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Nursing

SELF CARE PRACTICES ON DIET AND PHYSICAL ACTIVITY AMONG THE TYPE 2 DIABETIC SUBJECTS RESIDING IN RURAL AREA AT CHIDAMBARAM TALUK IN CUDDALORE DISTRICT

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ABSTRACT

Background: Increased prevalence of diabetes in India is due genetic susceptibility, dietary shift and rapid lifestyle changes. Self care practices in terms of diet, physical activity and medication adherence reduce the risk of complications related to diabetes.

Objective: The objective of this study is to assess the self care practice on diet and physical activity among Type 2 diabetic patients residing in selected rural area at Chidambaram taluk in Cuddalore District.

Materials and Methods: The cross-sectional study was conducted using structured interview guide among 90 subjects with Type 2 diabetes residing at selected rural area. Baseline characteristics of the study participants were elucidated and their practice regarding the diet and physical activity were assessed. In this study International physical activity questionnaire -short form (Version 2.0.april 2004) was used to assess the physical activity of the subjects with diabetes.

Results: The mean age of the study population was found between 55-65years. The study results reveal that 55(61.11%) of subjects had inadequate dietary practices. Whereas 35(38.89%) respondents with diabetes had moderately adequate practice and none of them had adequate dietary practices. Only about 5(11.36 %) among males and 2(4.34%) among females are physically active and exercise apart from their normal work duties.

Conclusion: During the past few years, there have been significant advances in medications, insulin delivery and glucose monitoring technologies. Despite the advances, individuals with diabetes in rural areas have limited access health-care resources and education on importance of physical activity and adherence to dietary regimen. This highlight the need to address structural inequities and empower individuals to pursue health and well-being on their own.

KEYWORDS : Self care practice, Physical Activity , Dietary practice

1. BACKGROUND

Type 2 diabetes mellitus is an escalating public health problem in India that is associated with genetic susceptibility, dietary shift, and rapid lifestyle changes. Historically diabetes was considered to be a disease of the urban elite. Quantitative studies had confirmed rising prevalence rates among marginalized populations in rural India.(Matthew Little et al. 2016).Dietary habits and sedentary lifestyle were the major factors for rapidly rising incidence of type 2 Diabetes Mellitus among developing countries (Waqas Sami et al. 2017).The presence of the Public Distribution System that subsidized rice, sugar, and cooking oil had influenced food intake in recent years. Commercialization of agriculture and improved access to packed foods reduced the local availability of healthy traditional staples that lead to increased consumption of high-fat and high-sugar foods (Matthew Little et al. 2016). Diabetes is a chronic disease which requires a multipronged approach for its management, wherein the individuals has an important role to play (Raithatha SJ et al. 2014). They are required to follow certain self-care practices to achieve an optimal glycemic control and prevent complications. These practices include regular physical activity, appropriate dietary practices, daily foot care practice, compliance with treatment regimen and tackling complications such as hypoglycemic episodes (American Diabetes Asssociation. Standards of medical care in diabetes 2013). Studies have concluded that decreased physical activity was observed among the South Asians when compared to other ethnic groups (Hayes L et al. 2002, Khunti K et al . 2007). Several studies have focused on the risk factors and lifestyle modifications on the individuals residing in urban area. Only few studies have focused about the dietary practices, food perceptions, and physical activity on the rural population especially among the southern part of Tamil Nadu. Thus it is essential to have awareness about self care practices among the diabetic individuals residing in rural area to improve the quality of life and prevent complications. Based on this background, the objective was designed to assess the practices of diet and physical exercise among Type 2 diabetic patients residing in selected rural area.

2. OBJECTIVE

To assess the self care practices in terms of diet and physical activity among the subjects with type 2 diabetes residing in selected rural area

