that the use of fitness apps/gadgets had a beneficial role in achieving physical fitness. Majority of the study population felt that using the fitness apps/gadgets had a positive influence in their lives in the form of increase in the time spent on physical activity, regularity and intensity of physical activity, better sleep quality, decreased stress levels, positive attitude towards life and awareness of nutrition. Drainage of phone battery and lack of desired features in the fitness apps/gadgets were the main reasons for discontinuing the usage.

Limitations

The study had the following limitations.

1. A self-reported, non-validated questionnaire was used; therefore, all the information collected might not be accurate especially in case of open-ended questions.

2. Causality between app use and the outcome variables cannot be determined. Randomized controlled studies need to be performed to determine a causal relationship.
3. Several types of apps/gadgets were included as there were no validated instruments available. Apps differ in their features and may differ in their effectiveness as well. Therefore, the possibility that the relationships found might be different for each app has to be kept in mind, because the way apps present information and provide feedback differs.
4. This study did not exclude those individuals that were already active and motivated before using the apps and did not exclude those with comorbidities such as diabetics and hypertension.

Recommendations

The fitness apps/gadgets seem to play an important role in achieving and maintaining physical fitness, so its use is advisable. Development of standardized apps supported by scientific evidence by any national institutions or from the health ministry is highly recommended. Future apps could be tailored to meet personal needs and future studies could use app tracking data to measure actual food consumption and physical activity changes rather than perceived changes through self-reports. Further research is needed to determine a causal relationship between app use and physical and health related outcomes and also to determine which features would need to be included in such an app.

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