The Effectiveness of Wearable Devices on the Users’ Health: The Case of Saudi Arabia

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Abstract - Individuals’ health and well-being can be greatly improved by using wearable devices. However, despite the rising popularity of wearable devices, we have a limited understanding of how these devices influence the users’ health and fitness. To fill this gap, a qualitative investigation was carried out to investigate the effectiveness of smartwatches and fitness trackers. The data was collected through focus group interviews and were examined using thematic analysis. 12 female participants from Saudi Arabia who use smartwatches took part in this study. Overall, the study showed that there is a positive impact on the users’ health and motivation. The self-monitoring and reminders were the main features in the participants’ minds when buying a smartwatch. For some participants tracking their health was not the main purpose of buying a smartwatch. But eventually, they got attached to it. This study may be taken further by targeting a larger sample with both genders.

Keywords - wearable devices, smartwatch, fitness trackers, users’ health and fitness, persuasive technology.

1. Introduction

In recent years, individuals who put wearable devices on their bodies for health monitoring, and activity tracking as well as offering them guidelines via syncing smartphone applications are increasing. Wearable devices, often known as wearable technologies, are smart electronic devices that come in different forms such as a smartwatch, wristband, clothes, rings, glasses and etc. Wearables are more convenient for users than a smartphone for example because of their lightweight, accessibility, and control [1]. Wearables may provide various benefits to users; they can provide an easy method to track, save, and share real-time information. In addition, they give users feedback which allows them to make appropriate changes to their daily routines and behaviour which leads to enhanced healthcare delivery [2].

Researchers are becoming increasingly interested in wearable device studies. To the best of our knowledge, there is limited research in Saudi Arabia on the usage of healthy wearables which focused on a specific device like a smartwatch. The smartwatch and fitness trackers have been selected as a subject for this study because of the rise in their popularity in recent years compared to other devices in Saudi Arabia. The smartwatch is a wearable device that effectively integrates smartphone features with real-time data monitoring uses for instance step tracking, heart rate tracking, calories burning, and other physical activities to improve users’ health.

The objective of this study is to explore the effectiveness of smartwatches and fitness trackers on the users’ health in the Kingdom of Saudi Arabia through using focus group interviews. This study is intended to help to have a better understanding of the role that wearables play in users’ behaviour and health.

The paper is structured as follows. The next section is a review of the study’s literature. Then, the methodology and data analysis will be described. After that, we will discuss the finding of the research. The last two sections present the implication and limitations of the research as well as the conclusion will be provided.
2. Literature Review

Nowadays, wearable devices have gained popularity. The term wearable technology has been identified as the technological devices that the user wears on his/her body [3]. Example of these wearables is smartwatches, smart glasses, and etc. They can be used for physical activity and fitness, diet and weight loss, sleep monitoring, medication reminder, etc. Wearables are distinguished by the fact that they are comprised of both physical and digital artefacts. From the physical domain, sensors are attached to objects (e.g., glasses, wristbands) that are worn on the body rather than carried around, allowing the monitoring of physiological functions such as heart rate, sleep, and water hydration. In the digital domain, the sensor collects the data and analyse it through data analytics and machine learning application then present the obtained information to the user either through their wearable devices directly or through supporting software applications on smartphones or PCs [4]. Several studies have been conducted about the role of wearable devices on the users’ health, adoption (e.g.,[5],[6]), and use of persuasive health technologies (e.g., [7], [8]).

In [4], the authors draw our attention to how wearables can change users’ behaviour. Wearable devices include built-in behavioural change strategies that try to activate and promote desirable behaviour. Goal setting, reminders, rewards, and social support are some of the most prevalent strategies. According to them, behavioural changes outcomes can take a variety of forms. For instance, the wearable could be used to assist users to create new behavioural habits such as monitoring regular walks. Users could use nutrition tracking to change current unwanted behaviour, like unhealthy eating habits. Furthermore, the wearable can support current behaviour by giving workout histories and data statistics, along with making regular exercise more desirable.