3. MATERIALS AND METHODS

A cross-sectional community-based study was conducted for a period of 3 months. The study was conducted in a village named Methigudi that is situated in Cuddalore district at Chidambaram taluk . Methigudi village is situated 2 km away from Chidambaram town and has the total population coverage around 2,700 and the particular village was selected due to limited access to health services. Around 90% of the subjects with type 2 diabetes mellitus receive their treatment either from Chidambaram govt hospital or from PHC. Regardless of ethnicity, a total of 90 participants with diabetes were selected by using Purposive sampling. The subjects with type 2 diabetes were tracked from the Non Communicable Disease register maintained by the village health nurse and the subjects attending NCD clinic at Chidambaram govt hospital. Subjects of both gender with poor glycemic control and taking oral hypoglycaemic agents were identified and included in the study. Individuals with significant complications related to diabetes and systemic illness were excluded from the study. Before data collection, each participant was given a full explanation of the research project and its purpose and was then given to sign an informed consent form. Pilot study was carried out to find out the reliability and validity of the questionnaire. The structured questionnaire was pretested on a sample of 30 subjects to find out difficulties in understanding the meaning of the questions and to estimate the amount of time to answer all the questions. A face-to-face interview was carried out for approximately 10–15 min and was conducted at place comfortable for the participant. When it was necessary, appropriate probing

questions were asked and the participants were given freedom to express additional views on the topic at the end of the interview session to ensure completeness in data collection. The feedback revealed that the questionnaires were easy to understand and quite convenient for the respondents The study had been approved by the human ethical committee of Rajah Muthiah Institute of Health Science for conducting the study. Permission was obtained from the concerned authorities of the selected communities. The data collected were entered in Microsoft Excel Office 2007 and SPSS statistics version 20 was used for statistical analysis.

Description of the data collection instrument
Interview Schedule to assess the dietary practices
A structured Interview guide which was prepared in vernacular language were utilized to assess the self care practice on diabetes .The questions were organized under two domains namely, dietary practices and adherence to physical activity to make the tool complete.

a. Dietary practices domain: It consist of questions of Dietary intake practice were ascertained by 10 questions about the intake of complex carbohydrate and processed foods, inclusion of antioxidant, habit of reading food labels intermittent fasting. The subjects had to recall the dietary practices in the preceding week to assess the dietary practices, 'The answers were scored in three levels 'always' was given 2 marks sometimes' was given 1 marks and 'never' was given 0 mark in positive stated questions and vice versa in negatively stated questions.

Scoring interpretation

Level of practices	Range of score	No of questions	Percentage
Adequate diet practices	16-20	8-10	>75
Moderately adequate diet practices	12-14	6-7	50-75
Inadequate diet practices	<10	5	<50

b. Physical activity questionnaire In physical activity domain, International physical activity questionnaire short form was used as a measure to evaluate the physical activity of the individuals with diabetes. It consist of seven open ended questions surrounding individuals 7-day recall of physical activity to assess the intensity of physical activity and sitting time that individuals do as part of their daily lives are considered to estimate total physical activity in MET-min/week.

Vigorous intensity physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. The samples should think about those physical activities that they did for at least 10 minutes at a time for the past 7 days.

Moderate intensity activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. The individuals with diabetes should think about those physical activities that they did for at least 10 minutes at a time for the past 7 days.

Activity	MET levels
Walking	3.3 METs
Moderate Intensity	4.0 METs
Vigorous Intensity	8.0 METs

Continuous Score
Expressed as MET-min per week: MET level x minutes of activity x events per week Categorical score

Inactive Category 1	Minimally Active Category 2	Health Enhancing Physical Activity Category 3
No activity is reported OR Some activity is reported but not enough to meet Categories 2 or 3.	activities achieving a minimum of at least 600 - 1500 MET-min/week.-	activities achieving a minimum of at least 1500- 3000 MET-minutes/week

Operational Definition

Self care Practice: The pattern and regularity of practices of the subjects with diabetes in terms of eating and physical activity that helps to maintain optimal glycemic levels.

Physical activity: Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure.

Dietary practices :
The dietary measures taken by the subjects with diabetes in order to maintain glycemic control that includes intake of fibre rich foods and vegetables and fruits with low glycemic index and use of complex carbohydrate and unrefined foods.

