

Summer Training

at

Healthark Insights

Ahmedabad

From 10.05.2021 To 10.07.2021

A Report

By

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Roll no.- 1099

MBA Hospital and Health Management

2020-2022



Date: 13th July, 2021

Whom So Ever It May Concern

This is to certify that **Ms. Gitika Singh** worked with Healthark Insights Wellness Solutions LLP as an Intern Consultant from 10th May 2021 to 10th July 2021. During her internship, she conducted market assessment involving secondary research and basic excel modelling across Latin American, Russian and Saudi Arabian markets. She supported her seniors in preparing client deliverables in form of PowerPoint presentation and excel formats.

She has always shown responsible attitude towards the tasks assigned to her and completed them within time with utmost sincerity. She has been a good team player and was supportive to her other colleagues in the organization.

We wish her a bright future and success in her future endeavours.

Purav Gandhi

Sincerely,
Dr. Purav Gandhi
Founder & CEO
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Acknowledgement

The successful completion of this report was indeed a blessing from many people in my life. First and foremost, I thank the placement committee teachers & members of my institute IIHMR University, Jaipur, especially Mr. Anshul Goyal, for giving me the opportunity to train under a wonderful organization for my summer training. Without the due diligence of all the mentors and my friends in the placement committee, it would not have been possible to embark on this journey. And as I did embark on the new, exciting road, I met many others who made this nothing short of an enriching experience. I thank my college mentor Dr. Susmit Jain, for his instant support and response and his ever-caring demeanour that made it so easy to ask for help and guidance.

I thank my colleagues, seniors, and mentors at **HealthArk**. Working remotely, they tried their best to not only make this a great learning experience but that I do not miss out on the fun of a being part of an office team. I extend my heartiest gratitude to my mentor Ms. Bansi Dave for pushing me out of my comfort zones and challenging my limits. I thank her for making me learn even from the tiniest aspects of the job. With her guidance and encouraging words from the respected CEO Dr. Purav Gandhi, these challenging 2 months of training were converted into priceless learnings and lessons not just in consulting, but also in teamwork and the value of a great leadership for an organization's culture.

I thank my parents for providing me the necessary environment and resources. Without their constant love, support and care, this project could not have attained its present state. I thank my friends who were ever ready to hear me out and engage in discussions whenever I reached a block. Their constant support has undoubtedly helped me bring out the best in my work.

Gitika Singh

Roll no. 1099

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Acronyms & Abbreviations

GHD – Global Health Data

HbA1c – Haemoglobin A1c

HCV – Hepatitis C Virus

IDF - International Diabetes Foundation

MENA – Middle East and North Africa

T2D – Type 2 Diabetes

WHO – World Health Organization

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PART I

OBSERVATIONAL LEARNING

INTRODUCTION

Company Overview

Healthark Insights was established in 2016, by a team of consultants from top-tier strategy firms, with a cumulative experience of 100+ years. Over the last few years, Healthark has developed a team of experts from diverse fields such as consulting, pharma, medicine, medical devices, and digital health as well as public health and management with a common vision to cater to the healthcare and life sciences industry, along with a relentless focus on delivering executable solutions.

They help their customers make critical decisions every day through expertise that combines deep domain knowledge, rigorous research and analysis, understanding of markets, technology and experience. With their experience and expertise, they not only provide insights, but also work closely with their clients to execute the strategy that they have helped develop.

They offer services in strategy & research, digital health, modelling & forecasting, real world evidence, medical writing, artificial intelligence, business intelligence & reporting, claims analytics, KOL identification & mapping.

