Barriers and Enablers for Physical Activity Engagement Among Individuals From India With Type 2 Diabetes Mellitus: A Mixed-Method Study

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Background: Type 2 diabetes mellitus (T2DM) is a complex, chronic condition that can cause multiple complications due to poor glycemic control. Self-management plays a crucial role in the management of T2DM. Lifestyle modifications, including physical activity (PA), are fundamental for self-management. This study explored the knowledge, perception, practice, enablers, and barriers of PA among individuals with T2DM. Methods: A mixed-method study was conducted among individuals with T2DM in Udupi taluk, India. A cross-sectional survey (n = 467) followed by an in-depth interview (n = 35) was performed. The data were analyzed using descriptive statistics and thematic analysis, respectively. Results: About half (48.8%) of the participants engaged in PA of which 28.3% had an adequate score in the practice of PA. Walking was the most preferred mode. Self-realization, Comprehension, perception, and source of information, PA training, Current PA practices, enablers and barriers for PA were 6 themes derived under knowledge, perception, and practice of PA. Conclusion: Despite knowing the importance of PA, compliance with PA was poor. The personal/interpersonal, societal, and external factors constituted the trinity of barriers and enablers in compliance with PA. Behavioral changes, societal changes, policy initiatives, and PA training in health care settings may enhance PA practice among individuals with T2DM.

Keywords: glycemic control, poor-compliance, behavioral & policy changes, self-management

Diabetes mellitus is one of the major public health concerns, putting an immense burden on the public health system.1 Globally, in 2019, 463 million adults were living with diabetes, which is expected to rise to 700 million by 2045. In Southeast Asia, a 74% increase in diabetes cases is anticipated by 2045.2 With rapid urbanization and lifestyle changes in India, there has been a significant rise in the prevalence of obesity and diabetes.3 With a 43.9 million population living with diabetes, India is ranked second in the incidence of the disease and highest in mortality globally.1,2 Type 2 diabetes mellitus (T2DM) constitutes almost 90% of the burden of diabetes.4 Risk factors for T2DM are multifactorial; however, diet and physical activity (PA) are important modifiable factors that directly determine the incidence, severity, and effective management of T2DM.5

An important measure of effective management of T2DM is glycemic control.6 Lifestyle modifications (diet, PA, and stress management), medication compliance, periodic check-ups, and self-monitoring of blood glucose are key measures of T2DM self-management that help achieve optimal glycemic control.6

PA is paramount in managing T2DM, as it improves glycemic control, reduces complications, helps in weight loss,7,8 The American Diabetes Association recommends a combination of aerobic and strengthening exercises, including 30 minutes of moderate-to-intense aerobic PA at least 5 days a week for 150 minutes and strength training at least twice a week.9 Despite the clear recommendations, studies report that individuals with diabetes have less PA and lead more sedentary lifestyles than nondiabetic individuals.10–12

With a prevalence of 54.4% and 73.9% of insufficiency of PA among adults and adolescents, respectively, Indian people are recognized for physical inactivity.13,14 In comparison, only 41% and 45% of individuals with T2DM in India comply with the duration and frequency of PA recommended by the American Diabetes Association, respectively.10 In addition, PA practice patterns among Indians vary between urban and rural populations. India has a significant agricultural economy, and most of the Indian population is distributed in rural areas. Rural areas mainly depend on farming; however, the current agriculture depends on mechanized cultivation practices. This significantly reduced the PA among the rural population in recent years. Furthermore, the rapid urbanization in the perennial areas of urban pockets expanded into rural areas, significantly reducing traditional PA practice. The deviation of the rural population from traditional PA practice

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may lead to an increased risk of obesity and contribute to the higher prevalence of T2DM in rural pockets.3