Our study is focused on smartwatches and fitness tracker which is the most popular forms of wearable devices compared to others, as well as its effect on the users’ physical health. There is a different brand of these devices in the market, for example, Apple Watch, Fitbit, Huawei, Xiaomi, etc. Smartwatch is a wearable technology that integrates smartphone features with continuous data monitoring functions for example physical activity monitoring, step-counting, and heart rate tracking which can aid in health improvement [9], [10]. There have been numerous studies to investigate the effectiveness of wearables on physical activity. For instance, in a study by [11], users are motivated to do more exercise because smartwatches provide continuous data to reflect users’ fitness conditions. So, modifying a sedentary lifestyle by using health and fitness smartwatches as a motivator to increase daily activity can provide health benefits [12]. A research study that has been conducted in Malaysia by [13] which evaluated the factors that influence the users’ intention to use smartwatches for personal fitness and health monitoring reasons showed that there is a positive impact on behavioural intentions to use smartwatches for health and fitness monitoring. In addition, [2] point out that only young, healthier, and technologically aware adults are more likely to use wearable devices to indicate their fitness intentions to friends and enjoy the gamification features such as rewards, points, recognition of achievements, and awards together with other factors. In another study, [1] argued that social influence (e.g., family member); personal influence (e.g., lifestyle, health), personality (e.g., fashion, health condition), age and economic status, and product attributes were the main factors that influence users’ intention to buy a smartwatch. Furthermore, one study by [14] showed that the factors that influence adoption and sustained users are different. For example, adoption users started to use a smartwatch to achieve a specific goal (e.g., preparing for a marathon or losing weight, and etc.), design and price, and social influence. Whereas the sustained users who had been using their device for at least two years are interested in the device features, for example, produce continuously useful and accurate data as well as if the device can easily synchronize with other devices and applications, plus the significance of having fun while using the wearable device such as encouraging messages, new features, games, badges, and group competitions.

2.1. Persuasive Technology

Researchers are interested in how innovative technology such as smartwatches may be used for persuasion and how existing approaches might be improved [15]. Persuasion is defined by [16] as a technique for influencing people's attitudes and behaviours, without using force. There is some evidence indicating that a persuasive design can change users’ behaviour towards fitness and physical activities. For instance, [17] highlight in their study how player modelling and gamification have a positive impact on user engagement, motivation, and physical activity in the long term. One study that has been conducted in China by [10], investigate the impact of fitness trackers and their persuasive design on users’ workout behaviour. The result showed that the persuasive design of the wearables has a positive effect on the users’ physical activity intentions. Both dialogue support (e.g., Prize and rewards, etc.) and social support strategies (e.g., recognition and competition, etc.) were found to be effective in enhancing users’ intention toward workout activities.
The impact of social support strategies on behaviour change was stronger than dialogue support strategies. However, in another study by the same authors [18], they claimed that persuasive design has a different impact on people. They found that some participants did not exercise even after wearing a smart band (fitness tracker). On the other hand, half of the participants began exercising or they are motivated to do more.

Wearable devices have been linked to increased physical activity in some age groups, while their usefulness and effectiveness in others have been limited. As claimed in [9], wearable fitness trackers are incapable of long-term motivating people to participate in physical activity. She suggests combining the use of a tracker with “motivation generators”. The main goal of these generators is for users to discover their primary goal or motive for being physically active. Plus, they should discover the mode of physical activity that feels best to them, which can be challenging because many wearables are unable to track physical activity properly, such as bicycling.

Some studies explore the user in Saudi Arabia, especially user adoption. A recent study [6] concluded that wearable design is an essential factor for younger users compared to older users. In addition, graphical user interfaces (GUI), health information support (HIS), weight management, and sleep improvement are important too. Moreover, having a user-friendly application and fashionable design will increase the users’ adoption. However, our knowledge of wearables’ effectiveness on the users’ health - particularly in Saudi Arabia is largely based on very limited data. The research aims to evaluate the wearable devices (smartwatches and fitness trackers) effectiveness on the users’ overall health.

