Singapore Med J 2019; 60(5): 216-223
https://doi.org/10.11622/smedj.2019042

Factors affecting follow-up non-attendance in patients with Type 2 diabetes mellitus and hypertension: a systematic review

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This is a systematic review of the factors and reasons associated with follow-up non-attendance (FUNA) in patients with Type 2 diabetes mellitus and hypertension in an outpatient setting. We performed a systematic literature search using electronic databases and related keywords with the PRISMA-P checklist, focusing on the factors, types of studies and number of studies that showed a positive, negative or neutral association with FUNA. Data was presented in three categories: patient, disease and medication, and healthcare provider factors. In total, 4,822 articles were reviewed. Among the 24 articles that were relevant to the stated objective, 83 factors were found to be associated with FUNA. A target-board model for FUNA was presented for clinicians to better understand the various aspects contributing to and implications involved in FUNA. Greater awareness and understanding of the multifactorial nature of FUNA and taking a multifaceted approach are important to effectively reduce this problem.

Keywords: chronic, diabetes mellitus, follow-up, hypertension, systematic review

INTRODUCTION

Diabetes mellitus (DM) and hypertension, causes of cardiovascular morbidity, are among the leading chronic diseases in the world.[1-3] These two common chronic conditions require regular long-term follow-up as a standard of medical care.[4,5] Delivery of adequate medical care to such patients is impeded by their follow-up non-attendance (FUNA) of outpatient appointments. This may correlate with poor control of their chronic illness,[6,7] higher risk of hospital admissions,[8] decreased clinic efficiency[9] and mortality.[10] It is therefore important to determine the reasons behind poor outpatient clinic attendance in patients with chronic diseases, particularly DM and hypertension.

Many studies in the literature have investigated the effectiveness of different technological interventions, often at the systems level, in reducing the rate of FUNA in patients with chronic conditions, as reported by several recent systematic reviews.[11-13] However, we found that there are a limited number of studies with a comprehensive list of the factors affecting FUNA. For hypertension, our literature search showed that no studies to date provide a complete review of this area. As for DM, after a systematic review done by Griffin et al 18 years ago, there have been no subsequent reviews.[14] Hence, our aim was to provide a systematic literature review of the factors that influence FUNA, the patient characteristics associated with FUNA and the reasons cited for FUNA in patients with these chronic conditions.

METHODS

We created an electronic database using PubMed®, Google Scholar, PsycINFO®, Scopus® and Web of Science, based on the PRISMA-P reporting checklist, for our systematic review. Manual searches were carried out using the reference lists of related articles. We reviewed literature from the inception of the databases to December 2016. The keywords used were ((factors OR causes OR reasons) AND (no show OR defaulted OR non-attendance) AND (follow-up OR appointment) AND (hypertension OR diabetes OR hyperlipidaemia OR hyperlipidemia OR metabolic) AND ('outpatient' OR 'general practice' OR 'family practice')). For PubMed, we also searched using MeSH terms: (('diabetes mellitus, type 2'[MeSH] OR 'hypertension'[MeSH]) AND 'lost to follow-up'[MeSH] AND ('outpatient clinics, hospital'[MeSH] OR 'general practice'[MeSH])). We included hyperlipidaemia in the search as we had intended to include it; however, as no papers on hyperlipidaemia satisfied our search criteria, we decided to exclude this condition in the remainder of the review.

Two independent reviewers (Samsudin MI and Lee RRS) performed both article inclusion and data extraction. The inclusion criteria of the review were English peer-reviewed journals that studied patient factors and characteristics of non-attendance in Type 2 DM, hypertension and hyperlipidaemia. Studies that only involved patients with Type 1 DM or gestational DM were excluded because the patient demographics were different from those of Type 2 DM. FUNA of education programmes and dietitian consults were excluded. Studies that subsumed FUNA into its multiple outcomes were excluded. Reviews, meta-analyses, case series and case reports, as well as studies that were interventional in nature, were also excluded from the review.