Objectives and Features of the Firm

- Healthark is a boutique consulting firm founded with an aim of solving most complex healthcare problems through deep domain expertise, scientific rigor and diverse skills applied in most suitable manner
- The core team consists of ex-Consultants from Deloitte and ZS, pharma industry professionals, as well as people with diverse backgrounds doctors, engineers, MBAs, PhDs, biostatisticians, researchers, etc
- They have served multiple healthcare clients globally including Johnson & Johnson, Roche, Abbott, Pfizer, Gilead Sciences, Novartis, Boehringer Ingelheim and Eli Lilly

- They aim to deliver quick turnarounds with agile approach and cost-efficient model ensuring value for clients
- They support clients with end-to-end capabilities, starting with business problem, to data to analysis to insights to prediction

Learnings

Healthark has various capabilities. Throughout my training period, I was assigned various tasks and was fortunate to assist on a few projects. I learned a lot about the nature of work at a Health Consultancy firm and the manner in which the team gets the task accomplished.

- During my first week, I completed a 4-week course upon Data Visualisation and Analysis using Ms Excel and PowerPoint. It made me understand the nuances of data analytics using the versatile Ms Excel, presentation skills and creating a visually appealing, useful, and informative presentation.
- During the second week, I was assigned work under a relatively new venture called “Insights 10” for the rest of the month, which is basically the market research hand for the firm. The task assigned to was to prepare market syndicate reports on the drug/disease/therapeutic/service markets for various diseases for the Middle Eastern country Egypt.

My learning from the tasks included a deeper understanding of how to create concise market syndicate reports. I learnt specifically a lot about the developing nation of Egypt, even presented my 10 insights about the healthcare market and its future in the country in a short presentation session. The reports creation process helped me improve my information searching and comprehending skills. Google search engine is a great tool for secondary research and with the right kind of key words and search engine filtering tools, the desired information can be attained.

- Next, I got an opportunity to work upon the sample deck of digital health market in Egypt. It was a great project where I was required to dig deeper to create a more detailed picture of the market in order for potential clients to find it useful and purchase the complete version of the same. I found myself reading and learning about the factors affecting the digital healthcare market in the country, some new and established start-

ups making a difference in the field and the overall scenario of the shift from traditional methods of healthcare provision.

I was also required to utilise my deck making skills in a more practical fashion, that is, fit in useful information in limited space on a slide.

- Throughout the journey I was given opportunities to also assist my mentor with some mainstream projects in the firm with small and significant tasks. I assisted in a certain project with rating scales for some upcoming firms and it was an exciting experience. Later, we also got an opportunity to review some of the upcoming names in the field of healthcare innovations and frame a concise overview of each organization. It was good to become aware of such names and breakthroughs in the arena.
- Next, I got the task of creating what is called a “Customer Map” of a leading health care firm for Boehringer Ingelheim, a client of Healthark. It was definitely a challenging task, and I thoroughly enjoyed the push it presented to my comprehension and research skills. It was definitely some good exposure in reading such vast information about the firm and compiling the updates of the previous quarter in a manner that they assist in deriving implications for the stakeholders. I learned a lot about the operations of a leading health care firm and got acquainted with some platforms to boost my knowledge about the industry. It was certainly an eye-opening project.
- Apart from the firm, I gained some experience of a rigorous office life and some insights about my own strengths and weaknesses as a potential employee of such firm. I understood the importance of utilising the allotted office working hours to the fullest and equally the importance of giving timely breaks and not penetrating work into the after-office hours. I felt the responsibility of being an employee at an organization and found myself getting motivated to get as much done as possible in the time assigned to me. I gained some important skills in building a positive work culture during interactive sessions with seniors and mentors and “huddle sessions” to get to know everyone a little better. I learned the art of professional mail writing and the importance of giving credit to each and every fellow colleague, no matter how big or small the task. Such appreciations and acknowledgment go a long way in building positive work relationships and increase the satisfaction and consequentially the productivity.

