# Ethical responsibility of healthcare providers to advise patients on lifestyle modifications

**Shalini Garg and V Raman Kutty**

Sree Chitra Tirunal Institute for Medical Sciences and Technology

**Author note**

**Shalini Garg**, Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal institute for Medical Science and Technology, Trivandrum, India;

**V Raman Kutty**, Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal institute for Medical Science and Technology, Trivandrum, India

Shalini Garg is a senior doctoral fellow at Sree Chitra Tirunal Institute for Medical Science and Technology, Trivandrum, India

Correspondence may be addressed to Shalini Garg, AMCHSS, III floor, SCTIMST, Trivandrum, India, 650119. E-mail:gargshalini1978@gmail.com

*Keywords*: physical activity, inactivity, advice, low and middle income country, health professionals, providers, chronic disease, diabetes, life style modification, counselling

**Declarations:**

The authors declare no conflict of interest.

**Contributions of the authors:**

SG is senior PhD fellow at the Sree Chitra Tirunal Institute for Medical Sciences and Technology.VRK is Emeritus Professor at the Sree Chitra Tirunal Institute for Medical Sciences and Technology.

SG: Conceived and designed the study, performed the study, analysed the data, wrote the paper; VRK: critically supervised, manuscript layout, reviewed

**Acknowledgements:**

The authors would like to thank Prof.Mala Ramanathan and Dr. Malu Mohan for sharing their rich insights that build the discussion in a stronger way

**Abstract**:

There is clear evidence on association between health and physical activity. Physical activity(PA) is universally prescribed as a primary treatment for almost all chronic diseases. Unfortunately, studies show low levels of health professional advice on physical activityThe current study tries to examine as to how a cost effective tool to improve population health has been completely neglected in professional practice in low and middle income. country like India. Is it maleficence in practice or violation of human rights? Are health care providers exempted from their responsibilities because they choose so? Who should be held responsible for this colossal disease and death which is easily preventable?

**Background**:

Diabetes and physical activity

Recent reports show that non communicable diseases are responsible for nearly 62% of all deaths(ICMR et al., 2017). In India,approximately 65 million people had diabetes in 2016.(Tandon et al., 2018) and it contributed to 3% of the total mortality burden, most of them premature, occurring between the age of 30–70 years. This means huge economic and health losses. (Arokiasamy, 2018).Physical activity advice and counselling is one of the three pillars of treatment in diabetes. It is now considered a principal component of diabetes management protocol.(Rydén et al. 2013; “ADA Diabetes Guidelines Lifestyle Changes Diet Exercise | NDEI”) Research has shown that controlling blood sugar levels, blood pressure, and Low Density Lipids (LDL) can reduce the risk of long-term complications and death among people with diabetes(Castaneda, 2003; Hawley, 2004; Riddell et al., 2013). Substantial evidence shows that regular PA improves glycemic control and can prevent or delay type 2 diabetes, controls lipids, blood pressure and cardiovascular comorbidities..(Colberg et al., 2016).(Bazzano et al., 2005). International Diabetes Federation (IDF recommends physical activity at least between three to five days a week for a minimum of 30-45 minutes between three to five days a week for a minimum of 30-45 minutes. (*IDF Diabetes Atlas*,2017).

Because of the significant impact that non-communicable diseases, such as diabetes, have on health systems, WHO has promoted lifestyle modifications and other public health interventions (WHO, 2016).