3. Methodology

3.1. Research Design

Since the objective of this research was to investigate how wearable devices affect users’ health, a qualitative approach was applied. Qualitative approaches are appropriate when more in-depth knowledge is required [19]. Interviews are the most popular form of data collection in qualitative research [20]. Therefore, a semi-structured interview is used for this research. Participants were asked to participate in focus group discussions (45 minutes). Focus groups are a very useful technique because they allow the researcher to uncover elements that impact the participants’ ideas, behaviours, and motives [21]. Moreover, group interaction and individual contributions provide valuable qualitative information and allow for an in-depth understanding of user experience, patterns, and views [22]. The participants’ number can vary depending on the research topic and purpose. [22] suggest that the sufficient number of participants in each group is six to eight participants. So, this study included two focus groups with six-participant in each one.

Based on previous literature, the questions were developed. The guide was mostly followed during the focus group sessions. However, considering the discussions and the responses provided by the participants, the order had to be adjusted in a few cases.

3.2. Data Collection

As mentioned before, the data have been collected through focus group sessions. They were conducted using a pre-defined list of open-ended questions. If further information is needed, the moderator might ask follow-up questions. But due to the COVID-19 restriction and geographical location of the participants, a face-to-face interview was not possible. Instead, the Zoom application was the main platform for the focus group sessions.

The focus group sessions were conducted between March to April 2022. To guarantee correct transcription of these sessions, the interviews were audio-recorded. At the start, the participants were asked for their final agreement, and each had been informed about the research previously. For the reason that the sessions were processed by native Arabic speakers, transcriptions were conducted in Arabic and then translated into English.

In total, 12 female participants aged 17 to 33 years old who use or have used wearable devices in Saudi Arabia were interviewed (See Table 1). The target group is mostly from Eastern Region and Riyadh city. The participants were chosen from the researcher’s social networks that are willing to take part in the study. Following that, snowball sampling occurred, with individuals inviting their friends to join. Participation in this research project was entirely voluntary, and all participants were assured of their confidentiality. Additionally, an informed consent form outlining the study’s objective was given to each participant. The form contains the study objective, procedure, and duration, and it explains that their privacy and anonymity were guaranteed. All participants received the informed consent form in both English and Arabic language.
### Table 1. Participants Overview

<table>
<thead>
<tr>
<th>Group</th>
<th>Participant</th>
<th>Devices Used</th>
<th>Duration</th>
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<tr>
<td>1</td>
<td>28</td>
<td>Samsung</td>
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<td>2</td>
<td>28</td>
<td>Huawei</td>
<td>3Y</td>
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<td>3</td>
<td>30</td>
<td>Apple</td>
<td>3Y &amp; 6M</td>
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<td>29</td>
<td>Apple</td>
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<td>5</td>
<td>33</td>
<td>Xiaomi</td>
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<td>22</td>
<td>Apple</td>
<td>1Y &amp; 10M</td>
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<td>14Y</td>
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<tr>
<td>6</td>
<td>17</td>
<td>Apple</td>
<td>3M</td>
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### 3.3. Data Analysis

Following the completion of the focus groups, the next step was to transcribe them for subsequent study. The thematic analysis appears to be the best approach for this research. Because of its flexibility in allowing themes to be analysed in qualitative data, thematic analysis was used to analyse the transcribed focus group sessions [23].

Thematic analysis has several steps that have been followed in this research. In the first step, the researcher went through the transcript to identify codes. Second, these codes are grouped into categories according to their familiarity. Third, the categories were analysed to identify themes as well as subthemes that have been generated at this point. Finally, the collected data and themes were analysed, and the result has been reached. MS-Word has been used throughout these steps.

### 4. Results

The main findings of our study are presented in this section. Our findings show that wearable devices can improve the users’ health and fitness experience. As seen by these quotes, all participants were pleased and satisfied with their wearable devices as a whole and planned to continue using these wearables.

“I am very satisfied with my current watch” (FG1-P2).