Limitations and Scope for Improvement

My time as a summer trainee at Healthark was full of new insights and experiences. My observations regarding certain shortcomings at the firm include the following:

- As a fresher to the rigorous work culture of a consulting firm, I felt a better start to equip and make aware the new joiners of the intense work environment were much required. It can be in the form of an informal orientation where the new people onboard can get some idea of what lies ahead and how to deal with the stress that comes with such a job.
- Some standardised feedback on the work done could help us understand the exact shortcomings and the work needed to be done to improve upon them.
- To be aware of the complete functioning of a consulting firm, the organization could have engaged in more training sessions regarding some of the technicalities such as comprehension of large PDFs, some analytical methods and describing the project life cycle at the firm.

PART II
PROJECT REPORT

**Understanding the Role of Digital and Mobile Health Technology in the Management of
Diabetes Mellitus: A Systematic Review for Egypt**

Section - 1

Introduction

The Arab Republic of Egypt is an ancient country dating to the time of the pharaohs, linking northeast Africa with the Middle East. It is a developing nation with a rapidly rising population of about 100 million, making it the most populated country in the middle east. Like most other developing nations, the country was facing dual burden of diseases. Now, noncommunicable diseases (NCDs), including cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases, are currently the leading national cause of death in Egypt.

The International Diabetes Federation (IDF) has identified Egypt as the ninth leading country in the world for the number of patients with T2D. The prevalence of T2D in Egypt was almost tripled over the last 2 decades. This sharp rise could be attributed to either an increased pattern of the traditional risk factors for T2D such as obesity and physical inactivity and change in eating pattern or other risk factors unique to Egypt such as increased exposure to environmental risk factors like pesticides and increased prevalence of chronic hepatitis C (Hegazi et al., 2015).

With the current COVID-19 pandemic having brought out the importance, countries and health systems are now increasingly resorting towards digital health interventions such as telemedicine, mobile based healthcare technology such as SMS services or mobile applications, online medicine ordering platforms and so on. Health is now being understood beyond the premises of a clinic or hospital, in the context of people's lives and self-management or care at home.

Rationale

Diabetes and obesity are MENA's biggest epidemiological challenge. The rapid societal transition to a more urbanised lifestyle with little exercise and westernised diets has caused a huge increase in obesity, which in turn has seen huge increases in diabetes mellitus rates. With the present and projected Diabetes prevalence in Egypt being high compared to global levels, it makes for an interesting and important study to understand the role of digital health initiatives in helping the country manage diabetes among the population.

Apart from knowledge generation objective, the focus of the consulting firm that I trained under was on the pharmaceutical and therapeutics market for various countries worldwide. I was assigned the country of Egypt throughout the 2 months of training and therefore my report focuses on the digital health and diabetes market for the country.

Research Question

What is the role of Digital Health Interventions (Health related smartphone applications, telemedicine, and SMS) in managing the disease burden of Diabetes in Egypt?

Specific Objectives

- To summarise the present risk factors for increasing diabetes burden in Egypt and reasons for unsuccessful diabetes management.
- To understand Egypt's position w.r.t Diabetes Management by analysing data
- To comprehend the vast literature and summarise existing digital health interventions and their influence so far in managing Diabetes, deriving implications for Egypt

Section – 2

Material & Method

Research Design & Mode of Data Collection

The study is of a descriptive research design. A systematic review of the existing evidence for role of digital health interventions in managing diabetes was done through secondary data analysis.

Mode of Data Collection & Analyses used

About 20 articles associated with the role or effect of digital health interventions upon diabetes mellitus management, DM risks and prevalence of DM in Egypt were reviewed. The articles were retrieved from PubMed and the official websites of IDF, WHO, GHD, etc. Non-peer reviewed journals and articles published in languages other than English were excluded. The keywords used for building the search strategies included digital health, prevalence of diabetes, mobile health, diabetes mellitus risks, etc.

Further, the Diabetes Atlas published by International Diabetes Foundation (IDF) were analyzed from 2010 to 2019 to comprehend the diabetes disease burden on Egypt. Correlations were computed to understand the relationship between various indicators in the country and suggest future interventions.