Role of health professionalsHealth professionals are key to chronic disease prevention and health promotion(WHO, 2010)Offering vital information on self management, regular monitoring and lifestyle intervention aimed at delay in progression of disease and resulting complications constitutes DM self-management education (DSME)(Ofori and Unachukwu, 2014). Primary care physicians are often in a good position toprovide regular advice to the patients to facilitate healthier choices . Health care workers’ advice and support have been found found to motivate patients to the initiation of exercise and physical activity(He et al., 2013)Substantial research has shown that physical activity advice is an effective strategy for PA promotion.(Armit et al., 2009; Castaneda, 2003; Morrato et al., 2006). It also contributes to adherence to self management practice among patients with diabetes(Parajuli et al., 2014). ). In combination with other interventions, providing regular advice about physical activity, have shown to lower rates of diabetes in patients with glucose intolerance.(Armstrong and Sigal, 2015)

Studies found that only 25%-50% health care professionals advised patients to start or increase physical activity suggesting missed opportunities for disease prevention(Banu et al., 2014; Kalda et al., 2015; Patra et al., 2015).Similar studies on self care practices among people living with diabetes show that 40% of the patients are advised by healthcare professionals to start or increase their physical activity levels. Overall counselling and referral rates among diabetics were found to be 18-36% (Peek et al., 2008; Walsh et al., 1999; Yang et al., 2011)

Through this study, we integrate the available evidence from literature and the findings of our own study to highlight lack of regular physicians’ advice encouraging physical activity as like India a cost- effective tool (Orrow et al., 2012)tool to improve population health. We also attempt to draw attention to the fact that this has been completely neglected in professional practice in low and middle income countries leading to questions about patient care accountability. (Joshi et al., 2008 Holt et al., 2013))

**Methods& Findings**:

We conducted a secondary data analysis using data from 2016-17 *Prevention and control of non communicable diseases in Kerala* *India* project which is a large scale survey of over 12000 households covering all districts of Kerala The primary objective of this survey was to identify the need assessment large scale behavioural intervention. For the purpose of the current study we analysed the proportion of diabetic patients from Kerala who receive regular physicians’ advice about starting or increasing their physical activity. As stated in the survey, participants were asked, “To lower your risk for certain diseases, during the past 12 months have you ever been told by a doctor or health professional to start or increase your PA or exercise.” Response options were yes or no.

We found that only 29% of individuals living with diabetes were advised by a health professional to start exercising during the last 12 months. Among all adults who participated in the study, only 16.9% had been given such advice. Among adults reporting low levels of exercise, only 19% had been advised to increase their physical activity levels. Only 21% of overweight and obese adults were advised to increase their physical activity levels. The practice of advising seems to differ by age, marital status and socioeconomic status which further exaggerate health disparities. However, there was no gender or urban–rural difference in giving such advice.

**Discussion**:

***Is information important for health?***

In public health, the objective is to avoid poor health in the first place by empowering people with different ways to lead healthy lives(WHO, 2010). There are several ethical issues concerning the responsibilities of all agents including, individuals, health workers, governments in health promotion and disease prevention (Schmidt, 2016)., Information regarding treatment options, preventive measures and complication related with long term medications and surgeries. are critical means to ensure healthy lives for patients(Francis et al., 1969; Joshi et al., 2008). Information and awareness are two principal determinants of healthy behaviour. This information asymmetry leads to health challenges and burden for the entire health system(Asymmetric information in healthcare industry).

It is imperative for health workers to take an active role in promoting healthy lifestyle and reduce the future burden of non-communicable disease (Armstrong and Sigal, 2015; WHO, 2016; WHO EMRO | Physical activity case studies | Health education and promotion). Unfortunately, studies show low levels of health professional advice to individuals which also differs by age, sex and socioeconomic status. Various barriers to such practice have been documented, like, knowledge, time, primary focus on acute management, challenging care demands, time limitations, insufficient resources and attitudinal concerns (Barbosa Filho et al., 2016; Persson et al., 2013). ***Present scenario of advice on lifestyle modifications***