“I am satisfied with the services provided by the watch” (FG2-P4).

We begin by presenting how people use and perceive their devices. Following that, we look at some of the particular ways that these devices affect users’ health and fitness. We examine how participants get motivation from these devices. We are particularly interested in how wearable devices affect individuals’ involvement with their smartwatches and fitness trackers.

#### 4.1. Smartwatch Definition

During the interviews, participants were asked about what the role or concept of a smartwatch to them is to understand their idea about such devices. Their responses were as follows:

“The role of the smartwatch is very high in monitoring my health, as it urges me to change some bad habits … I think the watch is useful in terms of setting daily and weekly goals for movement and burning, which helps in improving fitness and thus affecting health” (FG2-P5).

“For me, yes, my idea of it changed. Before I bought it, my idea was that it is just an extra accessory and won’t help me with anything. But after using it for more than two years, no, frankly, it became a necessity for me in my life, and it became one of my needs that I make sure to use daily and so on” (FG1-P1).

As we can see that the participant viewed the smartwatch as a health monitoring device. However, other participants bought it for unhealthy reasons such as notification and calls while others after an influence from a family member as in:

“I bought it because of the notifications and calls so that I could answer and see the WhatsApp notifications … But there was a feature that attracted me to buy it as well, which is GPS…The idea was tempting to me” (FG2-P2).

“In my case, my older sister had a smartwatch, so I bought my watch to compete with her” (FG2-P6).

#### 4.2. Adoption

Most of the participants started using a smartwatch or fitness tracker to achieve specific goals in their minds such as losing weight or moving more. Others had bought a wearable device because they were interested in this technology in general and wanted to try it out or the smartwatch price was suitable for them, like in these cases:

“I bought it because it was digital. Ordinary watches run out of battery quickly. The initial reasons were unhealthy, I love it and the price suited me” (FG2-P4).

“In my case, I had zero interest in the smartwatch topic. I was going to buy a new phone, but the cashier said that the watch was on discount if you want to buy it. The offer was so tempting so I bought it to try it out” (FG1-P1).

Participants placed a high value on some features that indicate a certain purpose such as the ability to count steps, containing a heart rate monitoring, calorie-burning rate, sleep tracking, or standing notification, as seen in the following quotes:
“To be honest, the finest feature was the sleep tracking, which was quite useful to me ... As a person, who suffers from insomnia and sometimes I do not sleep well, so the watch helped me with this” (FG1-P1).

“My favourite feature is step counting and standing notification” (FG1-P6).

“The heart rate feature is the one I use the most since it notifies me of my situation quickly” (FG2-P4).

“I check my heart rate and calories burned” (FG2-P1).

The majority of the participants had fully incorporated the smartwatches into their daily routines and activities, wearing them all day or putting them in the morning and taking them off right before sleeping. They stated their strong attachments to them as follows:

“I always wear it and rarely take it off” (FG1-P2).

“I use it all day. Except for bedtime I take it off. Previously with Fitbit, I slept with it in my hand, but with Apple Watch sleeping in it is frustrating because of its size” (FG1-P3).

“From the moment I wake up until the time I go to bed the smartwatch with me in my hand, I only take it off when I go to sleep” (FG2-P1).

“I wear it daily and sometimes at bedtime” (FG2-P6).

While other participant did not always wear their smartwatch, but only while doing any physical activities, as follow:

“I use it occasionally, I switch between it and my other watches...If I knew I was going to do some physical activity, I would wear it. Or if I'm going out for a long time” (FG2-3).

Some participants mentioned that they will feel lost or sorrowful if they forget to wear or charge their smartwatch. Thus, they cannot see their progress like calories burning and the different types of tracking, as it is illustrated in these quotes:

“I don't feel comfortable” (FG2-P5).

“For me, there were several months when the watch was broken, and this issue was bothering me. I could not stand it and wanted to see my progress and track it quickly. I missed the watch during that time” (FG1-P3).