Analysis
Table 1: Distribution of Socio demographic characteristics of the subjects

Demographic variables		Chi square test	
		Group1(n=90)	
		N	%
Age	35 – 45 years	6	6.67%
	45 – 55 years	34	37.78%
	55 – 65 years	50	55.55%
Sex	Male	44	48.89%
	Female	46	51.11%
Marital status	Married	65	72.22%
	Unmarried	6	6.67%
	Others (divorcee/widow)	19	21.11%
Education	Illiterate	11	12.22%
	Primary school	18	20.00%
	Middle school	28	31.12%
	High school	22	24.44%
	Diploma	8	8.89%
	Graduate	3	3.33%
Family income	> Rs.19,575	16	17.78%
	Rs.9,787-19,574	36	40.00%
	Rs.4,894- 9,786	34	37.78%
	Rs.2,936- 4,893	4	4.44%
	<Rs.2,936	0	0.00%
Occupation	Professional	0	0.00%
	Clerical	9	10.00%
	Skilled	42	46.67%
	Unskilled	25	27.78%
	Unemployed	14	15.55%
Socio-economic status	Upper	9	10.00%
	Middle	67	74.44%
	Low	14	15.56%

NS= not significant P>0.05 not significant

Table 1 denotes distribution of the subjects based on socio-demographic variables in two groups. Nearly one third of the participants 50 (55.55) belonged to the age group of 55- 65 years and fewer subjects 6 (6.67%) were in the age group of 35-45 years among the subjects with T2DM .The data on distribution of subjects according to their gender revealed that 44(48.89 %) were male and 46 (51.11%) were female. With regard to education, majority of the subjects 28 (31.12%) and eleven (12.22%) of the participants were illiterate respectively. With reference to occupation, Majority of the subjects, 42(46.67%) were skilled labours, and fourteen (15.55%) of them are unemployed. Majority of the subjects 36(40%) had income between Rs.9,7 87-19,574 and fewer subjects 4(4.44%)

had income lesser than Rs,2936 respectively. Among 90 subjects 9(10%)of subjects belong to upper income group, 67(74.44%) of them belonged to middle income group and 14(1 3.56%) of subjects belonged to low income group.

Table 2: Self care practices regarding diet among the subjects

sno	Items	Life style Practice score					
		Never		Sometimes		Always	
		N	%	n	%	n	%
1	Take diet rich in complex carbohydrate & fibre	10	11.11%	70	77.78%	10	11.11%
2	Include foods rich in antioxidants	13	14.44%	60	66.67%	17	19.89%
3	Take Processed foods ,soft drinks and Maida products	36	40.00%	51	56.67%	3	3.33%
4	Take saturated fats like meat, coconut oil often etc	20	22.22%	63	70.00%	7	7.78%
5	Consume unrefined rice	31	34.44%	42	46.67%	17	18.89%
6	Consume at least 3 portions of fruits or vegetables with low glycemic index	23	25.56%	49	54.44%	18	20.00%
7	Have the habit of reading the food labels	55	61.11%	16	17.77%	19	22.22%
8	Eat meals at regular timings	13	14.44%	48	53.33%	29	32.22%
9	I compensate over eating by total fasting	13	14.44%	69	76.67%	8	8.89%
10	3 meals spaced over the day with intermittent spacing	45	50.00%	42	46.67%	3	3.33%

Table 2 displays the recall of dietary practices over the preceding week among the subjects .Out of 90 subjects, only few 10 (11.11%) exercised dietary control by largely by avoiding sweet items and reduce their intake of refined carbohydrates. On the other hand 10(11.11%) of the participants never had the habit of taking complex carbohydrate and fibre like legumes, whole grains and plant fibres as they were not able to relate complex carbohydrate with glycemic response . Only 1(19.89%) had the habit of taking foods rich in antioxidant and the majority of them were unaware that Glucose metabolism leads to oxidative stress in the diabetic subjects that leads to complications. Around 51(56.67%) sometimes take processed foods, soft drinks and Maida product because fast food hotels are now available in their village and food products are affordable. A total of 63(70%) of the respondents sometimes had the habit of taking saturated fats often especially meat, dalda etc. About 19(22.22%) of the participants always had the habit of reading food labels regarding added sugar and dietary fibre. Nearly two fourth of the participants 50(55.56%) in our study were skilled labourers and they expressed their opinion that it was not convenient for them to maintain every time a routine eating schedule. Around 69(76.67%) of them compensate overeating by total fasting that spike the blood sugar level. About 45 (50%) of the diabetic subjects never had the habit of gazing food items that make them more resistive to insulin and spike their post prandial blood glucose . Only18 (20%) of subjects had the regular habit of consuming fruits and vegetables with low glycemic index. During sorting exercises of foods based on the glycemic index most participants acknowledged the health benefits of vegetables, although dietary recall data suggest that the consumption of these items was low, averaging less than one serving per day. In addition, very few participants avoided high-fat items. In regard to oil consumption, usually groundnut oil or palm oil was readily consumed by respondents and were identified as 'healthy' during the sorting exercise. The subjects also believe that wheat products contain negligible carbohydrates and can be taken in any amount.