Udupi is one of the 31 districts of the state of Karnataka in India, having higher socioeconomic status as per guidelines set by the government of India. Udupi, though a rural region per government classification, underwent rapid urbanization in recent years with the development of educational institutions and industries, including hospitality, medium-scale industry, and realty. Surprisingly, the prevalence of T2DM in Udupi is on par with urban pockets of India, as per Rao et al15 and data available from district administration. This may have resulted from a forced sedentary life which in turn reduced the PA following the mechanization of agriculture and urbanization. However, there is a shortage of evidence in the literature on the role of PA practices in patients with T2DM in this region. This directed us toward investigating knowledge, perception, and practice of PA and further exploring micro components related to PA to gather supportive evidence. The study findings may be leveraged as these provide critical findings at the individual, community, societal, and perhaps even at the policy level in managing T2DM. In this line, we designed a community-based mixed-method study to investigate PA knowledge, attitude, and practice and explore further micro components related to PA.

**Methodology**

**Setting**

This study was conducted among individuals with T2DM in Udupi district. Udupi district is one of the 3 coastal districts of the state of Karnataka in India, comprising urban, suburban, and rural areas with a total population of 1,177,361 and an estimated prevalence of 16% diabetes mellitus. For this study, the participants were included from the Udupi taluk, Karnataka, India.

**Study Design**

This study adopted a sequential explanatory mixed-method research design where phase 1 was a quantitative study (cross-sectional survey), followed by in-depth qualitative interviews in phase 2 (Figure 1).

**Sample for this Study**

Individuals with T2DM and those in the age group between 30 and 65 years were included in the study. Individuals with type 1 diabetes mellitus, T2DM and on insulin therapy, a critical illness, gestational diabetes, severe mental illness, and self-reporting of excessive alcohol intake and substance abuse were excluded from the study. A total of 467 samples were included in the cross-sectional survey, whereas for qualitative interviews, data collection was done until saturation.

**Data Collection**

The data collection was done between June 2016 and December 2018. After Kasturba Medical College and Kasturba Hospital Ethical Committee approval, data were collected from the participants after obtaining written informed consent. For the cross-sectional survey, the participants were randomly selected from the diabetes registry using computer-generated random numbers. (The diabetes registry was developed under the World Diabetes Foundation 15: 941 project—a project funded by the World Diabetes Foundation and carried out by the Manipal Academy of Higher Education in Collaboration).

Demographic proforma included age, sex, and duration of diabetes, and the frequency, duration, and type of PA; the Diabetes Knowledge Questionnaire (DKQ) and Diabetes Self-Management Questionnaire (DSMQ) were used.16,17 The instruments were pretested to comprehensively evaluate their reliability and cross-cultural validity. Cronbach alpha was used to test the internal consistency of the questionnaires, and the scores were categorized for DKQ as .774 (acceptable) and for DSMQ as .909 (excellent); hence, tools were found to be reliable. PA was the subscale in DKQ and DSMQ. Knowledge score was categorized as inadequate (<50%), satisfactory (50%–75%), and adequate (>75%). In DSMQ, scores above 6 (10) were categorized as adequate practice scores and less than 6 (10) as inadequate. The researcher spent around 45 minutes per participant for the data collection.

For qualitative in-depth interviews, the sample was selected purposively. The sample for in-depth interviews was a subset of quantitative participants. Those who scored optimally and minimally in the subscale of PA in DSMQ (practice scale) were...
sequentially contacted for the in-depth qualitative interviews (IDI). The quantitative data analysis result is the basis for formulating IDI guidelines. The feasibility of using IDI was tested using a sample of 2 individuals, and IDI was finalized. This validated IDI guide, which had 10 sections, was used for the IDI; however, it prominently focused on 3 pillars of T2DM management, that is, diet management, PA, and stress management.

In relation to PA, the IDI comprised of a leading question on the “importance of PA in managing T2DM.” Furthermore, during the interview, participants were probed to obtain answers for the existing practice of PA, types, duration, regularity of training, source of information on PA, challenges for engaging in PA, and possible solutions.

The researcher, who had prior experience interviewing in qualitative research, interviewed the participants. Each interview was conducted in the local language (Kannada), lasted for about 45 to 75 minutes, and was audio-recorded. Additionally, field notes were recorded for seemingly essential points.