Information on the study design and clinic setting (hospital or community), sample size, country of study, and disease of interest of selected studies was summarised. The quality of the studies was

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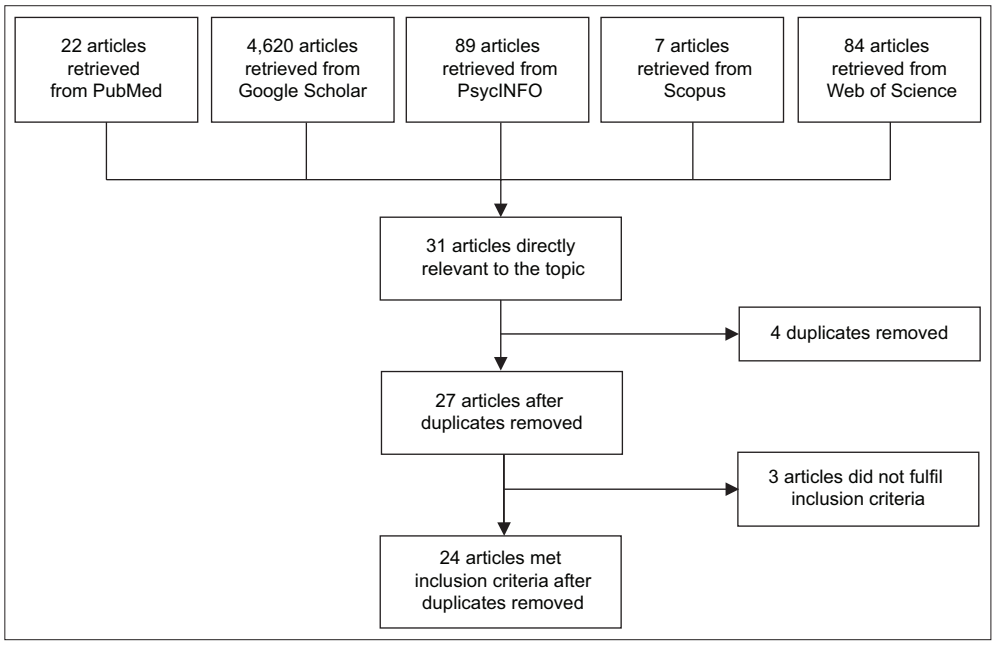

Fig. 1 Flowchart shows the selection of articles for review.

assessed using the modified Newcastle Ottawa Score.[15] Studies were then classified into three main categories and tabulated according to whether each factor showed a positive, negative or neutral association with FUNA. Anecdotal reasons given by patients for their FUNA were also presented. These 'reasons' for FUNA did not have any statistical analysis done as reflected in the original studies and, as such, were distinguished from 'factors' in our review. A target-board model of FUNA in patients with chronic diseases was proposed to better understand the delicate factors that affect FUNA in this group of patients.

RESULTS

A total of 4,822 articles were retrieved by our searches, comprising 22 PubMed, 4,620 Google Scholar, 89 PyscINFO, seven Scopus and 84 Web of Science articles. Out of 31 articles that were relevant to our objective, four were duplicates, while another three articles did not fulfil the inclusion criteria, leaving 24 articles for review (Fig. 1). Among these 24 articles, 15 (62.5%) were cohort studies, 6 (25.0%) were cross-sectional studies, and 3 (12.5%) were case-control studies.

The country, sample size and disease of interest for each study are summarised in Table I. A total of 83 factors and 36 reasons were procured for FUNA in diabetic and hypertensive patients. Tables II–IV contain quantitative data detailing the factors and studies that had a positive, neutral or negative association with FUNA. Several studies showed mixed results, which were also indicated in each table, as some studies reported univariate versus multivariate results, while some reported results at two different time points. The 83 factors reviewed were classified into three categories: patient factors; medication and disease factors; and healthcare provider factors. Qualitative data in the form of anecdotal reasons cited by patients for FUNA is shown in Table V.