Table 3 : Distribution of subjects based Dietary practice score

Level of Diet practice score	Group I	
	n	%
Inadequate diet practices	55	61.11%
Moderately adequate diet practices	35	38.89%
Adequate diet practices	0	0.00%
Total	90	100.0%

Table 3 highlights that among the subjects, 61.11% of them had inadequate dietary practice, 38.89% of them had moderately adequate practice and none of them had adequate practice.

Table 4: Adherence to Physical Activity Based On IPAQ among the Participants

N=90

Category	Male (44)		Female(46)		Chi square test
	Number of Respondents	Percentage	Number of Respondents	Percentage	
Inactive	22	50.00	18	39.13	$\chi 2$= 3.53p value 0.17 (NS)
Minimally Active	17	38.63	26	56.52	
Health Enhancing Physical Activity	5	11.36	2	4.34	

Table 4 specifies that most participants residing in selected rural area admitted that diet and medication adherence is important in management of diabetes than physical activity. Only very few 5 (11.36%) among males and 2(4.34%) among females are physically active and exercise apart from their normal work duties. Around 17 (38.63%) of males and 26(56.52%) of females are minimally active as they are involved in only moderate household activity and spent less time for vigorous physical activity that take hard physical effort. About 22(50%) of males and 18(39.13)% of females are sedentary as they spent more time in watching television and carrying out light house hold work. Most commonly females they regarded themselves as very busy and cited that they lack free of time to make vigorous activity atleast for 10 min in a day. Since the $\chi 2$ value is 3.53 lesser than the table value and p value greater than 0.05 indicates no significant difference between the groups in terms of physical activity. Overall adherence to physical activity was also found to be poor. Only a few subjects accumulate activity for a healthy lifestyle. The following are the statements regarding activity among the subjects .

"My family members and neighbours will make fun if I do exercise in this age"

"I wake up and make food for my family members, there is no time for other activities "

"Where is the time for activities, I must fulfil my responsibilities. …"

"I feel tired to exercise"

These quotes also suggest that exercise is perceived to detract from work and family duties and is considered selfish, over smart or irresponsible. Particularly elderly participants viewed themselves as incapacitated by diabetes and therefore unable to exercise. Some recognized this as a

negative cycle. During data collection it became apparent that exercise for health or leisure had little cultural importance or acceptance, and was often met with fears of appearing 'abnormal.'

DISCUSSION

Table 2 displays the results of dietary practices that were recalled over previous week by the subjects in selected rural area. About 70 (77.78 %) of the subjects sometimes take complex carbohydrate and only 10 (11.11%) had the habit of taking complex carbohydrate food regularly like whole grains and legumes .The findings of study conducted by Khattab etal .,(2010)   stated that Whole grains and legumes fulfil the four dietary objectives for people with diabetes specifically high complex carbohydrates, high fibre, low fat and refined sugar. The type of fats consumed is more important than total amount of fat when looking at metabolic goals and CVD risk. Shashank R Joshi et al., (2014) concluded that T2DM participants belonging to any part of India consume high CHO in their diet if we compare with dietary recommendations. The findings of our study pointed out that almost 51(56.67%) of individuals with diabetes sometimes take Processed foods ,soft drinks and Maida product because fast food hotels are now available in their village and food products are available at cost they can afford.   Similarly the findings of Marcy et al., (2011) have identified that high cost of healthy food and inability to resist the temptation to eat unhealthy as barriers in adopting new dietary habits among type 2 diabetes patients belonging to low-income group.   The findings of the present study reveal that 63(70%) of the study subjects sometimes had the habit of taking saturated fats. Whereas   Multiple randomized controlled trials including patients with type 2 diabetes have reported that a Mediterranean-style eating pattern (Brehm BJ, Shai I Brunerova L Bloomfield HE) rich in monounsaturated fats can improve both glycemic control and blood lipids. MUFA improves insulin responsiveness in insulin-resistant and type 2 diabetic subjects.