Section – 3

Data Compilation, Analysis, and Interpretation

This section is divided into 3 parts as per the 3 specific objectives of the report:

1. Risk factors for rising disease burden in Egypt

Based on previous surveys and studies, the following major risk factors emerged for diabetes susceptibility in Egypt (Hegazi et al., 2015):

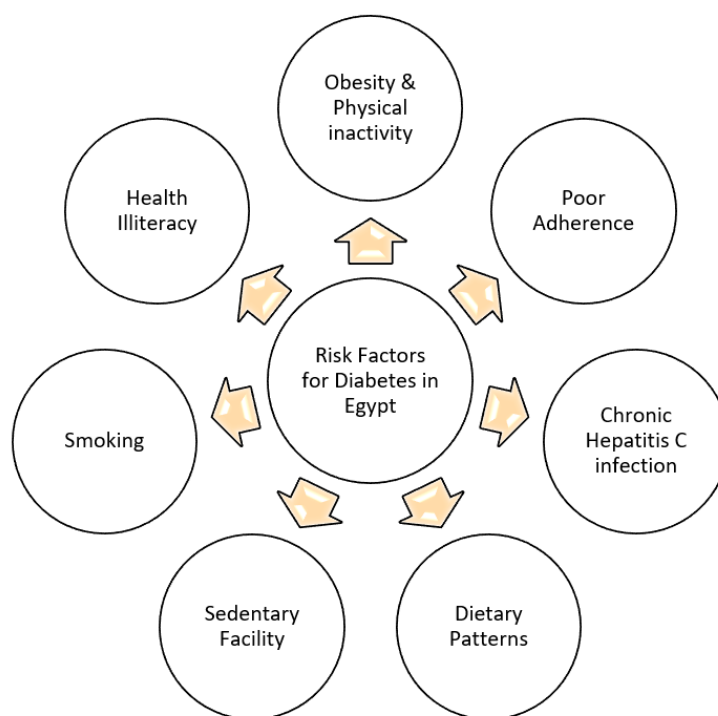


Fig 1. Risk factors that contribute to the diabetes problem in Egypt

i. Obesity and Physical Inactivity

According to a report by WHO (2010), 20.3% of adults in Egypt are obese, ranking it 3rd in terms of highest prevalence of obesity in the MENA region. Another survey by Egyptian National Hypertension Survey revealed that about 50% of the adults

have central obesity (Population Council, 2015; Ibrahim et al., 2011) Egyptians are prone to central adiposity which is probably inherited like in many other ethnicities.

Similarly, a survey in Egypt reported that many people suffering from one of the chronic diseases do not engage in any form of physical activity due to reasons such as overcrowded cities, lack of proper physical education in schools and lack of exercise facilities.

ii. Chronic Hepatitis C Infection

Owing to a mass intravenous treatment campaign carried out using unsterilised needles in the 1960s and 1980s, Egypt has the highest prevalence of Hepatitis C infection in the world. Hepatitis C is associated with T2D and also worsens control. Studies report poor glycaemic control in HCV positive people (Chehadeh et al., 2011). Further, evidence has also been reported for significantly reduced HA1c levels among people with effective HCV elimination (Huang et al., 2012).

iii. Dietary Patterns

Consisting of a diet rich in vegetables, legumes, fish, fruits and low to moderate amounts of animal protein, Egyptians follow Mediterranean region eating habits. However, the constituents of white bread and polished rice particularly add to high glycaemic load in their diet. Apart from this, the diet is also high in trans-fat. There is an increasing shift from light breakfasts to greater consumption of fast food in large cities. Such changes have resulted in greater obesity linked with diabetes.

iv. Sedentary Lifestyle

Egyptian culture and lifestyle are such that promote little to no physical activities. There is huge gender disparity when it comes to sports as males dominate the field with football. Exercise facilities are limited, and crowded cities leave no space for playing grounds for youth. Scorching heat keeps people indoors contribution to Vitamin D deficiencies which in turn is linked with diabetes and obesity (Fields et al., 2011).