Patient factors

A total of 32 patient factors from 19 studies[16-34] were identified (Table II). The studies investigated the different patient factors that may affect an individual's willingness and ability to return for follow-up at their respective health clinics. The results were summarised under the following categories: mental state, demographics, alcohol and tobacco use, knowledge/beliefs/attitudes, and others. Mental state factors that were associated with FUNA included patients who had interpersonal relations that were dismissing, where they felt the need to be independent and were not comfortable trusting others; and interpersonal relations that were fearful, where patients were afraid of intimacy due to fear of rejection.[21] Depression, on the other hand, was not associated with FUNA.[30,31]

While there are several studies that showed a positive association between FUNA and certain demographic factors such as age and gender, many more studies showed that these factors as well as type and status of employment were not associated with FUNA.[16-20,22-26,29-33] Two studies showed varied results regarding a positive association between FUNA and patients with English as their primary language and between FUNA and education status.[18,30] For alcohol, smoking and substance use, several studies showed no association with FUNA.[19,27,29,30,33] However, three studies found that FUNA was positively associated with smoking.[18,19,23] As for knowledge, beliefs and attitudes, patients with FUNA were positively associated with poor knowledge of their disease, belief that their medications do not work and lack of satisfaction with their DM care.[30,31,33] Two studies on patients' recommended therapeutic diet had differing associations of FUNA.[25,33]

Other patient factors associated with FUNA included: having missed appointments in the past; having a community services card that allowed for larger health service subsidies; a longer time since the previous medical appointment; having had a hospital admission since their previous appointment; and not having insurance to cover their medical bills.[18,26,30,32]

Table I. List of studies included in this systematic review.

Author, yr, country	Study design, setting	n	Disease	NOS*
Archibald and Gill, 1992, UK[16]	Case-control, community	37	Type 2 DM	4, 1, 1
Babwah et al, 2006, Trinidad and Tobago[17]	Cross-sectional, hospital	360	Type 2 DM	4, 2, 1
Benoit et al, 2004, USA[18]	Case-control, community and hospital	573	Type 2 DM	4, 2, 2
Busnello et al, 2001, Brazil[19]	Cohort, hospital	945	Hypertension	4, 2, 3
Chew et al, 2009, Malaysia[20]	Cohort, hospital	57,780	Type 2 DM	4, 2, 3
Ciechanowski et al, 2006, USA[21]	Cross-sectional, community	3,923	Both Type 1 and 2 DM	4, 2, 2
Gill and Owens, 1998, UK[22]	Cohort, hospital	7,015	Both Type 1 and 2 DM	3, 1, 2
Graber et al, 1992, USA[23]	Cohort, community	422	Both Type 1 and 2 DM	4, 1, 3
Wilkinson and Daly, 2012, New Zealand[35]	Cohort, community	142	Both Type 1 and 2 DM	3, 1, 3
Hammersley et al, 1985, UK[24]	Cohort, hospital	162	Both Type 1 and 2 DM	4, 1, 3
Kawahara et al, 1994, Japan[25]	Cohort, community	109	Type 2 DM	4, 1, 3
Levitt et al, 2015, Bangladesh, Guatemala, Mexico and South Africa[36]	Cohort, community	4,101	Hypertension	4, 1, 2
Lloyd et al, 1990, UK[37]	Cohort, hospital	715	Both Type 1 and 2 DM	3, 1, 2
Low et al, 2016, Singapore[26]	Cohort, hospital	1,645	Both Type 1 and 2 DM	4, 2, 3
Malcolm et al, 2013, Canada[27]	Cohort, community	193	Type 2 DM	4, 2, 3
Masding et al, 2010, UK[28]	Cohort, hospital	114	Both Type 1 and 2 DM	4, 2, 2
Masuda et al, 2006, Japan[29]	Cohort, community	160	Type 2 DM	4, 2, 2
Ngwenya et al, 2009, South Africa[38]	Cohort, hospital	76	Both Type 1 and 2 DM	4, 2, 1
Nwabuo et al, 2014, USA[30]	Cross-sectional, hospital	185	Hypertension	4, 2, 2
Parker et al, 2012, USA[31]	Cohort, community	12,957	Type 2 DM	4, 2, 2
Simmons and Clover, 2007, New Zealand[32]	Case-control, community	89	Type 2 DM	4, 2, 3
Simmons and Fleming, 2000, New Zealand[33]	Cross-sectional, community	1,488	Both Type 1 and Type 2 DM	3, 2, 3
Thongsai, 2015, Thailand[34]	Cross-sectional, hospital	442	Type 2 DM	3, 1, 2
Wiwanitkit, 2011, Thailand[39]	Cross-sectional, community	50	Both Type 1 and Type 2 DM	2, 1, 3