Data Analysis

Quantitative Data Analysis

Descriptive statistics were used to analyze the cross-sectional data; the data set was prepared and analyzed using SPSS (version 16.0). For qualitative analysis, Open Code software (version 3.6.2.0) was used.

Qualitative Data Analysis

A thematic analysis approach was used to explore PA practices. Data familiarization, assignment of preliminary codes to data to define the content, search for themes in codes, review of themes, definition and nomenclature of the themes, and development of the report were the sequential methods used in the thematic analysis.18,19

The audio recordings and field notes were transcribed into English by the researcher, fluent in English and the local language. Then, the quality of the transcripts was assured while listening to the audio recordings, and changes were made wherever required. Quality-assured transcripts were analyzed using thematic analysis. Three authors read the transcripts line-by-line to familiarize themselves with the data and to identify the initial codes regarding knowledge, practice, perception, and enablers and barriers for PA. The data were coded and organized into major and minor themes. The emerging themes were then discussed among all authors to refine the research.

Finally, an expert who was not involved in data collection or analysis reviewed the themes’ transcripts, codes, concepts, and narrative summaries. Efforts to ensure the trustworthiness of the analysis included identifying investigator biases, peer evaluation of codebooks and concepts by the researchers, member checks, and external assessment of the final themes.

Results

Quantitative (Cross-Sectional Survey)

Demographics and Baseline Characteristics of the Cross-Sectional Survey

In this cross-sectional study among 467 persons with T2DM, the majority belonged to the age group of 46–60 years (51.6%, n = 241) and were males (n = 249/467); of the participants, 78.6% had diabetes for less than 10 years (n = 367), 57.4% of the participants had diabetes-related complications (n = 268), and only 2.1% of the participants consulted the physiotherapist or yoga therapist about PA training (n = 10). Most participants had adequate (n = 200, 42.8%) and satisfactory (n = 213, 45.6%) knowledge scores. Furthermore, only 28.3% of the participants scored acceptable practice scores (n = 132).

Physical Activity

Only 48.8% of the participants (n = 237/467) reported performing PA frequently. Furthermore, as depicted in Table 1, only 41.3% (n = 98) and 15.2% (n = 36) of the participants, respectively, performed PA daily 5 and 6 times a week. Most participants completed 30 to 45 minutes of PA (n = 140, 59%); 74.3% of the participants chose walking as the form of PA (n = 176).

Qualitative (In-Depth Interview)

Participants’ Characteristics

Thirty-five individuals who scored optimally (n = 17) and minimally (n = 18) in the DSMQ questionnaire participated. The mean participant age was 51 years (SD = 8) and comprised 20 male and 15 female participants. The mean HbA1c value of participants was 9.6 (SD = 0.89) and 6.7 (SD = 0.42), respectively.

Qualitative Analysis

The thematic analysis primarily derived 6 themes for knowledge, perception, and practice of PA. The 6 themes obtained from IDI were 1) comprehension, 2) perception, 3) source of information, 4) PA training, 5) current PA practices, 6) enablers and barriers for PA. The gist of the themes and sub-themes are depicted in Table 2 and Figures 2 and 3.

Comprehension, Perception, and Source of Information

This theme is further categorized into 3 subthemes: 1) comprehension: lack of knowledge, 2) perception: traditional values and societal norms; and 3) source of information: well-springs of mainstream and social media.

