



Young adults' experience of social support in effective diabetes management

E Visagie

 **orcid.org/0000-0002-9469-6154**

Dissertation submitted in partial fulfilment of the requirements for the degree Master of Science in Counselling Psychology at the North-West University

Supervisor: Prof. E. van Rensburg
Co-supervisor: Dr. E Deacon

Graduation July 2018

Student number: 22831606

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Table of contents

Acknowledgements	vi
Declaration statement	viii
Summary	ix
Opsomming	xi
Preface	xiv
Letter of permission	xv
Proof of language editing	xvi
Section 1: Introduction and rationale	
1.1 Introduction	1
1.2 Problem statement and orientation	1
1.3. Diabetes mellitus as chronic condition	
1.3.1 Introduction	3
1.3.2 Diabetes mellitus as a syndrome	4
1.4 Type 1 diabetes mellitus during young adulthood	11
1.5 Management of diabetes mellitus	
1.5.1 Introduction	14
1.5.2 Medical intervention for diabetes mellitus	15
1.5.3 Nutritional management of type 1 diabetes mellitus	17
1.5.4 Physical activity and type 1 diabetes mellitus	19

SOCIAL SUPPORT AND DIABETES MANAGEMENT

1.5.5 Mental health and type 1 diabetes mellitus	21
1.6 The role of social support and diabetes management	
1.6.1 Introduction	23
1.6.2 Parental support	24
1.6.3 Support from friends	25
1.7 Research paradigms	
1.7.1 Qualitative research design	28
1.7.2 Social constructivism	28
1.8 Contextualisation of the study	29
1.9 Research question	29
1.10 Research methodology	
1.10.1 Research approach and design	30
1.10.2 Research context	30
1.10.3 Participants	31
1.10.4 Data generation	33
1.10.5 Data analysis	35
1.10.6 Trustworthiness	37
1.11 Ethical considerations	39
1.12 Outline of the study	40
1.13 Reference list	41

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Section 2: Article – Young adults’ experience of social support in effective diabetes management	69
---	----

2.1 Guidelines for authors	70
----------------------------	----

Health SA Gesondheid – Journal of Interdisciplinary
Health Sciences

2.2 Manuscript	86
----------------	----

2.3 Reference list	105
--------------------	-----

Section 3: Critical reflection

3.1 Introduction	110
------------------	-----

3.2 Conception of the study	110
-----------------------------	-----

3.3 Research aim	111
------------------	-----

3.4 Epilogue

3.4.1 Research process	111
------------------------	-----

3.4.2 Findings of the study	112
-----------------------------	-----

3.4.3 Limitations	114
-------------------	-----

3.4.4 Recommendations	115
-----------------------	-----

3.4.5 Significance of the study	116
---------------------------------	-----

3.5 Complete reference list	117
-----------------------------	-----

List of Tables

Section 1

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Table 1: Diagnostic criteria for diabetes mellitus	8
Table 2: Characteristics of the nonrandom purposive sample utilized in this study	33
Section 2	
Table 1: Summary of themes and subthemes reflecting the social support experiences of diabetes management among young adults who effectively manage their T1DM	93
Addenda	
Addendum A: Proposal approval letter issued by scientific committee	149
Addendum B: Ethical approval certificate of overarching larger study	151
Addendum C: Ethical approval certificate of current study	152
Addendum D: Participant information leaflet and consent form	153

Acknowledgements

The support, guidance and encouragement received from the following role-players made the completion of this mini-dissertation possible. I would like to sincerely thank and express my gratitude to:

God the Almighty, who has always provided me with grace and blessings.

Prof. **Esmé van Rensburg**, my study leader. You have, without fail, offered knowledge, wisdom and guidance throughout the process. Your widespread knowledge and expertise inspired me to work hard and challenge myself every day. ‘Knowledge will bring you the opportunity to make a difference’ – Claire Fagan. You made a difference in my life. Thank you for your unwavering encouragement and presence.

My co-study leader, **Dr. Elmarí Deacon**. ‘It is said that wisdom lies in not seeing things, but seeing through things’ – Manly. P. Hall. You have enabled me to clearly see the vision and significance of the topic under study. You kindled a passion regarding the study and I thank you for all your patience, efforts and assistance that you unselfishly offered.

Althea, for going the extra mile while language editing this mini-dissertation. Your attention to detail and thorough effort is much appreciated.

The **participants** for their involvement and willingness to partake in the study, in addition to their enthusiasm regarding the research.

The members of the overarching research study, **Beatrice Mulder, Deborah Jonker, Marietjie Willemse, Christiaan Bekker**, and **Werner Ravyse**, for all your support and assistance throughout this study.

My parents, **Gerhard** and **Eldoret Visagie**. You have always, unselfishly put my needs first and fully support the different endeavours I commit to. Your love, support,

SOCIAL SUPPORT AND DIABETES MANAGEMENT

understanding, loyalty, and guardianship has always been my anchor and has enabled me to accomplish my goals due to the example that you both have set. I value you dearly.