Kerala recorded the highest prevalence of diabetes (19%) in the country in 2016. and is expected to double by 2030 (ICMR et al., 2017; *IDF Diabetes Atlas*.).This could lead to health system crisis in the stat(Thankappan et al., 2010).The national programme for control of non communicable diseases provides for a comprehensive structure and training to health providers for health communication regarding benefits of physical activity and threats of a sedentary life style. Our analysis shows that in 2016, less than one- third of adults living with diabetes had been told by a health care professional to start or increase their exercise in the past 12 months. Such a small number of patients getting lifestyle modification advice seems inadequate. Although this study suffers from several limitations as analysis was based on a single question and included information only about past twelve months, we try to highlight a much neglected aspect of primary and secondary prevention in our countryEffective management of diabetes can only be done through a combination of medication and lifestyle modification, however, there is a complete lack of education on lifestyle modification aspects during their first or any of review visits(Joshi et al., 2008; Tharkar et al., 2011).The patients are clearly not a part of the active decision making where they could be informed about the various choices they have for disease prevention or treatment and long termcomplication-free healthy life . Doctors were found to underrate patients' need for information(Waitzkin, 1984). They directed their consultation mostly on quantitative measures such as blood glucose levels or glycated haemoglobin levels which was difficult for patients to relate to their physical experiences(Kruse et al., 2013). They talked about the importance of physical activity but focused mostly on the use of medications for treatment (Persson et al., 2013). Various individual and organisational barriers like lack of knowledge and training in physical activity counselling and perceptions about their qualification to offer physical activity advice in addition to lack of time and lack of selfefficacy,(Kennedy and Meeuwisse, 2003; Persson et al., 2013) need to be addressed to improve physical activity in clinical setting.

***Is advice by health care professional enough?***

Research shows that advice by health care providers is not enough, translate into adoption and maintenance(Glasgow et al., 2001). A large number of patients fall short on adherence to self management activities due to various barriers ranging from lack of awareness, unacceptable guidelines, social circumstances, practicalities related to changing lifestyle,(Booth et al., 2013)support from family(S and T, 2014),lack of time and local facilities(Thomas et al., 2004) fear of injuries (Sohal et al., 2015)etc. Patients' social contexts like care giving and work schedule(Kruse et al., 2013) influenced their self management .

Interventions to improve physical activity now encompass a comprehensive approach which ranges from interpersonal and community based interventions to broader national policy level changes. Although these transformations are necessary, it is also imperative that all change agents have to perform their role to bring about an evident change in the current lifestyle patterns(Bauman et al., 2012; Sallis et al., 2015).

***Why the physician’s responsibility?***

Physical activity reduces risk of mortality, associated complications with long term medication, surgeries associated with the disease and co-morbidities. In low resource countries, this strategy could lead to improved glycemic control, bring down the burden of chronic diseases, increase life expectancy and quality of life of the population thereby bringing down cost of care to patients and the country health resources(Asano et al., 2014; Colberg et al., 2016) (Wei et al., 2000)(Moucheraud et al., 2019)(Çolak et al., 2016).

.Health care professionals are responsible for giving advice (physical activity and diet modification) and mechanisms to do so need to be evolved. Health communication about benefits of personal behaviour like diet modification and physical activity and risks of sedentary behaviour should be an integral part of each counselling or contact with the health provider. There is a need for more concrete communication by the providers so that they partner with the patients in finding feasible solutions in adopting and maintaining this behaviour(Forbes et al., 2010; Sallis et al., 2015).

“Advice and prescribed medicines from physicians are seen by many as the ultimate source of and resource for healthier lives. Physical activity must be a part of this, in the form of opportunistic advice or encouragement, as well as more profound and committing written “prescriptions”(WHO, 2010).

**Conclusion**

The doctor-patient contract is based upon the trust of the patients and physicians’ ethical responsibility to place patients’ interests first. Patients believe in the doctor’s conviction of the best possible treatment for them.(“Code of Medical Ethics: Patient-Physician Relationships”)(Chipidza, Wallwork, and Stern 2015).Responsibility of physicians involves informing patients about the contraindications and side effects of any intervention. Advice on benefits of physical activity and threats of sedentary lifestyle should be a part of this.

like care giving and work schedule(Kruse et al., 2013) influenced their self management .