Table 1 Frequency, Duration, and Types of PA as Reported by Persons With T2DM (n = 237)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of PA</td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>98 (41.3)</td>
</tr>
<tr>
<td>5–6 times a week</td>
<td>36 (15.2)</td>
</tr>
<tr>
<td>3–4 times a week</td>
<td>78 (33.0)</td>
</tr>
<tr>
<td>1–2 times a week</td>
<td>25 (10.5)</td>
</tr>
<tr>
<td>Duration of PA per time</td>
<td></td>
</tr>
<tr>
<td>&lt;30 min</td>
<td>140 (59.0)</td>
</tr>
<tr>
<td>30–45 min</td>
<td>52 (22.0)</td>
</tr>
<tr>
<td>&gt;45 min</td>
<td>45 (19.0)</td>
</tr>
<tr>
<td>Type of PA</td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td>176 (74.3)</td>
</tr>
<tr>
<td>Yoga</td>
<td>32 (13.5)</td>
</tr>
<tr>
<td>Others (cycling, outdoor sports, and jogging)</td>
<td>29 (12.2)</td>
</tr>
</tbody>
</table>

Abbreviations: PA, physical activity; T2DM, type 2 diabetes mellitus.

(Ahead of Print)
<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes</th>
<th>Responses/reaction by participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA training</td>
<td>Spasmodic PA training: a token of structured education in health setup.</td>
<td>Assessment for PA training: less known (4/35). Accessible to PA training: small number (7/35). Access to PA training: only source were yoga teachers and yoga classes. PA formal education: by nurses and doctors at health setups. PA informal education: easily accessible; mainstream media, social media, peers, family. Clarifications and doubts: few consulted experts or were comfortable searching the literature.</td>
</tr>
</tbody>
</table>

Abbreviations: PA, physical activity; T2DM, type 2 diabetes mellitus.

**Figure 2** — Enablers in physical activity.

**Figure 3** — Barriers in physical activity.
Comprehension: Lack of Knowledge

Participants had inadequate knowledge about the duration, frequency, types of PA and their recommendations. Many had articulated regular activities like house chores, mobility, and so forth, to compensate for exclusive PA. Contrary to this, few narrated that only the exclusive PA was enough to control diabetes. The majority of participants were unaware of the safety precautions required during PA.

I heard when we are sweating during exercise it would reduce the sugar level. (Participant 27 Male 20 [P27M20])

I work as a carpenter, which demands hard work. The doctor advised for the exercise, but I think my work is exhaustive, so exercise is not essential. (P22M17)

I am advised to do exercise, and I walk for 15 to 30 minutes a day. I do not know whether it is sufficient to control diabetes or not. (P20F12)

Perception: Traditional Values and Societal Norms

Perception, traditional values, and societal norms tend to affect commitment to the practice of PA. For most participants, 83%, PA plays a vibrant role in the control of T2DM. Most use walking as PA because it is easy, can be done anywhere, and requires no training. Yoga was the next choice with a perception of suitability for all with no adverse effects. The main assumptions of participants were that barefoot walking is good for diabetes control and that morning walking is better than evening walking. A night walk shortly after dinner is good for health and diabetes control. Furthermore, practicing PA outdoors with sport attire leads to name-calling and stigma as a patient.

We knew yoga since ancient times, and it has no adverse effects, fit to do in any condition in all season, it gives mental peace, exercises to all parts of the body. (P10F6)

Our ancestors have advocated walking of 101 steps after dinner. (P10M10)

Source of Information: Well-Springs of Mainstream and Social Media

The major sources of PA were reportedly received from the mainstream and social media. Articles on PA in newspapers and magazines were well taken. However, more importance was given to the messages delivered by leading specialists and saints. The messages about PA from junior doctors and strangers were overlooked.

I receive many videos on exercise in WhatsApp, also I read in the newspaper and try to follow it. (P28M19)

I follow the exercise and yoga by seeing TV channels. (P31M14)

PA Training

Sporadic PA Training: A Token of Structured Education in Health Setup

Overall, only 20% of participants had access to PA training. Few of those who received PA training (mainly in yoga camps) got the yoga training in yoga classes and through a qualified teacher. The majority got the education on PA from their health professionals. However, they received formal education in PA which was sporadic. Informally, education on PA was received from friends, peers, family members, and relatives. PA was learned many times from TV shows and promotions. Very few respondents mentioned using books, literature, or expert consultation to address their doubts and questions. Significantly less is known about assessment for the individualized PA training (n = 4/35).