My sister, **Liz-Mari Visagie**, for your sense of humour and love that you never ceased to show. Our unique connection and bond have always influenced me positively and I thank you for sharing your radiant spirit with me.

My dearest friends, **Marica Pienaar** and **Lario Botha**. ‘Sometimes they know us better than we know ourselves. With gentle honesty, they are there to guide and support us, to share our laughter and our tears’ – Vincent van Gogh. With the two of you by my side, I am never alone.

My friend and work colleague, **Kavishka Moodley**, we have laughed together, and we have cried together. Thank you for being there to listen whenever I wanted to share a thought, story or an idea. You inspire me, and I am grateful to have such a person to look up to.

My flatmates, **Hilette Wentzel** and **Richardt Hechter**. You always seek to ignite the best version of myself. You challenge me, support me and steadfastly back me. The relationship that we have is truly cherished and it enables me to fearlessly pursue my goals as I know I have a support team always on my side.

Declaration Statement

I, Elné Visagie, declare that Young adults' experience of social support in effective diabetes management, a mini-dissertation submitted in partial fulfilment of the requirements for the degree Magister Artium in Counselling Psychology at the Potchefstroom campus of the North-West University, was completed according to the Copyright Act, No 98 of 1978 of the Republic of South Africa. All literary and academic material and sources, consulted during the writing and compilation of this mini-dissertation have been acknowledged and referenced according to the American Psychological Association's Publication manual (6th edition). No single or comprehensive unit of this minidissertation has been plagiarised from another author or institution and remains the intellectual property of the corresponding author, namely myself.

Furthermore, I certify that submission of this mini-dissertation is exclusively for examination purposes at the Potchefstroom Campus of the North-West University and has not been submitted for any other purposes to any third party.



.....
Elné Visagie

Summary

Young adults' experience of social support in effective diabetes management

The endocrine disease known as type 1 diabetes mellitus (T1DM) is increasingly being diagnosed amongst young adults. Widespread statistical information regarding T1DM in young adults is readily available. However, more precise information regarding the prevalence in South Africa and the factors that aid management are lacking. Increased attention is given to T1DM as it imposes strenuous management requirements and an economic burden, and ultimately affects these individuals and their families' quality of life. Hence, diabetes is often referred to as a family disease. In young adulthood additional challenges include a threat to increased independence and such challenges may foster perceptions of being different from others. Young adulthood represents a key stage for the progression and integration of diabetes management skills. Receiving adequate social support is thus considered a crucial factor for adhering to management. Social support promotes feelings of consideration, acceptance, and importance in young adults. Therefore, social support forms a vital coping mechanism with the potential to influence more effective diabetes management.

The research objective was to explore the social support experiences of diabetes management amongst a group of young adults with well-controlled type 1 diabetes. The study utilized a qualitative research approach and was governed by social constructivist theoretical framework. The final sample consisted of eight young adults with well-controlled T1DM sourced through means of nonrandom purposive sampling. Data was generated and captured through audio recorded semistructured interviews. Thereafter, by means of transcription and thematic data analysis, a rich and condensed description of the participants' social support experiences of diabetes management were constructed.

The findings of the study demonstrated the facilitating role that social support played

SOCIAL SUPPORT AND DIABETES MANAGEMENT

in the participants' diabetes management. Social support mainly encompassed aspects of being knowledgeable about diabetes management, providing practical assistance, and emotional support. Loved ones participated in gaining knowledge support from the outset and throughout. Initially, management tasks and the comprehension thereof seemed almost unattainable, but the participants were assured that they are not on their own in this process. The acquisition of knowledge was undertaken by parents by means of consultations with specialized professionals and interactions with the diabetic community, thereby enabling the participants to gain confidence in their ability to manage their diabetes. Generally, social cognizance of type 1 diabetes was related to perceptions of support. Knowledge of diabetes management constructively affected practical support as loved ones had the ability to assist in management tasks. Emotionally, when the participants were embedded in a family network and larger diabetic communities, supportive feelings such as belonging and empathy provided motivation and courage to continue facing the arduous management tasks as they knew it was not something they had to face on their own.

The study highlighted the key role of social support within diabetes management as constructed and perceived by participants through interaction with members of their social network. Furthermore, the research brought to the fore the need for further investigation into how social support can be incorporated into diabetes management intervention and the supportive role of online diabetic communities. Finally, it became evident that there is an increased need of social cognizance regarding type 1 diabetes.