Interventions to improve physical activity now encompass a comprehensive approach which ranges from interpersonal and community based interventions to broader national policy level changes. Although these transformations are necessary, it is also imperative that all change agents have to perform their role to bring about an evident change in the current lifestyle patterns(Bauman et al., 2012; Sallis et al., 2015).

. **References**

ADA Diabetes Guidelines Lifestyle Changes Diet Exercise | NDEI (n.d.). Available at: http://www.ndei.org/ADA-diabetes-management-guidelines-lifestyle-changes-medical-nutrition-therapy-physical-activity.aspx.html (accessed 23 July 2017).

Armit, C. M., Brown, W. J., Marshall, A. L., Ritchie, C. B., Trost, S. G., Green, A., & Bauman, A. E. (2009). Randomized trial of three strategies to promote physical activity in general practice. *Preventive Medicine*, *48*(2), 156–163. https://doi.org/10.1016/j.ypmed.2008.11.009

Armstrong, M. J., & Sigal, R. J. (2015). Exercise as Medicine: Key Concepts in Discussing Physical Activity with Patients who have Type 2 Diabetes. *Canadian Journal of Diabetes*, *39 Suppl 5*, S129-133. https://doi.org/10.1016/j.jcjd.2015.09.081

Arokiasamy P (2018) India’s escalating burden of non-communicable diseases. *The Lancet Global Health* 0(0). DOI: 10.1016/S2214-109X(18)30448-0.

Asano RY, Sales MM, Browne RAV, et al. (2014) Acute effects of physical exercise in type 2 diabetes: A review. *World Journal of Diabetes* 5(5): 659–665. DOI: 10.4239/wjd.v5.i5.659.

Asymmetric information in healthcare industry : Networks Course blog for INFO 2040/CS 2850/Econ 2040/SOC 2090 (n.d.). Available at: http://blogs.cornell.edu/info2040/2016/12/01/asymmetric-information-in-healthcare-industry/ (accessed 8 October 2018).

Banu, B., Shahi, M. S. J. R., Begum, K., Ahmed, T., Choudhury, H. A., & Ali, L. (2014). Prescribing behavior of diabetes treating physicians in selected health care facilities of the diabetic association of Bangladesh. *Indian Journal of Public Health*, *58*(3), 180–185. https://doi.org/10.4103/0019-557X.138627

Barbosa, J. M. V., Souza, W. V. de, Ferreira, R. W. M., Carvalho, E. M. F. de, Cesse, E. A. P., & Fontbonne, A. (2017). Correlates of physical activity counseling by health providers to patients with diabetes and hypertension attended by the Family Health Strategy in the state of Pernambuco, Brazil. *Primary Care Diabetes*, *11*(4), 327–336. https://doi.org/10.1016/j.pcd.2017.04.001

Bauman AE, Reis RS, Sallis JF, et al. (2012) Correlates of physical activity: why are some people physically active and others not? *The Lancet* 380(9838): 258–271. DOI: 10.1016/S0140-6736(12)60735-1.

Bazzano, L. A., Serdula, M., & Liu, S. (2005). Prevention of type 2 diabetes by diet and lifestyle modification. *Journal of the American College of Nutrition*, *24*(5), 310–319.

Booth AO, Lowis C, Dean M, et al. (2013) Diet and physical activity in the self-management of type 2 diabetes: barriers and facilitators identified by patients and health professionals. *Primary Health Care Research & Development* 14(3): 293–306. DOI: 10.1017/S1463423612000412.

Castaneda, C. (2003). Diabetes control with physical activity and exercise. *Nutrition in Clinical Care: An Official Publication of Tufts University*, *6*(2), 89–96.

Chipidza FE, Wallwork RS and Stern TA (2015) Impact of the Doctor-Patient Relationship. *The Primary Care Companion for CNS Disorders* 17(5). DOI: 10.4088/PCC.15f01840.