I have attended yoga camp organised by sangha (society); I have learnt thereby Yoga Guru. (P12F2)

I watch Television to learn yoga and exercise in a yoga, sports and spiritual channels. (P16F6)

I was told to do the exercise by the nurse, and she suggested walking for 40 minutes a day while walking I get leg pain. (P21M14)

I was taught few exercises by a doctor when I was not able to walk due to leg pain. (P17F7)

Current Practices of PA

This theme is further categorized into 3 subthemes: Inconsistency, mode and duration of PA, and environs and precautions for PA.

Inconsistency: On a Good Day, Work Out; on a Bad Day, No Outing

Half of the participants (18/35) reported that they were irregular at practicing PA. The priority of household work, child-rearing, workload at the office, mood of the day, and variations in the health conditions contributed to the inconsistency in regular PA.

I am not regular in going for walking, a few days I go, in-between if I miss for a day, or two then I won’t go for many a day’s. (P14F1)

Some days I am lethargic to get up, especially the next day of the alcoholic party, often I stop temporarily. (P28M19)

I have to take care of children, their school preparation, and house chores, not finding time for the walking. (P31F16)

Mode and Duration of PA

The most preferred form of PA was walking, followed by yoga, cycling, jogging, and outdoor games. Only a few (n = 8/35) practiced warm-ups and cooling-down activities in their practice. However, few have considered routine activities as a part of exclusive PA, and few assumed exclusive PA suffices for the management of diabetes, so ambivalence prevails. The duration of the PA varied from 10 to 60 minutes per day.

I pedal cycle, every day, 10 km of cycling in the morning. Also, I do some stretching exercise. (P9M6)

Without fail, I walk for one hour a day, it is compulsory, I cannot spare much time do other work in-between. (P3M3)

I always walk around, I cook at home, wash clothes, go upstairs often, these are all exercise that can keep me healthy. (P36F13)

Environ and Precautions for PA

Participants preferred to do the PA amid nature and the morning was the most preferred time. However, less was known about safety precautions during PA, and so was the practice.
I am walking in the morning with two of our neighbours we feel relaxed for the whole day, if we miss in the morning, we may not find time in the evening so finishing in the morning. (P15F5)

There are snakes on the riverside, so I am wearing shoes and take a torch with me. (P3M5)

Enablers and Barriers for the Practice of PA

The enabling factors and barriers for the practice of PA are further categorized into sub-themes: individual, societal, and external factors. The descriptions are depicted in Figures 2 and 3.

Enablers for the Practice of PA

**Personal Factors.** For most participants, adequate knowledge of PA—including duration, frequency, and type of PA—was the primary factor promoting PA. Positive attitudes about and perceived benefits of PA were acknowledged among many who endorsed the PA. Improved clinical outcomes, weight loss, reduced sugar level, feeling good, controlled blood pressure, prevention of complications, good sleep, increased appetite, mental peace, and better stress management experienced by many participants were the achievements of PA that encouraged the practice. Physical fitness, feeling good, being energetic, and having better endurance were the reported physical and mental well-being benefits of the PA and were prerequisites to engaging in PA for the majority. Self-goals, self-efficacy, routine, and personalized PA program were the self-regulations, while determination, commitment, and caring responsibilities were self-motivation in the self-management of T2DM, as expressed by the majority. The participants’ pacifying, pleasant, positive, stress-free, and socialization experiences are immeasurable, blissful, and autonomous motivators nourishing PA practices.

**Societal Factors.** As expressed by many, support extended, either in-person or distant, by grandchildren, children, partners, friends, acquaintances with diabetes, neighbors, and colleagues were the bedrock of the society that nurtured the sustainability of the PA. Most have articulated that nurses, doctors, counselors, dieticians, and physiotherapists were instrumental in providing authentic information, and their informed support enabled the practice. PA training and counseling, yoga classes, hands-on training, and demonstrations received from yoga teachers and physiotherapists were the lifetime persuaders in the practice of PA for those who participated in it.