KEYWORDS: type 1 diabetes, diabetes management, well-controlled diabetes, young adults, social support, social constructivist

Opsomming

Jong volwassenes se ervaring van sosiale ondersteuning in effektiewe diabetesbestuur

Die endokriene siekte bekend as tipe 1-diabetes mellitus (T1DM) word toenemend onder jong volwassenes gediagnoseer. Wydverspreide statistiese inligting oor T1DM by jong volwassenes is geredelik beskikbaar, maar daar bestaan 'n gebrek aan presiese inligting oor die voorkoms daarvan in Suid-Afrika en die faktore wat die bestuur daarvan bevorder. T1DM kry toenemend aandag aangesien dit streng bestuursvereistes verg, 'n ekonomiese las dra en individue en hul gesinne se lewensgehalte beïnvloed. As gevolg daarvan word diabetes dikwels beskou as 'n familiese siekte. Tydens jong volwassenheid hou addisionele uitdagings onder andere 'n bedreiging in vir groeiende onafhanklikheid. Dit kan persepsies van andersheid by jong volwassenes kweek en versterk.

Jong volwassenheid verteenwoordig 'n belangrike stadium in die bevordering en integrasie van die bestuursvaardighede ten opsigte van diabetes. Daarom word sosiale ondersteuning as 'n belangrike faktor beskou in die nakoming van bestuur. Sosiale ondersteuning bevorder gevoelens van aanvaarding en belangrikheid by jong volwassenes. Daarom vorm sosiale ondersteuning 'n belangrike hanteringsmeganisme met die potensiaal om effektiewer diabetesbestuur te beïnvloed.

Die navorsingsdoelwit was om die sosiale ondersteuningservarings van diabetesbestuur onder 'n groep jong volwassenes met goed beheerde T1DM te ondersoek. Die studie het 'n kwalitatiewe navorsingsbenadering benut en het 'n sosiale konstruktivistiese teoretiese raamwerk gevolg. Die finale steekproef het bestaan uit agt jong volwassenes met goed beheerde T1DM wat verkry is deur middel van nie-willekeurige doelbewuste steekproefneming. Data is gegenereer deur middel van semigestruktureerde onderhoude. Daarna is 'n ryk en geïntegreerde beskrywing van die deelnemers se sosiale ondersteuningservarings van diabetesbestuur deur middel van transkripsie en tematiese data-

SOCIAL SUPPORT AND DIABETES MANAGEMENT

analise opgebou.

Die studie se bevindinge het die bemiddelende rol aangetoon wat sosiale ondersteuning in die deelnemers se diabetesbestuur gehad het. Sosiale ondersteuning het hoofsaaklik aspekte van inligtingsondersteuning, praktiese ondersteuning en emosionele ondersteuning ingesluit. Geliefdes het van die begin af deel geneem aan die verkry van kennis en informasie. Aanvanklik wou dit voorkom of bestuurstake en die begrip daarvan onbereikbaar was, maar die deelnemers is verseker dat hulle nie alleen in hierdie proses is nie. Die verkryging van kennis is deur ouers onderneem. Deur middel van konsultasies met gespesialiseerde professionele individue en interaksie met die diabeet-gemeenskap het die deelnemers meer vertrouwe in hulle siektebestuur gekry. Dit het kennis van T1DM verwant aan persepsies van ondersteuning behels. Kennis van diabetesbestuur het gelei tot praktiese ondersteuning aangesien geliefdes die vermoë gehad het om met bestuurstake te help omdat hulle goed ingelig was. 'n Ondersteunende familienetwerk en 'n betrokkenheid by groter diabetesgemeenskappe het 'n samehorigheidsgevoel en 'n sin van empatie onder deelnemers geskep. Dit het hulle die motivering en moed gegee het om voort te gaan met die moeilike bestuurstake, aangesien hulle mettertyd besef het dit was nie iets wat hulle op hul eie moes aanpak of hoof aan te pak nie.

Tydens die studie is die verneme rol van sosiale ondersteuning binne diabetesbestuur geïdentifiseer soos deelnemers dit gestruktureer het en deur interaksie met lede van hulle sosiale netwerk waargeneem het. Die behoefte aan verdere ondersoek na hoe maatskaplike ondersteuning opgeneem kan word in die intervensie van diabetesbestuur en die ondersteunende rol van aanlyn- diabetiese gemeenskappe het ook duidelik geword. Ten slotte het dit duidelik geword dat daar 'n toenemende behoefte is aan sosiale kennis oor tipe 1-diabetes.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

SLEUTELWOORDE: tipe 1-diabetes, diabetesbestuur, goed beheerde diabetes, jong volwassenes, sosiale ondersteuning, sosiale konstruktivistiese

Preface

- This minidissertation was written in article format in accordance with rules A4.4.2 of the North-West University.
- The article in Section II of this minidissertation, titled: *Diabetes management: Young adults' experience of social support in effective diabetes management* will be submitted for possible publication in the *Health SA Gesondheid – Journal of Interdisciplinary Health Sciences*.
- The editorial and referencing style of Sections I and III of this minidissertation is in strict accordance with the guidelines described and defined within the Publication Manual (6th edition) of the American Psychological Association (APA) style guide.
- The author guidelines of the *Health SA Gesondheid – Journal of Interdisciplinary Health Sciences*, described in section 2.1 of this minidissertation, stipulates adherence to the Harvard editorial and referencing style.
- The page numbering in this minidissertation is consecutive, starting from the introduction.
- Prof. E. van Rensburg and Dr. E. Deacon, the co-authors of the article: *Young adults' experience of social support in effective diabetes management* in Section II of this minidissertation granted their consent for submission of the said article for examination purposes in partial fulfilment of the requirements of a MA degree in Counselling Psychology.
- The numbering of the tables is restarted in Section II.
- For publication purposes the referencing in this minidissertation is restarted in every section.
- This minidissertation received a Turn-it-in report within accepted norms.