Çolak TK, Acar G, Dereli EE, et al. (2016) Association between the physical activity level and the quality of life of patients with type 2 diabetes mellitus. *Journal of Physical Therapy Science* 28(1): 142–147. DOI: 10.1589/jpts.28.142.

Colberg SR, Sigal RJ, Yardley JE, et al. (2016) Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association. *Diabetes Care* 39(11): 2065–2079. DOI: 10.2337/dc16-1728.

Forbes CC, Plotnikoff RC, Courneya KS, et al. (2010) Physical activity preferences and type 2 diabetes: exploring demographic, cognitive, and behavioral differences. *The Diabetes Educator* 36(5): 801–815. DOI: 10.1177/0145721710378538.

Francis V, Korsch BM and Morris MJ (1969) Gaps in doctor-patient communication. Patients’ response to medical advice. *The New England Journal of Medicine* 280(10): 535–540. DOI: 10.1056/NEJM196903062801004.

Glasgow RE, Eakin EG, Fisher EB, et al. (2001) Physician advice and support for physical activity: results from a national survey. *American Journal of Preventive Medicine* 21(3): 189–196.

Hawley J (2004) Exercise as a therapeutic intervention for the prevention and treatment of insulin resistance - Hawley - 2004 - Diabetes/Metabolism Research and Reviews - Wiley Online Library. *Diabetes/Metabolism Research and Reviews* 20(5): 383–93.

He, W., Zhang, Y., & Zhao, F. (2013). Factors influencing exercises in Chinese people with type 2 diabetes. *International Nursing Review*, *60*(4), 494–500. https://doi.org/10.1111/inr.12046

Holt RIG, Nicolucci A, Burns KK, et al. (2013) Diabetes Attitudes, Wishes and Needs second study (DAWN2TM): Cross-national comparisons on barriers and resources for optimal care—healthcare professional perspective. *Diabetic Medicine* 30(7): 789–798. DOI: 10.1111/dme.12242.

Joshi S, Das A, J Vijay V, et al. (2008) Challenges in diabetes care in India: Sheer numbers, lack of awareness and inadequate control. *The Journal of the Association of Physicians of India* 56: 443–50.

Horne, M., Skelton, D., Speed, S., & Todd, C. (2010). The influence of primary health care professionals in encouraging exercise and physical activity uptake among White and South Asian older adults: Experiences of young older adults. *Patient Education and Counseling*, *78*(1), 97–103. https://doi.org/10.1016/j.pec.2009.04.004

ICMR, PHFI, & IHME. (2017). *India: Health of the Nation’s States The India State-Level Disease Burden Initiative* (p. 220). New Delhi, India.

IDF. (n.d.). *IDF Diabetes Atlas* (country reports No. 8). Brussels,Belgium. Retrieved from http://reports.instantatlas.com/report/view/846e76122b5f476fa6ef09471965aedd/IND?clear=true

Joshi S, Das A, J Vijay V, et al. (2008) Challenges in diabetes care in India: Sheer numbers, lack of awareness and inadequate control. *The Journal of the Association of Physicians of India* 56: 443–50.

Kalda, R., Pechter, U., Suija, K., Kordemets, T., & Maaroos, H.-I. (2015). Physical activity and exercise counselling: a cross-sectional study of family practice patients in Estonia. *Quality in Primary Care*, *20*(5). Retrieved from http://primarycare.imedpub.com/abstract/physical-activity-and-exercise-counselling-a-crosssectional-study-of-family-practice-patients-in-estonia-259.html

Kennedy MF and Meeuwisse WH (2003) Exercise counselling by family physicians in Canada. *Preventive Medicine* 37(3): 226–232. DOI: 10.1016/S0091-7435(03)00118-X.

Kruse RL, Olsberg JE, Shigaki CL, et al. (2013) Communication during patient-provider encounters regarding diabetes self-management. *Family Medicine* 45(7): 475–483.