**External Factors.** Most participants enjoyed PA outdoors amid nature at the seashore, riverside, and lakeside. Among many participants, school grounds, stadiums, parks, roads, and footpaths were the public infrastructures for PA. Dawn and dusk, the golden and magical hours of sunrise and sunset, were the blissful times amidst nature at the seashore, riverside, and lakeside. Among many participants, school grounds, stadiums, parks, roads, and footpaths posed a considerable challenge in the engagement of outdoor PA.

I feel blessed to walk in the morning, it gives mental and physical stamina, we are a small group of walkers walk together. (P7M7)

I walk beside the seashore or riverside, it is very much relaxing gives physical and mental relaxation. (P11F1)

We are a group of individual walking together in the school ground, a retired physical education training teacher teaches us a few exercises good for the joint pain, leg pain, neck pain. (P9M6)

I was knowing Yoga but stopped, in that book useful yogasanas for sugar was there I started again, and my daughter and husband also do it … . (P8M6)

my daughter reminds me about walking some time scolds me … (laugh …) so I walk … . (P13F3)

Morning I go to temple on a walk, I walk around ashwattha (peepal) tree that releases oxygen, gives mental, physical, and spiritual peace. (P16F6)

Barriers for PA

**Personal Factors.** Inadequate knowledge of duration, frequency, and type of PA made many participants’ practice of PA a complex process. Harboring negative perceptions and attitudes on disease, being too old for the PA practice, undermining benefits of PA, inability to link the benefits of PA, and lack of perception of obesity as an issue made PA a burden for a few participants. The majority of females considered gender as a limitation, and deliberations of being aged and unfit for PA were the biological factors that inhibited the PA. Among a few, frustration, stress, disappointment, embarrassment, fear, and self-stigma were the psychological factors that contributed to noncompliance to PA. Alcoholism, irregularity, lack of self-drive, self-efficacy, self-determination, and commitment were demotivating factors for sustained PA. Experiencing symptoms of hypoglycemia, giddiness, and falls were the alarming episodes that called for the discontinuation of PA. Mobility problems, comorbid conditions, knee pain, leg pain, fatigue, seasonal allergies, and breathing difficulty were the other personal obstacles for PA. Alcoholism, unwillingness, lethargy, lack of physical fitness, and lack of time were the other constraints for the practice of PA.

**Societal Factors.** Obligation to others, late working hours, lack of rest, and work at home were the work and home-related factors hindering PA practices. Overprotectiveness by family members has interfered with PA practice. Lack of privacy, winking and name-calling by others during PA, and being made fun of wearing sports attire were the factors that led to a stigma that impeded PA. Special occasions, including fasting, feasting, festivals, and functions, posed a risk of nonadherence to PA among the persons with T2DM, wherein they faced a dilemma between rituals and PA. An unsafe and insecure environment because of unknown individuals and thieves while walking on isolated roads and footpaths posed a considerable challenge in the engagement of outdoor PA.

**External Factors.** Poor public infrastructures of bad roads, roads with potholes, unclean beaches, and no or narrow footpaths posed a significant risk and discouraged engaging in PA. Rainy seasons and cold weather in winter prevent engaging in PA. Walking in the forest areas, darkness, and the threat of wild animals, snakes, and stray dogs posed insecurity among participants in rural areas and were the major obstacles for PA.

I couldn’t walk due to leg pain and surgery but now little I do; the rod is there in the leg I feel pain. (P11F14)
The majority of participants favored walking, followed by yoga practice. Similar findings were published in a study conducted in Eastern India and Sri Lanka. However, a consensus was lacking regarding PA duration, type, and frequency. Similar results were also revealed in previous studies. It may be due to the erratic information available on PA. Though not comprehensive, a few individuals with T2DM had access to formal PA training from health professionals. The studies conducted in India and Sri Lanka explored similar themes.