Letter of Permission

Permission is hereby granted for the submission by the first author, E.Visagie, of the following mini-dissertation for examination purposes, towards partial fulfilment of the requirements for the degree Magister Artium in counselling psychology at the Potchefstroom campus of the North-West University:

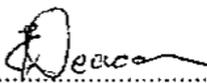
Young adults' experience of social support in effective diabetes management

The roles of the co-authors were as follows: Prof. E. van Rensburg and Dr. E. Deacon acted as supervisor and co-supervisor respectively. Prof. E. van Rensburg and Dr. E. Deacon assisted with the conception, design, data generation and peer review of this study.


.....

Prof. E. van Rensburg

Supervisor


.....

Dr. E. Deacon

Co-supervisor

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Proof of language editing

DECLARATION BY LANGUAGE EDITOR

I hereby declare that I have language-edited the minidissertation *Young Adults' Experience of Social Support in Effective Diabetes Management* by Elné Visagie (student number 22831606) submitted in the partial fulfilment of the requirements for the degree *Magister Artium in Counselling Psychology* at the Potchefstroom Campus of the North-West University to the approval of the student and her supervisors.

A black and white image of a handwritten signature, 'A.D. Kotze', written in white ink on a black background. Below the signature is a horizontal line that ends in an arrowhead pointing to the right.

.....
Dr. A.D. Kotze

Althéa Kotze • Language practitioner • APEd (South African Translators' Institute)

• PhD Afrikaans and Dutch • MA Afrikaans and Dutch • MA Applied Linguistics • BA Hons • BA • PGCE • 4 Ixia Close • Yzerfontein • South Africa
+27 (0) 823518509 (m)

althea.erasmus@gmail.com

Young adults' experience of social support in effective diabetes management

SECTION 1: INTRODUCTION AND RATIONALE

1.1 Introduction

In this study, the social support experiences in the management of diabetes are explored among a group of young adults with well-controlled type 1 diabetes mellitus (T1DM). In the first section of this minidissertation, a general introduction to and the rationale for this study is provided. First the problem statement and orientation of this study are outlined. This is followed by the literature review wherein notable findings regarding T1DM are outlined. There is a specific focus on T1DM, its etymological origin, aetiology, etiopathogenetic categories, pathophysiology, symptoms, diagnostic criteria, and complications. The management of diabetes and the social support experience of living with and managing a chronic illness, specifically among young adults, are explored. The meaning and applicability of qualitative research and social constructionism that configures the rudimentary paradigms of this study are explained. The research question for this study is stipulated and the research methodology is described

1.2 Problem statement and orientation

Globally, the World Health Organization (WHO) (2016) estimates reveal that 422 million (8.5%) adults are living with diabetes and this figure is predicted to rise to 640 million in less than 40 years (International Diabetes Federation (IDF), 2017). The National Diabetes Education Program (NDEP) (2014) subscribes this increase due to the upsurge of obesity and inactivity in these individuals. Furthermore, statistical reports estimate that there are 175 million cases of undiagnosed diabetes and that one in two adults are undiagnosed (IDF, 2017). Within the Africa Region (constituting of the African continent) it is estimated that 15.5 million adults are living with diabetes, a prevalence of approximately 6% within this

SOCIAL SUPPORT AND DIABETES MANAGEMENT

region (IDF, 2017). With regards to South Africa, approximately 7% (3.85 million people) of the country's inhabitants, aged between 20 and 75, are diagnosed with the disease. These individuals may experience many short- and long-term problems, including recreational, social, occupational, and educational activities (Rostami, Parsa-Yekta, Ghezeljeh, & Vanaki, 2014; Wennick, Lundqvist, & Hallstrom, 2009). Diabetes-related complications can include retinopathy, neuropathy, and hypertension that poses further health risks (IDF, 2017; James et al., 2014; Pinhas-Hamiel et al., 2014; Rollo et al., 2014).

Therefore, if not adequately managed, diabetes has a negative effect on overall health and health-associated quality of life (Amod et al., 2012). This statement holds true, especially during the developmental period of young adulthood (Wiebe, Helgeson, & Berg, 2016). Young adulthood represents a critical period of risk for people with T1DM. Considering the several transitions that young adults with T1DM confront, diabetes management may subside (Wolpert & Anderson, 2001). Diabetes-related complications that appear during young adulthood could possibly augment the risk for succeeding complications in later adulthood (Bryden, Dunger, Mayou, Peveler, & Neil, 2003). Beck, Tamborlane, Bergenstal, Miller, DuBose, and Hall (2012) found that approximately 17% of young adults, aged 18 to 25 meet the existing recommendations for glycaemic control ($HbA1c \leq 7.5\%$) (Hendricks, Monaghan, Soutor, Chen, & Holmes, 2013). A national online survey indicated that management adherence is impeded as approximately 33% of young adults struggle to remain positive; nearly 28% perceived their efforts to manage their diabetes effectively as inept; less than 46% of young adults felt that at times they were not motivated enough to care adequately for their diabetes; and nearly 25% of young adults has experienced long-term depressive symptoms (Bryden et al., 2003).