Korkiakangas, E., Taanila, A. M., & Keinänen-Kiukaanniemi, S. (2011). Motivation to physical activity among adults with high risk of type 2 diabetes who participated in the Oulu substudy of the Finnish Diabetes Prevention Study. *Health & Social Care in the Community*, *19*(1), 15–22. https://doi.org/10.1111/j.1365-2524.2010.00942.x

Morrato, E. H., Hill, J. O., Wyatt, H. R., Ghushchyan, V., & Sullivan, P. W. (2006). Are health care professionals advising patients with diabetes or at risk for developing diabetes to exercise more? *Diabetes Care*, *29*(3), 543–548.

Morrison, F., Shubina, M., & Turchin, A. (2012). Lifestyle counseling in routine care and long-term glucose, blood pressure, and cholesterol control in patients with diabetes. *Diabetes Care*, *35*(2), 334–341. https://doi.org/10.2337/dc11-1635

Moucheraud C, Lenz C, Latkovic M, et al. (2019) The costs of diabetes treatment in low- and middle-income countries: a systematic review. *BMJ Global Health* 4(1): e001258. DOI: 10.1136/bmjgh-2018-001258.

Ofori SN and Unachukwu CN (2014) Holistic approach to prevention and management of type 2 diabetes mellitus in a family setting. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy* 7: 159–168. DOI: 10.2147/DMSO.S62320.

Orrow G, Sanderson S and SUTTON S (2012) Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials | The BMJ. *BMJ* 344. Available at: https://www.bmj.com/content/344/bmj.e1389.long (accessed 26 May 2019).

Parajuli, J., Saleh, F., Thapa, N., & Ali, L. (2014). Factors associated with nonadherence to diet and physical activity among nepalese type 2 diabetes patients; a cross sectional study. *BMC Research Notes*, *7*, 758. https://doi.org/10.1186/1756-0500-7-758

Patra, L., Mini, G. K., Mathews, E., & Thankappan, K. R. (2015). Doctors’ self-reported physical activity, their counselling practices and their correlates in urban Trivandrum, South India: should a full-service doctor be a physically active doctor? *British Journal of Sports Medicine*, *49*(6), 413–416. https://doi.org/10.1136/bjsports-2012-091995

Peek, M. E., Tang, H., Alexander, G. C., & Chin, M. H. (2008). National prevalence of lifestyle counseling or referral among African-Americans and whites with diabetes. *Journal of General Internal Medicine*, *23*(11), 1858–1864. https://doi.org/10.1007/s11606-008-0737-3

Persson, G., Brorsson, A., Ekvall Hansson, E., Troein, M., & Strandberg, E. L. (2013). Physical activity on prescription (PAP) from the general practitioner’s perspective – a qualitative study. *BMC Family Practice*, *14*, 128. https://doi.org/10.1186/1471-2296-14-128

Riddell MC, Miadovnik L, Simms M, et al. (2013) Advances in Exercise, Physical Activity, and Diabetes Mellitus. *Diabetes Technology & Therapeutics* 15(S1): S-96. DOI: 10.1089/dia.2013.1511.

Rydén L, Grant PJ, Anker SD, et al. (2013) ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASDThe Task Force on diabetes, pre-diabetes, and cardiovascular diseases of the European Society of Cardiology (ESC) and developed in collaboration with the European Association for the Study of Diabetes (EASD). *European Heart Journal* 34(39): 3035–3087. DOI: 10.1093/eurheartj/eht108.

Ramachandran, A., Snehalatha, C., Mary, S., Mukesh, B., Bhaskar, A. D., Vijay, V., & Programme (IDPP), I. D. P. (2006). The Indian Diabetes Prevention Programme shows that lifestyle modification and metformin prevent type 2 diabetes in Asian Indian subjects with impaired glucose tolerance (IDPP-1). *Diabetologia*, *49*(2), 289–297. https://doi.org/10.1007/s00125-005-0097-z

S A and T M (2014) Self Care and Medication Adherence among Type 2 Diabetics in Puducherry, Southern India: A Hospital Based Study. *Journal of clinical and diagnostic research: JCDR* 8(4): UC01-03. DOI: 10.7860/JCDR/2014/7732.4256.