“Honestly, my watch is broken, so I don't have one now. The idea that the watch had always been in my hand for two years at the time of workout and now it's not was difficult and I struggled at first. But later I got used to it” (FG2-P1).

“Saying I cannot live without it is an exaggeration, but I can’t take it off for a long time ... Now I'm so used to it that I can't imagine myself if I didn't wear it” (FG1-P1).

On the other hand, some participants said that there is no problem if they do not wear it for a certain period, as shown in the following quotes:

“I think it is possible and I will not suffer if I do not have the watch” (FG2-P2).

“I feel that it is possible to go days and weeks without wearing a watch” (FG2-P3).

4.3. Awareness

In the framework of the data, insight and measurement supplied by the device, the focus group participants established a high level of awareness of the value of their efforts as well as the value of a smartwatch and fitness trackers. Participants showed a deep understanding of themselves, regarding the progress they may be achieved in different activities, their movement, sleep, and water hydration:

“After using it for a while, I became aware of myself, for example, how much distance I run in 10 minutes and so on, so I knew that in 10 minutes I could run 2 kilometres” (FG2-P1).

“The smartwatch made me know a lot about my daily performance and activity” (FG2-P3).

“The amount of awareness that the watch provides you with is very, very large, you will know and understand yourself from the number of steps, heart rate, energy level, your fitness level. Just this information that you have, in itself is enough, for you to understand what your situation is. Having this information, I feel that it is very important, that your sport is not pointless, and your activity is not thoughtful” (FG2-P4).

“After using a smartwatch, I became aware that when I am at work, this is the number of my steps, and when I am not wearing it, I can count my steps in another way, for example, in ten minutes, I will walk this number of steps ... When my lifestyle changed and I walked a lot, I don’t care to wear it. I was able to estimate the number of steps because the watch gave me an idea of how many steps I’ve got” (FG1-P6).

“I started to know myself that in these working days this is the average of my steps, or this is the average calories that I burn. And while doing exercises, I came to know that this is my burn rate. So, I have this much information about myself ... Without relying on the watch, I have the knowledge about myself” (FG1-P3).

Moreover, participants mentioned how the devices had an instant impact on their behaviours, such as noticing a low step count and then using the stair rather than the elevator or if their heart rate increased, they try to relax. Another impact is in fixing their sleeping behaviour. The motivation and encouragement most participants felt from the smartwatch feedback were noticeable, as seen in this case:
“Sometimes it affects my decisions, for example, to take the stairs instead of the lift to collect more steps” (FG2-P6).

“The main benefit from it was while sleeping. Indeed, my use of it has improved my sleep quality. My sleep is being analysed, when do I wake up, when do I sleep, how many hours do I sleep, and for how many minutes my sleep is deep or light. After getting to know my sleeping routine, I became aware that I must prepare myself one hour or two before I sleep, I don’t sleep with my smartphone in my hand, for example, and avoid any stimulation before going to bed” (FG1-P1).

The smartwatch has motivated or helped participants in making long-term changes or noticing improvements in their health, as exemplified by these quotes:

“The smartwatch helped me move more and get fit” (FG1-P2).

“After using the watch, I became aware and focused that I must walk a certain number of steps” (FG2-P2).

“After using the smartwatch, I became more active, at least at the normal level” (FG2-P5).

In addition, some participants mentioned that they would have loved to get a smartwatch when they were younger. They believed that a person could buy a smartwatch at a younger age especially if that person is aware of himself, his/her health, and the value of a smartwatch, as follows:

“I feel that age doesn’t matter. Anyone who likes the smartwatch or one of its features, and understands how it works, can buy it. I don’t feel that age will limit a person for me” (FG2-P1).

“Whoever has the awareness of the importance of tracking and walking, if a person has this thinking or he is tracking his steps in any way, the watch will be a great help” (FG2-P4).

“I don’t feel that age matters. Anyone of any age can use it” (FG2-P3).

4.4. Persuasive Features

Some of the features the participants seek from wearables are self-monitoring and tracking, along with reminders or notifications. These two features were reported as one of the main purposes for using a smartwatch to motivate them more.