Diabetes bears transience and health related consequences. It requires adherence to a strict self-management care plan. Therefore, the availability of interpersonal relationships

SOCIAL SUPPORT AND DIABETES MANAGEMENT

with loved ones, health care providers, and social networks are crucial for practicing self-management behaviours. Social support facilitates necessary lifestyle changes such as dietary adjustments, increased physical activity and monitoring blood glucose which contributes to effective management practices (Khyndeit, Rao, Narayanan, & Mayya, 2016). Accordingly, sufficient knowledge regarding diabetes mellitus, diabetes management, and self-management is needed to make informed decisions and reduce complications and dangers associated with metabolic diseases (Chinnappan, Sivanandy, Sagar, & Molugulu, 2017).

1.3 Diabetes mellitus as a chronic condition

1.3.1 Introduction

The endocrine disorder, diabetes mellitus, stems from multiple aetiologies mainly associated with chronic glycaemia which is related to instabilities of carbohydrate, fat, and protein metabolism (Craig et al., 2014; Hamilton, Knudsen, Vainio, Smith, & Prosad, 2017). Incidents of diabetes mellitus have been found in Egyptian writings as early as 1500 BC that described the disease as *draining excess urine* (Lakhtakia, 2013). It was termed *madhumela* (*honey urine*) by Indian physicians due to the immense amount of sugary urine that an individual with diabetes secreted (Das & Shah, 2011; Lakhtakia, 2013). Approximately 400-500 AD, Sushruta (an Indian physician) and Charaka (a surgeon) identified two types which later became known as type 1 and 2 diabetes (Tipton, 2008). The term *diabetes* (which means *to go through* or *siphon*) is suspected to have been termed by Aretaeus, approximately 250 BC. Individuals with the disease drained more fluid than they ingested. The term *diabetes mellitus* was derived from the Greek verb, *diabainein* (meaning *siphon*) and in 1798, the Latin word *mellitus*, was added (which is translated to *honey-like*) by British Surgeon General, John Rollo (Hamilton et al., 2017; Lakhtakia, 2013). The metabolic disease has a long history that proved puzzling to physicians due to insufficient knowledge of anatomy,

SOCIAL SUPPORT AND DIABETES MANAGEMENT

pathophysiology, and the dearth of diagnostic means (Lakhtakia, 2013). Diabetes mellitus continues to be the centre of ample research, as the endocrine disorder is not yet fully comprehended (Atkinson, von Herrath, Powers, & Clare-Salzler, 2015; McCarthy, Rodríguez Ramírez, & Robinson, 2017; Qin, Fu, Speake, Greenbaum, & Odegard, 2016; Weir & Bonner-Weir, 2017).

1.3.2 Diabetes mellitus as a syndrome

Diabetes mellitus constitutes of complex and multiple metabolic abnormalities that suggest an underlying aetiology of a heterogeneous nature (Craig et al., 2014). Heterogenic causes are related to the secretion of pathophysiological beta cells and the functioning of the insulin hormone within the pancreas (Jones & Persaud, 2010). Insulin, which is produced by the pancreas, is a hormone that permits glucose to penetrate the body's cells, where it is transformed into energy needed for everyday activities (Amod et al., 2012; Moore, Hackworth, Hamilton, Northam, & Cameron, 2013). The relative or absolute absence of insulin, reduction of insulin receptors in peripheral tissue, or the body's inability to use it, thus resulting in extensive metabolic aberrations, is the phenomena identified as diabetes mellitus (Saeed, Mansor, Naz, Fatima, & Ishaq, 2012). The progression and commencement of diabetes mellitus is determined by the deficient emission and/or immunological function of insulin (Craig et al., 2014). The aetiology of deficient insulin and/or immunological function is closely examined as it classifies diabetes into clear and expansive etiopathogenetic types of the disease (Beaser, 2010; Craig et al., 2014). Most of diabetes cases are classified as either type 1 diabetes, which entails a complete deficiency of insulin secretion; or type 2 diabetes, which is produced from an amalgamation of opposition to insulin action and an incompetent reimbursing insulin exuding reaction (Craig et al., 2014; National Institute for Health and Care Excellence (NICE) (2016). However, several other forms of diabetes are prevalent, but these are secondary to hereditary defects, genetic syndromes, diseases of the exocrine

SOCIAL SUPPORT AND DIABETES MANAGEMENT

pancreas, endocrinopathies, medications, substances, chemical compounds, viruses, maturation, and uncommon forms of immune-mediated diabetes (Turner & Wass, 2009). The focus of this study required the participants to be young adults with well-controlled type 1 diabetes.