Sallis, R., Franklin, B., Joy, L., Ross, R., Sabgir, D., & Stone, J. (2015). Strategies for promoting physical activity in clinical practice. *Progress in Cardiovascular Diseases*, *57*(4), 375–386. https://doi.org/10.1016/j.pcad.2014.10.003

Schmidt H (2016) Chronic Disease Prevention and Health Promotion. In: H. Barrett D, W. Ortmann L, Dawson A, et al. (eds) *Public Health Ethics: Cases Spanning the Globe*. Cham (CH): Springer. Available at: http://www.ncbi.nlm.nih.gov/books/NBK435779/ (accessed 30 May 2019).

Sohal T, Sohal P, King-Shier KM, et al. (2015) Barriers and Facilitators for Type-2 Diabetes Management in South Asians: A Systematic Review. *PloS One* 10(9): e0136202. DOI: 10.1371/journal.pone.0136202.

Tandon N, Anjana RM, Mohan V, et al. (2018) The increasing burden of diabetes and variations among the states of India: the Global Burden of Disease Study 1990–2016. *The Lancet Global Health*. DOI: 10.1016/S2214-109X(18)30387-5.

Thankappan, K. R., Shah, B., Mathur, P., Sarma, P. S., Srinivas, G., Mini, G. K., … Vasan, R. S. (2010). Risk factor profile for chronic non-communicable diseases: results of a community-based study in Kerala, India. *The Indian Journal of Medical Research*, *131*, 53–63.

Tharkar S, Devarajan A, Barman H, et al. (2011) How far has translation of research been implemented into clinical practice in India? Are the recommended guidelines adhered to? *International Journal of Diabetes Mellitus* 3. DOI: 10.1016/j.ijdm.2011.01.002.

Thomas N, Alder E and Leese G (2004) Barriers to physical activity in patients with diabetes. *Postgraduate Medical Journal* 80(943): 287–291. DOI: 10.1136/pgmj.2003.010553.

Thent, Z. C., Das, S., & Henry, L. J. (2013). Role of Exercise in the Management of Diabetes Mellitus: the Global Scenario. *PLOS ONE*, *8*(11), e80436. https://doi.org/10.1371/journal.pone.0080436

Waitzkin, H. (1985). Information giving in medical care. *Journal of Health and Social Behavior*, *26*(2), 81–101.

Walsh, J. M. E., Swangard, D. M., Davis, T., & McPhee, S. J. (1999). Exercise counseling by primary care physicians in the era of managed care. *American Journal of Preventive Medicine*, *16*(4), 307–313. https://doi.org/10.1016/S0749-3797(99)00021-5

Wei M, Gibbons LW, Kampert JB, et al. (2000) Low cardiorespiratory fitness and physical inactivity as predictors of mortality in men with type 2 diabetes. *Annals of Internal Medicine* 132(8): 605–611.

WHO (2010) *Steps to health*. denmark. Available at: (http://www.euro.who.int/pubrequest). (accessed 26 May 2019).

WHO (2016) WHO | Global Action Plan for the Prevention and Control of NCDs 2013-2020. Available at: http://www.who.int/nmh/events/ncd\_action\_plan/en/ (accessed 5 October 2018).

WHO EMRO | Physical activity case studies | Health education and promotion. (n.d.). Retrieved March 4, 2017, from http://www.emro.who.int/health-education/physical-activity-case-studies/index.html

Yang, K., Lee, Y.-S., & Chasens, E. R. (2011). Outcomes of health care providers’ recommendations for healthy lifestyle among U.S. adults with prediabetes

*Metabolic Syndrome and Related Disorders*, *9*(3), 231–237. https://doi.org/10.1089/met.2010.0112

[[1]](#footnote-1)

1. [↑](#footnote-ref-1)