*The three values in each study correspond to the selection (out of 4), comparability (out of 2) and outcome (out of 3) sections of the NOS, respectively. DM: diabetes mellitus; NOS: Newcastle Ottawa Score

Disease and medication factors

35 disease and medication factors from 15 studies[16,18-20,22-25,27-33] were elucidated (Table III). While several studies revealed that poor disease control, especially baseline glycated haemoglobin (HbA1c) level, was positively associated with FUNA, a number of other studies showed that higher systolic and diastolic blood pressure, poor lipid profile, and baseline HbA1c had no association with FUNA.[16,18,20,24,25,27-31] Several studies showed that high body mass index and a longer duration of DM did not have any association with FUNA.[16,18,23,24,32] As for the presence of complications of disease in patients, some studies showed that diabetic retinopathy and nephropathy had no association with FUNA, while several others showed a positive or varied association.[16,19,20,24,27,29,30,32,33]

Mixed conclusions were drawn regarding insulin treatment, a medication factor, as evidenced by several studies showing positive, negative and no association with FUNA.[18,20,23,27,32,33] While some studies found a positive association between FUNA and the type of medication that patients were taking,[23,29,33] others found no association.[18,20,24] Another study showed varied results.[27] One study showed that other medication factors associated with FUNA included non-adherence to medication, difficulty paying for medication, having experienced side effects of medications and high medication charges upon hospital discharge.[30]

Healthcare provider factors

16 factors related to healthcare providers from eight studies[20,23,26,27,29,31-33] were identified and categorised into scheduling factors, provider characteristics, and factors that influence the doctor-patient relationship (Table IV).

In terms of scheduling, duration between appointments and scheduled month of the year, particularly between January and July, were associated with FUNA.[26,27] For healthcare provider characteristics, more studies[27,29,32] showed that distance from the clinic was not associated with FUNA. Other provider characteristic factors that had a positive association with FUNA included not having a dedicated primary physician and a higher number of re-referrals from an intra-hospital source.[26,27,31] Interestingly, out-of-pocket expense and the type of setting (urban or rural) did not show any association with FUNA.[27,32] Under factors that influence the doctor-patient relationship, FUNA was positively associated with patients who were dissatisfied with their care and lacked trust in their providers.[31,33]

Reasons cited by patients

In addition to the quantitative factors elucidated above, a total of 36 reasons were qualitatively reported from ten studies (Table V).[16,24,25,30,32,35-39] Commonly cited reasons related to the patient included: work commitments; having a busy schedule or

Table II. Relationship between patient factors and follow-up non-attendance in the studies reviewed.

Factor	Study no.		
	Positive	Neutral	Negative
Mental state			
Attachment style	21		
Depression		30, 31	
Demographics			
Younger age	22, 26, 29, 31, 33	16, 18, 19, 20, 23, 24, 25, 27, 30, 32	28
Age at diagnosis	33	32	31
Male gender	17, 20, 26	16, 18, 19, 23, 24, 25, 27, 28, 30, 31, 32, 33	
Ethnicity	18, 26, 31, 33	20*, 32	
Married		30, 32	
Employed	33	29, 30, 31, 32	
Type of employment	31		
Household income		31, 32	
Language	18*		
No. in household		32	
Type of occupation		29, 33	
Education status	19, 30*, 31	33	32
Age at completing school		33	
Partner with DM			32
Time at address		33	
Alcohol and tobacco use			
Alcohol consumption		19, 29, 30	
Smoking	18, 19, 23	27, 29, 33	
Substance use		30	
Knowledge/beliefs/attitudes			
Belief that medications do not work	30		
Poor knowledge of DM or hypertension	30, 31, 33		
Perceived knowledge deficit		32	
Illness perception		34	
DM interferes with life		31, 32	
Not satisfied with DM care	33		
Psychological barrier		31, 32	
Lifestyle (diet or exercise)		25	25, 33
Others			
Previously missed appointments	26		
Accessibility (financial)	30, 31, 32	18	18
Time since previous attendance	32		
Hospitalisation since previous appointment	26		