The heterogeneous aetiology of type 1 diabetes mellitus' comprises genetic predisposition, largely unknown environmental factors, and stochastic events. It has been established that type 1 diabetes' clinical pictures are largely delineated as a gradual loss of beta-cell function over a period. Accordingly, this necessitates the daily administration of insulin. However, the exact immunologic, genetic, and physiologic occurrences that govern the start and progression of the disease is continuously elucidated (Bluestone, Herold, & Eisenbarth, 2010). Due to the indefinable nature of type 1 diabetes' aetiology, Hamilton et al. (2017) refers to risk factors instead of definite causes. Risk factors for the development of type 1 diabetes include genetics and environmental factors such as viruses, dietary content, substances, and stressful life events. These factors are associated with the pathogenesis of type 1 diabetes.

Type 1 diabetes results from auto-immune destruction of beta-cells within the pancreatic endocrine islets (a portion of tissue structurally distinct from surrounding tissues) (Kaur, Gautam, & Singh, 2016; Roberts et al., 2017). The beta-cells cells destroyed in the pancreas are responsible for producing insulin (Céspedes-Knadle & Muñoz, 2011; NDEP, 2014; NICE, 2015; Peters, Nawijn, & Van Kesteren, 2014). To obtain a more comprehensive understanding of the aetiology of type 1 diabetes, the term *auto-immunity* must be explicated (Glassford, 2017). Auto-immunity occurs when an individual's immune response goes astray, and the immune system goes awry and attacks the body itself. Auto-antibodies are fundamental to auto-immunity. Auto-antibodies are defined as a blood protein that is produced in response to and counteracting a specific antigen (toxin or foreign substance that

SOCIAL SUPPORT AND DIABETES MANAGEMENT

induces an immune response and the production of antibodies). Antibodies chemically coalesce with substances which the body distinguish as alien (for example bacteria and viruses). Thus, the American Diabetes Association (ADA) (2017a) delineates the term “type 1 diabetes mellitus” as the manifestation of one or more antibodies. Instead of the immune system attacking an invading infection, it attacks the body itself. Auto-antibody testing is used to test an individual’s auto-immunity as the cell-mediated auto-immune destruction of pancreatic beta cells can be detected through the test (Glassford, 2017).

Moreover, most of type 1 diabetes can be identified through a panel of serum biomarkers that include five main markers (specifically for type 1 diabetes), namely islet cell auto-antibodies, antibodies to insulin, glutamic acid decarboxylase, protein tyrosine phosphatase, and zinc transporter (Heinonen, Moulder, & Lahesmaa, 2015). Complications arise as not all individuals diagnosed with diabetes will carry detectable islet auto-antibodies (Glassford, 2017). Prior to any clinical type 1 diabetes symptoms being displayed, auto-antibodies are created, and self-reactive lymphocytes become operational and in turn they infiltrate the pancreas and destroy the insulin producing beta-cells in the islets (Kaur et al., 2016). This interaction may continue for several years and may only be noticed when most beta-cells have been damaged. This results in the individual requiring additional insulin from external sources to survive. Thus, these biomarkers serve a critical purpose as it acts as indicators of an ongoing auto-immune response (Kaur et al., 2016). However, the mundane diagnosis of diabetes and comprehension of the causation thereof remains elusive. Thus, extensive attention should be given to multiple causes of diabetes (Roberts et al., 2017).

By consulting various longitudinal, prospective research (for the scientific statement of JDRF, the Endocrine Society, and the American Diabetes Association) Insel et al. (2015) concluded that T1DM has a continual course which develops consecutively, at relatively predictable stages before the start of symptoms. Stage one commences presymptomatically

SOCIAL SUPPORT AND DIABETES MANAGEMENT

and is defined by the presence of two or more islet antibodies with normoglycaemia. This indicates the manifestation of beta cell auto-immunity. Similarly, Stage 2 occurs presymptomatically and encompasses the existence of beta cell auto-immunity with deglycation. Stage 3 involves the beginning of the characteristic disease. During the third stage, various symptoms may arise due to T1DM. The type of diabetes diagnosed is based on the characteristics displayed during a consultation (Craig et al., 2014). Symptoms such as polyuria, polydipsia, polyphagia, blurred vision, and weight loss in association with glycosuria and ketonuria, are characteristic of underlying type 1 diabetes (Das, Raghupathy, & Tripathy, 2012; IDF, 2015). These clinically significant symptoms usually have a sudden onset and warrant thorough routine blood examinations to confirm or discard a possible diagnosis of type 1 diabetes (IDF, 2017).