v. Smoking

Smoking is a very prevalent and common issue in the MENA region, especially among men. It is linked directly to micro and macrovascular disease incidence in patients with diabetes.

vi. Health Illiteracy

Egypt is very much a part of the common health illiteracy problem in the MENA region. Patients with diabetes rarely sign up for routine check-ups, dietary check-ups, or exercise habits after diagnosis with diabetes. Daily glucose monitoring is almost non-existent due to fear of high costs or finger pricks. More often than not, patients resist insulin injections. These and other factors have resulted in poor glycaemic control within the Egyptian population along with problems such late diagnosis, increased prevalence complications and a population that accepts their fate as inevitable and not seeking help.

vii. Poor Adherence

Diabetes patients in Egypt have very poor adherence to diabetes management norms. Frequent omission of insulin injections, poor eating habits and physical activity are common even among the educated people. Public health system in Egypt is not well sculpted to meet the needs and diabetes care in private sector is expensive, making it difficult for a lot of people to obtain routine check-ups. In a survey on 560 people in Egypt, majority of the patients believed that Diabetes is an infectious disease caused due to stress and only about 38.4% had positive attitudes towards self-management of the disease. Such misconceptions and ill-informed patients also increase the risk of diabetes burden in the country (Koura et al., 2001).

2. Understanding Egypt's Diabetes Problem

Table 1: Egypt's data for Diabetes from year 2010 to 2019 and forecast to 2030 and 2045

Year of data collection	Prevalence of Adult Diabetes (%)	Total cases of Adult Diabetes (Millions)	Total Undiagnosed Cases in Adults (Millions)	Govt. Spending Per person (USD)
2010	10.4	4.7	-	116
2011	15.16	7.3	4.5	136

2013	16	7.5	3.8	351
2015	14.9	7.8	3.2	218.8
2016	14.9	7.8	3.2	219
2017	15.1	8.2	4.4	268
2019	15.2	8.9	4.8	279.1
2030*		11.9 *		
2045*		16.9*		

*- Forecast as per IDF Diabetes Atlas, 9th Edition

As can be seen from Table 1, Total cases of diabetes in adults (20-79 years) have been continuously rising since 2010 and are predicted to go up to 16.9 million by the year 2045, ranking it at 7th in the world on a list of countries with most adult diabetic population. Currently, Egypt ranks 9th in the world.

Table 1.1: Correlation between Govt. Spending Per person and Prevalence of Diabetes in Adults

	Prevalence of Adult Diabetes
Govt. Spending Per Person	0.6948*

*The P-Value is .083166. The result is significant at $p < .10$

As can be seen from Table 1.1, there is a strong significant correlation between the prevalence of diabetes in adults and govt. spending per person, indicating towards the possibility that with increasing prevalence of diabetes, the govt. expenditure per person is also likely to increase. Therefore, Diabetes is not only a health hazard in Egypt, but also has impact on the economy of the country. If we consider the correlation vice-versa, that is increase in govt. spending has resulted in increase in prevalence of diabetes, it could be speculated that expenditure in itself is not sufficient to control the problem in the country.

This becomes evident when we look at **Figure 2**.

In a study conducted in Egypt in 2020, reasons for non-attainment of glycaemic control in Egyptian population were identified through a cross-sectional study. As per the study, the control of diabetes in Egypt is still poor with the vast majority of the patients do not achieve the targeted metabolic control as recommended by the international guidelines.