*Varied results (not all in one category). DM: diabetes mellitus

having alternative appointments; the perception that their DM was not dangerous or that they were not ill enough; the inability to afford clinic or medication expenses; having forgotten their appointment; or transport difficulties.[16,24,25,30,32,35-39] As for reasons related to healthcare providers, transport logistics such as cost and lack of accessibility, as well as patients perceiving the clinic sessions to be useful, were cited in most of the studies.[16,25,30,32,35-38]

Target-board model of FUNA in patients with chronic disease

The various factors elucidated in this study can be broadly categorised into patient, disease and healthcare factors. Based on this, we proposed the target-board model of FUNA in patients with chronic disease to allow healthcare providers to understand these factors better and to apply this improved understanding to address FUNA in their institutions or clinics (Fig. 2).

DISCUSSION

This systematic review involved a comprehensive literature review of the factors affecting FUNA in patients with hypertension and Type 2 DM. To the best of our knowledge, the last similar study was done more than 18 years ago.[14] The present review gives an overview of the types and numbers of studies that showed various associations with the factors investigated.

Table III. Relationship between disease/medication factors and follow-up non-attendance in the studies reviewed.

Factor	Study no.		
	Positive	Neutral	Negative
Disease factor			
High diastolic BP	18, 24, 30	20*, 27	
High systolic BP	18, 31	20, 24, 27, 30	
High baseline BP	18, 25	19, 32	
High baseline glucose (plasma)		24, 25	29
High baseline HbA1c	16, 18*, 20, 24, 27, 28, 31	23, 25, 32	27, 29
High baseline insulin	25		
High total cholesterol		25, 27, 32	
High baseline LDL	20, 31	25, 27	
High baseline triglyceride	25	27, 32	
High baseline HDL		27, 32	25
Total cholesterol to HDL ratio	25	27	
Urine albumin-to-creatinine ratio/absolute creatinine		32	
High BMI/obesity	24, 25*	16, 18, 20, 23, 27, 32	
Attaining treatment targets		20	
DM Type 2 compared to Type 1		23, 27, 28	
Duration of DM (longer)	27*	16, 18, 20*, 23, 24, 32	31, 33
Duration of hypertension/dyslipidaemia		20*	19
Poor skin/nail/foot care	32		
Family history (first-degree relative)		19, 25	
Previous DM diagnosis/gestational DM	29, 33		
Diagnosed with symptoms/during screening	33*		
Comorbidities present	20*, 33	27, 30	
Complications present	16, 20, 24*, 27*, 32*, 33*	19, 29, 30	22
Mortality risk category	31	30	
Emergency room visits	27		
Medication factor			
Currently taking BP medication	33	20	32
Not prescribed medication	23, 32	18	
On insulin treatment	27, 33	18	20, 23, 32
On aspirin/antiplatelet		27	20
Treatment regime (medication)	23, 27*, 29, 33	18, 20, 24	
Non-adherence to medication	30		
No medication coverage	30		
Medication coverage with copayment		30	
Experienced side effects	30		
High cost of discharge medication	30		

*Varied results (not all in one category). BMI: body mass index; BP: blood pressure; DM: diabetes mellitus; HbA1c: glycated haemoglobin; HDL: high-density lipoprotein; LDL: low-density lipoprotein