With reference to genetics, researchers have found that an individual's possibility of developing diabetes is considerably augmented when having a first-degree relative with T1DM (Phillips, 2016), clearly displaying the high genetic susceptibility of T1DM (Glassford, 2017). Moreover, researchers of several former studies have identified more than 40 genes related to the development of the disease in addition to varied environmental triggers (Barrett et al., 2009; Noble, Valdes, Cook, Klitz, Thomson, & Erlich, 1996; Simmons & Michels, 2015). Well-known genes include the Human Leukocyte Antigen (HLA) gene, which is in the short arm of chromosome 6 (Kaur et al., 2016). The HLA complex helps the immune system distinguish the body's own proteins from proteins made by foreign invaders such as viruses and bacteria and contributes to genetic susceptibility by approximately 50%. Known as the histocompatibility complex, its genetic pathophysiology inhibits the immune cells ability to distinguish amid foreign cells and insulin generating autogenic beta cells within the pancreas (Ali, 2010; IDF, 2017; Matthews, 2007). Consequently, as beta-cells are exhausted and destroyed by the immune system, insulin deficiency and a lifelong dependence

SOCIAL SUPPORT AND DIABETES MANAGEMENT

on exogenous insulin develops as the internal phenomena leads to this occurrence leads to the exhaustions and destruction of beta cells by the immune system (Chiang, Kirkman, Laffel, & Peters, 2014; Matthews, 2007).

The environmental influences on T1DM are currently still unclear (Paun & Danska, 2016). The hygienic hypothesis aims to elucidate some of the uncertainty by explaining that a probable cause for T1DM is the fact that prevalent antibiotics and improved health services have altered human microbial exposure (Paun & Danska, 2016). The mechanisms of this process are not yet understood, but disturbances in gut micro-biome composition are associated with gut epithelial compromise, adult insulin resistance, obesity, and T1DM. External sources that cause a decrease in symbiotic gut microfiber and initiates an auto-immune response include lack of breastfeeding, drinking cow's milk, and polyunsaturated fatty-acid deficiency (Rewers & Ludvigsson, 2016).

A diagnosis requires an in-depth exploration of the complicated aetiology of T1DM. There are several measures that can be utilized to diagnose T1DM – as presented in Table 1. In addition to the occurrence or lack of symptoms of the disorder, the diagnostic criteria for diabetes in young adults are grounded on blood glucose tests and measurements (Craig et al., 2014).

Table 1

Diagnostic criteria for diabetes mellitus

Diagnostic criteria:

- i) Classic symptoms of diabetes or hyperglycaemic crisis, with plasma glucose concentration ≥ 11.1 mmol/L (200 mg/dL) or
-

- ii) Fasting plasma glucose level ≥ 7.0 mmol/L (≥ 126 mg/dL). Fasting is characterised by seizing calorie consumption for 8 hours or more.
 - iii) Two-hour post-load glucose ≥ 11.1 mmol/L (≥ 200 mg/dL) during an oral glucose tolerance test.
-

Note. Corresponding values (mmol/L) are ≥ 10.0 for venous whole blood and ≥ 11.1 for capillary whole blood and $\uparrow \geq 6.3$ for both venous and capillary whole blood. (Adapted from Craig et al., 2014).

However, the diagnosis of diabetes is increasingly being hindered by issues such as the rising frequency of overweight in individuals with T1DM and the presence of diabetic ketoacidosis (DKA) in some young people (Couper & Donaghue, 2009; Islam et al., 2014; Kapellen et al., 2014). DKA is one of the physical complications that can arise due to T1DM.

Young adults with T1DM may experience various physical complications. The nature of the complications may be enduring or acute in nature (Cooppan, Beaser, & Shetty, 2010; Misra, Wasir, & Vikram, 2012). Physical complications with an acute nature include physiologically-related diabetic ketoacidosis (DKA), hypoglycaemia, and various macro- and microvascular chronic complications (Cooppan et al., 2010). DKA is caused when the body's cells receive insufficient glucose, it starts to burn fat for energy, thus producing ketones (ADA, 2017b). Ketones are compounded from chemicals and when they build up in the individual's bloodstream, it causes the blood to be more acidic (ADA, 2017a).

Hypoglycaemia is the most common acute physical complication and occurs when plasma-glucose levels are between 2,9 mmol to 3,9 mmol per litre (Cooppan et al., 2010; Davis, 2013; Landel-Graham, Yount, & Rudnicki, 2003; Sosenko, 2012). Hypoglycaemia occurs when usual neurological functioning is inhibited due to inadequate cerebral glucose volumes. With the aim to compensate for insufficient cerebral glucose levels, epinephrine is secreted.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Consequently, many clinically significant symptoms may arise due to this process. Symptoms such as involuntary neurological tremors, cardiovascular palpitations and nutritional starvation are indicative of underlying mild hypoglycaemia, while altered mental activity, seizures and stupor are due to severe hypoglycaemia (Cooppan et al., 2010; Landel-Graham et al., 2003). In addition to hypoglycaemia, DKA poses severe life-threatening and physiologically-related physical complication for young adults with T1DM. Recurrent hypoglycaemia can result in an increased risk of the development of chronic micro- and macrovascular complications (Chawla, 2012). Microvascular complications may include diabetic retinopathy, diabetic nephropathy, and diabetic neuropathy, whereas macrovascular complication comprise of cardiovascular disease, peripheral vascular disease, and cerebrovascular disease (Beaser, 2010; Chawla, 2012; Seshiah, 2009). Adequate and timely intervention is needed due to the adverse complications associated with DKA, hypoglycaemia, micro-, and macrovascular setbacks.