Only 48.8% of individuals with T2DM practiced PA; only 28.3% of the participants had adequate self-management practices. The study results are consistent with previous studies conducted among general adults and individuals with T2DM. Among those who practice PA, a large proportion do not meet the American Diabetes Association’s prescribed PA. These findings in their report align with previous studies.

In comparison, personal/internal enabling factors for the PA in the self-management of T2DM extracted from this study were similar to previous studies except for the participants’ physical well-being and autonomous motivations emphasized by this study. Furthermore, the significant personal barriers to the regularity of PA in the self-management of T2DM were aligned with previous studies.

Most enabling factors and barriers concerned with the societal aspects align with the previous studies. The unsafe and insecure society and embarrassment due to social stigma and lack of privacy are unique to this study. Though most external barriers and enablers align with previous studies, the timings, natural outdoor sites and creatures, and conventional occupations emerged as distinct themes for barriers and enablers in this study.

Discussion

This study describes the pattern, level of knowledge, and practice of PA among individuals with T2DM. Further, it explores the micro components of knowledge, perceptions, current practices, and the barriers and enablers for PA. The absence of research in this stream highlights the importance of the present study. PA has proved to be successful in managing diabetes directly or through weight loss. In our study, 42.8% and 45.6% of the participants had adequate and satisfactory knowledge of PA, respectively. Besides that, it was reflective that participants consensually accepted that compliance with PA endorses the control of diabetes.

Emphasis on PA by health-care providers has emerged as an important enabling factor for PA; however, the information on PA was sporadic. Further, only 2.1% of the participants had access to consultation on PA. These results fortify the necessity of PA training in regular visits to primary health-care clinics of private and public health sectors. For rendering the services of lifestyle modification, including yoga, health awareness, and telecommunication along with traditional maternal and child health services, by 2022, the Ministry of Health and Family Welfare and the government of India proposed to transform Sub Health Centers and Primary Health Centers into Health and Wellness Centers under Ayushman Bharat. However, as most have adapted walking as a primary PA, it necessitates integrating yoga and modern PA services to render comprehensive services by trained professionals for better scope and greater reach.

As family, peers, neighbors, and colleagues influenced the PA, further social stigma and lack of privacy were the cause of embarrassment in PA. These factors are contemplative of the society. They necessitate the encouragement to channel the support and strive to remove the stigma attached. In this regard, to teach the culture of PA among citizens of the country, India has already initiated the Fit India Movement (FIM) in the Ministry of Youth and Sports. Through FIM, which aims to encourage youngsters to participate in indigenous sports, games, and yoga, other age groups are covered. Furthermore, with the enthusiastic involvement of the public and other stakeholders in PA, the transformation of FIM as a public movement may harvest a conducive environment for the practice of PA in society.

Enablers and barriers for PA emerged in this study, including the poor and available infrastructure. The majority consider PA as a health component. However, in India, except for listing PA in the National Health Policy 2017, due importance to PA has not been given. Thus, developing a culture of PA in the country necessitates behavioral changes and demands PA training, qualified professionals, societal changes, and a supportive environment, such as jogging and cycling tracks, good infrastructure, and so forth. In this context, the exclusive national policy on PA and inclusion of PA perspectives in national health policy may become a directive document to percolate the required changes at the periphery through the state government and rural and urban local bodies in partnership with concerned departments. The study’s strength is its community-based mixed-method approach with a simple random sampling technique.

Limitations

Our study used IDI for data collection; it took 35 participants to reach data saturation because of varied responses. For the given number, a focus group discussion would have been a better choice but was unanticipated during study planning. Also, our study was conducted in a single center involving multiple centers with similar socioeconomic and geographical settings for the wider generalization data.

Conclusion

Despite knowing the importance of PA, compliance with PA was poor. Personal/internal, societal, and external categories were identified as barriers and enabling factors for adherence to PA. Behavioral changes, societal changes, policy initiatives, and immediate intervention of PA training and counseling in health-care settings may enhance PA practice among individuals with T2DM and the general population.
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