The following reasons emerged (Halawa et al., 2020):

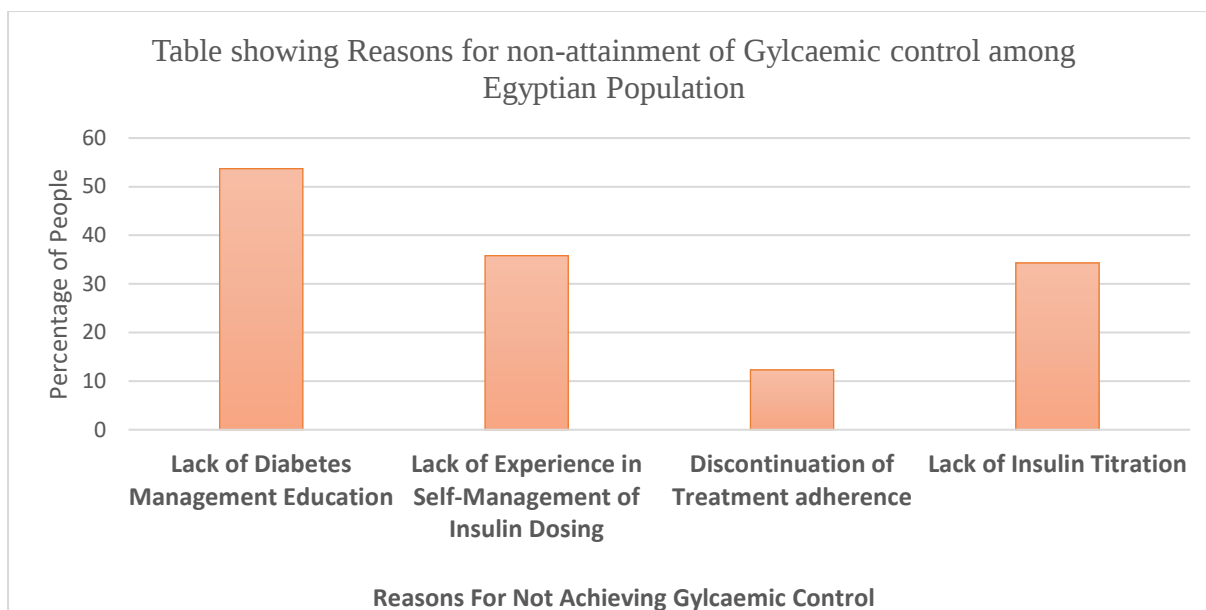


Fig. 2: Understanding why people with Diabetes in Egypt are unable to achieve glycaemic control (Halawa et al., 2020)

Therefore, As can be seen from the data above, Egypt currently displays poor management of Diabetes within its population. It is therefore important to progress with Digital and Mobile health interventions to manage the diabetes in Egypt. The following section elaborates upon the evidence and benefits of mobile based technology and digital healthcare innovations that can be applied in Egypt.

3. Comprehending literature on role of Digital Health in Diabetes Management to derive implications for Egypt

Multiple studies highlight the promising future that mHealth and other digital health interventions bring for people with Diabetes.

In a study conducted in 2020 on patient and healthcare workers experience with mobile application for self-management of Diabetes in Qatar, it was found that participants had a positive experience with the application as it helped them communicate more efficiently with their care team. The facility to communicate remotely with healthcare professionals improved patient outcomes. Convenience in using the app also emerged as an influencing factor to determine whether or not people will adopt to a new technology. The study urged health application makers to engage in the promotion and research that provides clinical

outcomes for effectiveness of these applications in order to improve their uptake. The study was conducted in an Arabic country and overall, there was complete cultural acceptance towards adopting an application that assists them in self-management of Diabetes (Abd-alrazaqa et al., 2020)

Mobile based applications have also been found to improve the patient compliance with diabetes self-management tasks such monitoring one's blood glucose levels, which also happens to be the most favoured feature in an application. (Jeffrey et al., 2019).