Approximately 49(54.44%) of the subjects sometimes consume fruits and vegetables because of the financial inability and lack of market facility   that they consistently do not eat a healthy diet. Where as a study done by Gopichandran et al., (2012) and Rajasekharan et al., (2015) also showed only 26% consume fruits and vegetables regularly in their diet This low consumption in our study could be due lack of awareness about the importance of fruits and vegetable intake and also due to their misperception that fruit intake will increase blood sugar levels.

The significant finding is that 55 (61.11%) never had the habit of reading food labels and the study findings were in accordance to the study conducted by Jumma Al-Kaabi et al., (2008) explained that among a sample of 409 diabetic patients was recruited, 50% of whom were illiterate. Only 24% read food labeling. 76% reported being unable to distinguish clearly between low and high carbohydrate index food items and no one reported to count calorie intake.

Table 4 present that around 17 (38.63 %) of males and 26(56.52%) of females are minimally active as they are involved in only moderate household activity and spent less time for vigorous physical activity that take hard physical effort. About 22(50%) of males and 18(39.13) % of females are sedentary as they spent more time in watching television and carrying out light house hold work. The study findings were in agreement of the study conducted by Gracy Paulin and Rama Subramanian ˹2019) to address the levels of activity among the subject with diabetes residing in urban area. Most of the physical activities done by the diabetic patients were moderate intensity physical activity like brisk walking or cycling. The proportion of study population involved in

vigorous intensity physical activity was very low (1.5%). Nearly 15% of them engaged in moderate physical activity in the transport domain. On an average, the study population spent only 18 minutes per week on physical activity in transport.

The present study findings indicate that females they regarded themselves as very busy and cited that they lack free of time to make vigorous activity atleast for 10 min in a day. Since the $\chi 2$ value is 3.53 lesser than the table value and p value greater than 0.05 indicates no significant difference between the groups in terms of physical activity. The study findings were not similar to the study conducted by Carol Susan Devamani et al., (2018)   revealed that women had a higher prevalence of insufficient physical activity compared to men in rural (44.5% vs. 35.6%) areas. Rural participants had higher work and travel related Physical Activity. The high prevalence of insufficient activity found in present study shows that targeted interventions are needed to reduce insufficient physical activity especially for rural populations.

Currently, there is a pressing need to better understand the physiology and health outcomes specifically derived from replacing sedentary time with non fatiguing types of light activity. It can be potentially achievable in more types of people   and thereby provide high impact at the population level.

Limitations:
1. Social desirability bias may be existed in this study while this is questionnaire based interview study
2. Recall bias: Bias in recall occur when the study participant had a poorer recall in general. Other factors that influence recall include age and education

Recommendation
1. Nurse should influence policymakers to combat the nutrition transition and the diabetes epidemic in rural regions of India by promoting foods with higher fiber content and lower glycemic indices. Hence simultaneously reducing availability and consumption of 'hyperpalatable' foods.
2. Dietary recommendations need to be individualized as 'one size does not fits all' and accepted by the subjects with diabetes. It's important to note that the nutrition goals for diabvetes individuals should incorporate into their lifestyle.
3. A special focus must be given by community health nurse for subjects with diabetes and other related comorbidity by providing them with additional information on dietary adherence.
4. Nurses can organize "move program" in community for the subjects with diabetes to encourage physical activity

CONCLUSION
Diabetes mellitus (DM) is an incurable but controllable disease. Self-knowledge about the physical exercise is very important to enhance the insulin sensitivity. Hence, this study provides the valuable data on diet, physical activity and medication adherence. According to our findings, non-adherence to physical activity is high among T2DM is high as evidenced by 74.3% of the study participants reporting non-adherence. Lack of knowledge on complications, presence of co-morbidities, lack of motivation, socio-cultural factors, family influences were the most significant barriers responsible for non-adherence. Therefore, health professionals must become proactive in identifying and addressing these barriers and health care decision and policymakers should design effective practice guideline for people with T2DM especially in rural areas.