There are specific rewards and goals provided in the participants’ smartwatches to be achieved which is one of the persuasive features that can encourage users’ performance. Besides putting their own goals, the Apple Watch, for example, has a system of accomplishment badges, like one for International Women’s Day or one for completing 30 minutes of workouts in a single day which will enhance the users’ health and fitness. As stated by this participant:

“Every month there are certain goals and if you achieve them, you will get a reward. It really motivates me. Even when there are certain occasions like Women’s Day, there will be certain rewards you will get when you complete the day's exercises, it motivates me more” (FG2-P1).

4.4.1. Motivation

The participants reported that the smartwatch has a positive impact on motivating them to be more active. One of the main reasons for using and buying a smartwatch is to track their health and activities or remind and motivate them to move. Such as in this case:

“My main goal was to lose weight and motivate me to move” (FG1-P6).

The motivational advantage the smartwatch provide was a huge influence on the participant’s behaviour. On one hand, the reminding feature motivates them to move, practice and walk, and etc. Also, it helps them to reach their goal and receive rewards. As explained in these quotes:

“It reminds me of to move and control myself” (FG2-P3).

“It reminds me to stand up and move around when I've been sitting for a long time ... Sometimes while exercising I set a timer for each exercise, so if the time for exercise came and I did not exercise, I receive a notification that now is the time, and I haven’t exercised yet. The watch really helped me” (FG2-P1).

“Because most of the time I am sitting and not moving, I get (get up and move) notification” (FG1-P2).

“The watch stimulates and motivates you to move and counts the steps” (FG1-P6).

Furthermore, the participants mentioned that the smartwatch helps them to reach their goals as well as setting goals for themselves even after using it. Goals may either act as a guideline for people to evaluate their effort or as a target level of exercise. Some of them put a daily goal like walking, burning, and exercising, for example, in this case:

“I think the watch is useful in terms of setting daily and weekly goals for movement and burning” (FG2-P5).

“My goal was for sport/activities and step tracking” (FG1-P3).

“The watch is very useful because it motivates me and makes me set for myself many goals” (FG2-P2).
However, if they failed to achieve goals, they would feel guilty and remorse which may affect them emotionally. Whether because they forget to wear their smartwatch or if it is broken and does not work anymore or because they did not exercise enough that day, as expressed by these participants:

“I felt sorrow when I didn't walk enough steps at the end of the week because I was sick one day” (FG2-P6).

“Frankly, if I go out without my watch, I feel sorrow because it did not track my steps, and I feel that something is wrong” (FG2-P4).

“Sometimes the watch makes me feel guilty when I don't move enough” (FG2-P3).

“Sometimes I don’t feel the desire to exercise. After exercising, I did not burn the usual number of calories, which affects me internally and makes me sad” (FG2-P1).

In contrast, the majority of the participants did not set goals for themselves, or they still did not reach them, as it is seen in the following quotes:

“It is true that it helped me move and so on, but it didn't help me reach my goal” (FG1-P6).

“No, I didn’t set any specific goals for myself, only the daily exercise was the lifestyle that I want for myself” (FG1-P3).

“In my case, I didn’t set any goals for myself” (FG1-P1).

“To be honest, I haven't closed the target yet ... because I set a big one, so as much as I can reach more than the half of that goal” (FG2-P4).

“I'm not one of those people who set goals for themself, but with the watch, I become more focused every single day” (FG2-P3).

4.5. Social Sharing Feature

The smartwatch offers a feature that allows participants to share their workouts progress and data with others. For some participants, such a fun and enjoyable experience were made through a group of users surrounding the application or device; for example, they enjoyed competing against a family member or a friend. Participants also enjoyed sharing their accomplishments and motivating one another:

“I can participate with a group of other people and compare the results among us, such as who has the highest score. It has a kind of competition and motivation as a group challenging each other ... It is kind of challenging and gives an atmosphere of fun when we discuss who’s is higher than the other” (FG1-P3).