A systematic review found significant reductions in HbA1c among the patients being treated by a mobile application in high resource settings. mHealth interventions were found to improve glycaemic control by about 0.8% compared to conventional methods and standards for care in short, if not long term. (Kitsiou et al., 2017). A meta-analysis conducted in 2021 showed that telemedicine-based interventions proved effective in reducing the serum levels of HbA1c and fasting blood sugar along with adherence to treatment and increase in self-efficacy w.r.t management in low as well as high income countries. These interventions also proved to be cost-effective (Correia et al., 2021). Many others have reported similar reductions in the HbA1C levels (Kundury et al., 2020; Abaza et al., 2017; Rosal et al., 2005; Jo et al., 2017)

Another study conducted four randomised trials involving 182 participants and found that diabetes patients improved moderately on measures of self-management of capacity and there was also moderate evidence to support better treatment compliance, after these patients received text messaging intervention that sent them reminders and general information to self-manage their condition. (de Jongh et al., 2012).

One study noted gradual decrease in usage of mobile application-based interventions and recommended tailor-made interventions to achieve better results in diabetes care. When a system provides real time report on the person's dietary intake and advice based on the person's blood glucose levels, it is much more likely to be effective (Jo et al., 2017).

mDiabetes Program in Egypt

On 23 February 2016, the national program "mDiabetes" was launched at a press conference in Egypt's capital, Cairo. The principal idea behind the same was to increase people's access to information on diabetes management.

Participants in the programme were to receive regular tips via SMS on lifestyle choices and simple steps they can take to manage their diabetes. It was also planned in a later phase to offer messages on diabetes prevention for the general population, and a 2-way interactive SMS service where recipients can select the kind of information most relevant to their personal needs. (WHO, 2016)

All messages generated by the mDiabetes programme were based on validated content from WHO global expert groups and clinical trials and adapted for language and cultural suitability in Egypt. Examples include:

- "Being overweight or obese increases the risk of diabetes complications ... eat healthy food and walk on a daily basis"
- "Control your weight (your ideal weight = length cm-100) to help controlling your blood sugar"
- "Do not walk bare-footed and avoid using tight or open shoes. It is advisable to wear cotton socks."

About 41% of the tested group showed a decrease in the HbA1c level in their blood and 70% found the SMS messages useful.

Such success indicates that these programs can actually go a long way in curbing and managing the problem of Diabetes in Egypt.

The following data helps us understand better the scope for digital health penetration in Egypt.

Table 2: Mobile, Internet and Healthcare Application Penetration in Egypt

Total No. of mobile phone users as of 2020	94.34 million subscriptions
Mobile Internet users as of 2021	59.19 million
Percentage of population between 20-79 using health related apps as of 2021	27%

As can be seen from the Table, almost everyone in Egypt has a mobile phone subscription and more than 50% of the population is using internet. This can be utilised by the healthcare system in Egypt to target the Diabetic population on a wider scope with mobile based and digital interventions.

Section – 4

Recommendations and Conclusion

Diabetes is a serious issue in Egypt. According to IDF Diabetes Atlas for 2019, the country is 9th among top 10 countries with highest burden of Diabetes Mellitus. It is also the most populated country in the MENA region. With the forecast predicting increase in the prevalence of Diabetes in the country, it is time to involve efficient interventions to tackle the situation.

According to studies conducted in Egypt, the major reasons for inability to achieve glycaemic control have been lack of education, support, and non-adherence to diabetes treatment norms. The positive correlation between spending per person by the government and the prevalence indicates that the above-mentioned risk factors are definitely a major cause for the high prevalence of the disease.

Egypt is currently making rapid strides in the Digital Health world. With multiple studies showing that mobile health-based interventions actually improve glycaemic control and improve self-management of diabetes among the population, digital health interventions can and should be incorporated on a wider scale in the country. The existing mDiabetes intervention is capable of targeting millions of people in Egypt. With a success rate of 47% of the total participants achieving glycaemic control, the intervention should definitely be studied further and applied on a larger scale.

Almost the entire population has subscriptions to mobile phone and leveraging on this, research should be conducted to build applications that help people self-manage diabetes, improve their adherence to diabetes control norms and help them understand their condition with correct information and facts.

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