REFERENCES
1. Matthew Little, Sally Humphries, Kirit Patel, and Cate Dewey (2017). Decoding the Type 2 Diabetes Epidemic in Rural India : Med Anthropology 36(2): 96–110

2. Waqas Sami, Tahir Ansari, Nadeem Shafique Butt and Mohd Rashid Ab Hamid (2017). Effect of diet on type 2 diabetes mellitus: A review Int J Health Sci (Qassim). Apr-Jun; 11(2): 65- 71
3. Raithatha SJ, Shankar SU, Dinesh K. (2014).Self-care practices among diabetic patients in Anand district of Gujarat. ISRN Family Med 2014. :743791.
4. American Diabetes Association. Standards of medical care in diabetes mellitus. Diabetes Care 2013;36 Suppl 1:S11-S66.
5. Hayes L, White M, Unwin N, Bhopal R, Fischbacher C, Harland J, et al. (2002).Patterns of physical activity and relationship with risk markers for cardiovascular disease and diabetes in Indian, Pakistani, Bangladeshi and European adults in a UK population. J Public Health Med;24:170-8. 11.
6. Juma Al-Kaabi., Al-Maskari, F., Saadi, H., Afandi, B., Parkar, H., & Nagelkerke, N. (2008). Assessment of dietary practice among diabetic patients in the United arab emirates. The review of diabetic studies : RDS, 5(2), 110–115. doi:10.1900/RDS.2008.5.110
7. Gracy Paulin1* and Rama SubramanianPhysical Inactivity among Diabetic Patients in Urban Tamilnadu: A Community-Based Study J Community Med Health Educ 9: 649, Vol 9(2)
8. CarolSusan Devamani Oommen, Anu & Mini, Gk & Abraham, VinodJoseph & George, Kuryan. (2019). Levels of physical inactivity in rural and urban Tamil Nadu, India: A cross-sectional study. Journal of Clinical and Preventive Cardiology. 8. 13. 10.4103/JCPC.JCPC_32_18.
9. Marcy TR, Britton ML, Harrison D. (2011).Identification of barriers to appropriate dietary behavior in low-income patients with type 2 diabetes mellitus. Diabetes Ther;2:9-19.
10. Hempler NF, Nicic S, Ewers B, Willaing I. (2015). Dietary education must fit into everyday life: A qualitative study of people with a Pakistani background and type 2 .diabetes. Patient Prefer Adherence;9:347-54
11. BloomfieldHE, KoellerE,GreerN,MacDonald R,KaneR,WiltTJ. (2016).Effects on health outcomes of a Mediterranean diet with no restriction on fat intake: a systematic review and meta-analysis. Ann Intern Med;165:491–500
12. Brehm BJ, Lattin BL, Summer SS, et al. (2009). One year comparison of a high-monounsaturated fat diet with a high-carbohydrate diet in type 2 diabetes. Diabetes Care;32:215–220
13. Shai I, Schwarzfuchs D, Henkin Y, et al. (2008).Dietary Intervention Randomized Controlled Trial (DIRECT) Group. Weight loss with a low carbohydrate, Mediterranean, or low-fat diet. N Engl J Med 359:229–241
14. Gopichandran SV, Lyndon MK, Angel PB, Manayalil BP, Blessy KR, Alex RG, et al. Diabetes self-care activities: a community-based survey in urban southern India. Natl Med J India. 2012;25(1):1-14. 8.
15. Rajasekharan D, Kulkarni V, Unnikrishnan B, Kumar N, Holla R, Thapar R. Self-Care Activities Among Patients with Diabetes Attending a Tertiary Care Hospital in Mangalore Karnataka. India. Ann Med Health Sci Res. 2015;5(1):59–64.
16. Hamilton, M. T., Healy, G. N., Dunstan, D. W., Zderic, T. W., & Owen, N. (2008). Too Little Exercise and Too Much Sitting: Inactivity Physiology and tshe Need for New Recommendations on Sedentary Behavior. Current cardiovascular risk reports, 2(4), 292–298. doi:10.1007/12170-008-0054-8
17. Joshi, S. R., Bhansali, A., Bajaj, S., Banzal, S. S., Dharmalingam, M., Gupta, S.,Joshi, S. S. (2014). Results from a dietary survey in an Indian T2DM population: a STARCH study. BMJ open, 4(10), e005138. doi:10.1136/bmjopen-2014-005138.