“My older sister had a smartwatch, so I bought my watch to compete with her in who has a higher number of steps” (FG2-P6).

“You can compete with other people and through them, you can get more rewards” (FG2-P2).

“The competition feature with your friend was very wonderful and motivated … I feel it is fun that my friend and I compete and find out who gets the reward” (FG2-P1).

“Competition and rewards are very motivating” (FG2-P5).

Though those who prefer to exercise alone are not interested in interacting with others, one participant showed concern regarding competing with others that it can be a “stressful experience”:

“I think the feeling of competition is irritating, it's more stressful than comfortable. It gives you more tension than it gives you a sense of accomplishment, so it becomes an atmosphere of pressure over competition and that's not what I'm interested in. I prefer to aim for the goal I set myself and finish it whenever possible” (FG2-P4).

“It is not important for me. Just having the watch to track my steps is enough for me to be motivated personally without sharing it with someone else” (FG1-P5).

“I don't care about the competition in these matters. I just focus on my performance” (FG2-P1).

4.6. Synchronization Feature

We asked participants if the compatibility between smartwatch and smartphone applications is important or not. A lot of participants mentioned that it is one of the features that they check before buying a smartwatch for various reasons. One participant said that the insight of the app can improve and enhance their performance. Moreover, others explain how important this feature is to them to compare their performance day by day.

“It is important. Because I want to compare, especially because my life routine directly affects my performance quality ... This feature is very important to me to know what are the things that affected my performance and the things that could motivate me more. I care to sync the watch with my smartphone” (FG1-P2).

“I am interested in syncing the watch with my smartphone so that I can compare the days, and I feel that I can access more details and insight as well. I feel that it is important to sync it with the smartphone” (FG1-P3).

In terms of smartphone applications, all participants agree that they cannot rely on them only to track their health and fitness. Due to a lack of providing accurate data, smartphones’ heaviness etc. So, it cannot replace a smartwatch:
“Those applications do not provide you with sufficient or good information based on your effort such as a smartwatch” (FG1-P1).

“I check the watch more than once a day, but the apps may go a week without checking it” (FG2-P4).

“The steps are not always as accurate as of the watch, so it does not motivate me to interact with it” (FG1-P3).

5. Discussion

The participants in this study chose to use wearables voluntarily rather than using them for chronic conditions, health issues or forced because of this study. We explore different aspects and features related to smartwatches and fitness trackers that may affect the users’ health.

Our findings imply that smartwatches affect the participants’ health and fitness positively. In addition, the participants themselves are aware of the value of smartwatches on their health and well-being in terms of achieving goals, fitness enhancement, self-monitoring, and tracking. What is more, the result indicates that participants continue to value and be motivated by smartwatches even after months or years of use, consistent with previous research [24].

The result found that the usability of the smartwatch can impact the participant. When purchasing a smartwatch, every participant has their particular usage of the wearable in mind, such as considering some features more important to them compared to others e.g., step tracking and calories-burned rate and etc., which supports the result of [1].

When participants have a particular goal in their mind such as health improvement goals, exercise goals and etc., they are more likely to use or buy a smartwatch or fitness tracker. Based on the age of our sample (17-33) and their opinion on this matter, some participants would like to use a smartwatch or fitness tracker at a younger age if they had the chance which is in accordance with the result of [1]. They believe that the age factor does not play a significant role that affecting the purchasing behaviour if the person itself has an awareness and understanding of the smartwatch’s role and value.

The compatibility between smartwatches and smartphone applications was a key factor in using these devices instead of only relying on the application as found in the research of [25]. We discover that the analysis of the users’ data can be a motivation to move more and comparing day to day activity. The information they get from the application can also aware the user of themselves. Despite that, the users prefer to use their smartwatch instead of relying on the application only because of various reasons such as inaccurate or enough information, smartphone heaviness, inexact calculation and so on.