Three categories of factors are presented in this target-board model of FUNA (Fig. 2). Each arrow in the model represents a domain of factors that healthcare providers, especially clinicians, should be aware of when dealing with the issue of FUNA. In order to achieve the desired goals represented by the target board in this model, all three domains have to be addressed adequately and collectively in order to effectively improve patient compliance, follow-up attendance and, ultimately, patient therapeutic outcomes. We hope that this model can achieve similar effects as the Wong-Baker FACES Pain Rating Scale and facilitate interaction between the patient and clinician.[40]

The prevalence of non-attendance at diabetic clinics varies significantly worldwide, ranging from as low as 4%–8% to as high as 64% in the United Kingdom alone;[7,8,14] a study done in Singapore published recently cited a prevalence that is in between those numbers.[26] Awareness and understanding of these patient characteristics will help clinicians to identify patients who are at high risk of defaulting based on factors such as smoking and ethnicity, as well as baseline HbA1c and low-density lipoprotein

Table IV. Relationship between healthcare provider factors and follow-up non-attendance in the studies reviewed.

Factor	Study no.		
	Positive	Neutral	Negative
Schedule			
No. of scheduled appointments	26		27
Consultation type		26	
Scheduled time/day of the week		26	
Scheduled month of the year	26		
First appointment			26
Duration between appointments	26, 27		
Provider characteristics			
Type of clinic	20		
Distance from clinic/travel issues	23	27, 29, 32	
Higher no. of re-referrals	27		
Referral source (intra-hospital)	26		
Out of pocket expense		32	
Urban vs. rural setting		27	
Percentage of visits where medication changed	27		
No designated primary care provider	31		
Doctor-patient relationship			
Dissatisfied with care	33		
Lack of trust in provider	31		

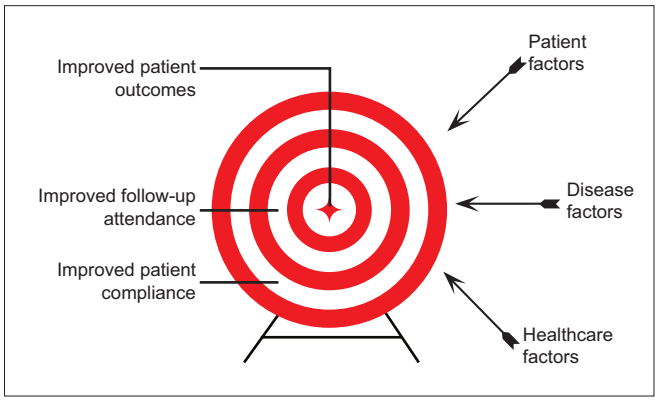

Fig. 2 Target board diagram shows the approach to follow-up non-attendance.

levels, thereby allowing for closer attention and care. It is important, however, to understand the regional context of the study when considering its clinical relevance.

A good doctor-patient relationship was shown to be associated with better patient attendance at chronic disease clinics, which is in line with our review findings.[41,42] Moving away from a paternalistic doctor-patient relationship to one that emphasises patient empowerment helps patients to make informed and early decisions about their plans of care, thus improving diabetic patient care.[43] Healthcare providers can employ these methods in their practice to reduce patients' lack of trust and dissatisfaction, thus improving FUNA and ultimately patient outcomes.

Other factors affecting non-attendance can be improved through interventions in the healthcare system. For example, for the problem of long clinic waiting times, the simple introduction of efficient registration systems was shown to reduce the number of patients lost to follow-up in a general practice diabetic care clinic.[44] Additionally, educating the patients about how the clinic functions through an orientation video, instead of pamphlets, improved non-attendance in outpatient clinics.[45] This improvement was even more remarkable when videos were also used to emphasise the importance of keeping appointments and explain the consequences of continual FUNA.[46]

A study done in Singapore by Low et al showed that several factors were positively associated with FUNA in diabetic patients, including ethnicity and longer intervals between appointments.[26] This was in agreement with several other studies in our review. However, as opposed to the Singapore study, a greater number of studies showed no association between FUNA and the age of the patients, and one study showed that having fewer appointments was associated with FUNA. In addition, no other studies looked at a previous history of FUNA and the month of scheduled appointment in the year as factors affecting FUNA.