The result of our study is in line with the finding of [10] as well as [26] that confirms that persuasive technology can affect participant behaviour. It can motivate, encourage, and even change bad habits or behaviours such as using the stairs. Another factor that can motivate the participants to move more is the reminding feature, which can send notifications to users to remind them or motivate them to (get up and move). Self-monitoring was one of the features the participants are interested in and was one of the main reasons for buying and using a smartwatch as well. Furthermore, the reward and badges system can be a funny and challenging method that motivate users who like to take challenges and compete with other to win today’s reward and encourage them to walk more to complete their goals and receive these rewards.

Another aspect that we discover is that the participants have varied opinions on the social sharing feature especially competition with other users. Some of the participants do not prefer to share their progress with others and refer to it as a “stressful experience”, they only focus on themselves. Whereas others explained it as a “fun experience” they enjoy every day. This current result is similar to the finding of [18] regarding the influence of persuasive technology in motivating users.

The willingness to obtain and use a smartwatch shows that some participants were already motivated to improve their habits and lifestyle. Anyhow, we can say that these wearable devices and their related feature and usefulness were able to affect and motivate greater awareness and activity generally.

6. Implication

Several findings from this study might be beneficial for future research. According to the outcomes, wearable devices can motivate and remind users to exercise and help them in tracking their performance, hence improving their health quality. This result can be useful for healthcare professionals or even family members who can track or check their patient status. Moreover, this study can be valuable to businesses that sell smartwatches and fitness trackers and etc., because it gives more detailed information. The information demonstrated not just the factors that influence the users, but also their motives for being influenced for example rewards and competition. Another implication is that the self-monitoring and reminder features were the main reasons for the participants e.g., step tracking and reminding them to do a specific workout. In the market domain, managers may make use of this
information to offer their product a more appealing image or advertise it in this manner. Furthermore, this study reveals that the participants could use a wearable device if it was known before or if they are aware of its benefits on them. This means that there is no need for companies and developers to limit their target groups to a certain age. This would result in a larger target group and the possibility of reaching more individuals for activities and exercise motivation.

7. Limitation and Future Research

This study’s finding contains some limitations that require further research. First, a more thorough literature study may have been conducted from a theoretical standpoint. However, papers on the effectiveness of wearables devices on the individual’s health in Saudi Arabia were difficult to come by. Furthermore, each study had a somewhat different focus, making it tough to choose the proper ones and give a greater perspective on research. The topic was also new, as smartwatches are a relatively new technology, which might explain the lack of studies in Saudi Arabia. For that reason, the effectiveness filled is the search gap in this master’s thesis, bringing something new to the table.

Second, there are several limitations to the sample we used in our study. The findings' generalizability is restricted due to the entire Saudi females as well as the small-sized sample. Therefore, future research should consider a larger sample with both genders. Additionally, the participants in this study were under the age of 35. Although younger individuals are the primary users of smartwatches and fitness trackers, further research should include elderly people who are less technologically skilled. Moreover, future research might investigate the healthcare providers if they plan to recommend smartwatches or fitness trackers to their patients.

8. Conclusion

Wearable devices are popular lately. It has been used for various reasons whether for healthy (e.g., step tracking, heart rate monitoring) or unhealthy reasons (e.g., notifications and Apple Pay). This study investigates the effectiveness of wearable devices on users’ health in Saudi Arabia. Our focus is on smartwatches and fitness trackers only. What features do they look at in a smartwatch? What is the role of wearables on the user’s health from the participants’ perspectives? There are also many other questions. We used a focus group method, each group with 6 female participants of different ages (17-33) in Saudi Arabia divided into two focus groups. 90% of the participants in this study have used their smartwatch for more than 1 year. Our finding reveals that smartwatches and fitness trackers have a positive impact on their health and well-being. Utilising a smartwatch has the ability to motivate and persuade individuals to move more and aim for a healthy lifestyle. Self-monitoring and reminders were the main reasons for purchasing a smartwatch according to the participants.

This study’s findings not only add to the literature on smartwatch effectiveness but also give significant information to understand the factors that might motivate individuals to use smartwatches for a healthy lifestyle.

References