Comparing our study to that done 18 years ago by Griffin et al,[14] we found that some characteristics were similarly associated with FUNA, such as smoking, poorer education and employment status, previous missed appointments, and little patient knowledge about their disease. Age and psychological issues, however, had no significant association with FUNA. With regard to disease, both articles identified that patients who exhibited FUNA had more comorbidities and complications of disease, and had higher mortality risk status. FUNA was also associated with patients who were not prescribed medication, suggesting that patients with good diabetic control were also more likely to default. Unlike Griffin et al, our study found less association with obesity. For provider factors, we similarly found that dissatisfaction with care and long interval between appointments were positively associated with FUNA. Conversely, more papers showed that transport issues

Table V. Reasons given for follow-up non-attendance (qualitative findings from studies).

Factor	Study no.
Patient	
Arrived late at the clinic and found it closed	38
At work/school and could not take leave to attend clinic	16, 35, 38
Away/out of town at the time	37, 38
Appointment during the holiday period	39
Busy schedule/opportunity cost/other personal appointments	25, 36, 38, 39
Claimed DM is gone/not ill enough/risk perception	24, 32, 36,39
Confused about appointment time	35
Could not read appointment card due to bad eyesight	38
Could not walk due to illness	38
Could not afford to attend the clinic/could not afford medicine	36, 38, 32
Dead	37
Denies non-attendance	38
Dislikes attending hospital	25
Fear of side effects of medication	39
Forgot	30, 35, 37, 38
Got dates mixed up	37, 38
Ill at the time	35, 37
Lost appointment card	37, 38, 39
Pregnant	37
Already seeing a DM specialist nurse	37
Traditional vs. Western medical care (prefer traditional)/pursuing alternative treatment	36, 39
Unaware of appointment	35
Would have lost time off work	24, 37
Healthcare provider	
Attended alternative clinic for DM/transferring clinic	25, 37
Clinic not helpful	30, 35, 37
Communication barriers/inadequate explanations	16, 36
Clinic too crowded	16
Fear of being reprimanded by CHW/unfriendly staff	32, 36
Different doctor each visit/not seeing consultant	16
Hospital inpatient at the time	37, 38
Lack of trust in CHW	36
Lack of acceptance of CHW referral (not qualified)	36
No appointment received	37
No transport/transport cost/clinic too far	16, 25, 30, 32, 35, 36, 37, 38
Waiting time too long	16, 24
Others	
Weather was bad	38

CHW: community health worker; DM: diabetes mellitus

and distance from the clinic were not significantly associated with FUNA[27,29,32] compared with one earlier paper by Graber et al showing a positive association.[23] Other factors found to be significantly associated with FUNA in Griffin et al's paper, such as long waiting times and poor communication between the healthcare professional and patient, were some of the reasons cited in Table V.

This review was limited by the search terms and databases used in our search strategy. We excluded interventional studies because we believed that they would have been tested based on findings from previous studies that were likely to be included in our review. Studies from specialist nurse clinics were also excluded, as the setting does not fall within the intended scope of our review.

Despite the personal, clinical and systemic factors that were extracted, a weakness of the present study is that the conflicting nature of research findings in this area prevented substantial conclusions from being made. Examples of conflicting findings in different primary studies include, but are not limited to, age, gender, type of medication, presence of comorbidities

and complications that had any association with FUNA. Other reviews performed on clinic non-attendance have shown similar results and cited differing definitions of non-attendance, research methodologies and populations studied as potential reasons for such discordances.[47,48] In addition, we acknowledge that the qualitative reasons for FUNA in this paper were not exhaustive. They were sourced as a secondary finding among papers that were otherwise selected for their quantitative content. However, there is significant value in synthesising a systematic review of the qualitative reasons in the literature, as it may offer more actionable insights to the FUNA problem.

In conclusion, 83 factors were found to be associated with FUNA in hypertensive and diabetic patients. Greater focus should be given by healthcare providers on the multifactorial nature of FUNA, which includes patient, disease and healthcare provider factors, in order to effectively manage it and maximise therapeutic outcomes in these patients.

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