An additional challenge that individuals with T1DM may face is diminished psychological well-being. Llorente and Urrutia (2006) report a positive correlation between T1DM and the development of numerous psychiatric disorders, especially anxiety, mood, eating and sexually-related psychiatric disorders (Kakleas, Kandyla, Karayianni, & Karavanaki, 2009; Kota, Meher, Jammula, Kota, & Modi, 2012; Lin et al., 2008; Luthra & Misra, 2008). Furthermore, the diagnosis of T1DM not only impacts the individual, but extends to the family and friends whom the individual interacts with on a regular basis. Challenges involve renegotiating household routines and patterns, regulating negative emotions, and managing interpersonal strain related to the diagnosis (Symons, Crawford, Isaac, & Thompson, 2015). Finally, apart from the potential adverse physiologically-related physical and psychological consequences, a diagnosis of T1DM is related to economic consequences for patients, families, and national and international health care systems and

SOCIAL SUPPORT AND DIABETES MANAGEMENT

economies (Josifova & Henrich, 2013). Economic related consequences may comprise of consultations with medical and diabetes professionals; medication and treatment equipment; hospitalization due to complications; and absenteeism from work or school due to diabetes-related consequences (ADA, 2014; Altamirano-Bustamante et al., 2008; Bishu, Gebregziabher, Dismuke, & Egede, 2015). These expenditures may cause substantial financial strain for many individuals with T1DM. It is estimated that an annual amount of R11 500.00 (US\$948,54) per South African is expended for diabetes related services and management (IDF, 2015).

The diagnosis of T1DM encompasses physical, psychological, and economic challenges. It requires an individual to undertake a multifarious and onerous diabetes management care plan. Commitment to diabetes management care plan minimises potential negative consequences of T1DM and supports a satisfactory quality of life (Beaser, 2010; Coffen, 2009).

1.4 Type 1 diabetes mellitus during young adulthood

Young adulthood is a significant time for health and well-being (Park, Scott, Adams, Brindis, & Irwin, 2014). Young adulthood is a developmental period which encompasses extensive opportunities with multiple opportunities for growth, exploration, and change. (Robins, Fraley, Roberts, & Trzesniewski, 2001). The young adult phase, ages 18 to 25, is characterized by instability, as these individuals are semi-autonomous and further exploring their identity (Arnett, 2000). It is a time of numerous transitions that are associated with increased freedom and reduced parental monitoring, both of which may combine to threaten psychological well-being and increase risk behaviour which jeopardizes the effective management of their diabetes (Wiebe et al., 2016). Young adults' lifestyles are more variable than those of adolescents and their elder counterparts (Lancaster et al., 2010). Many young adults enter a transition phase, shifting from a stable environment to contexts which

SOCIAL SUPPORT AND DIABETES MANAGEMENT

encompasses less formal support (Balfe et al., 2014).

Competing distractions during young adulthood such as moving out of the home; enrolling and attending university; the demands of work; physical activity and varying nutritive patterns have been reported as hindrances to effective diabetes management (Hynes et al., 2016). During young adulthood, several students with T1DM enter higher education institutions after completing high school. Higher education (for example universities, colleges, Technikons) challenges include managing new schedules and inconsistent routines; changes in diet and physical activity; evolving relationships with peers and parents; and peer pressure to engage in risky behaviours such as substance use (Balfe et al., 2014). Lack of access to healthy foods and decreased physical activity can worsen glycaemic control. Furthermore, inconsistent scheduling can disrupt routines for monitoring and administering insulin (Monaghan, Helgeson, & Wiebe, 2015). Similarly, work-related challenges for young adults with T1DM includes fitting diabetes management into inconsistent schedules; coping with work-related time pressures; securing privacy for completion of diabetes-related tasks; and storage space for diabetes-related supplies (Balfe et al., 2014; Pyatak, 2011; Rasmussen, Ward, Jenkins, Kings, & Dunning, 2011). Accordingly, young adults find it difficult to manage their diabetes during these transition periods, and moderately elevated levels of illness and mortality are experienced (Balfe et al., 2014; Peters, Laffel, & The American Diabetes Association Transition Working Group, 2011).

During young adulthood, exploration is a common endeavour. Chen and Jackson (2012) report an increase of risky behaviour, especially substance use, during this developmental phase. Substances such as alcohol and tobacco have specific implications for individuals living with T1DM. (Lee, Greenfield, & Campbell, 2009). Negative effects including acute hypoglycaemia, decreased physical exercise, and poorer glycaemic control have been associated with alcohol and tobacco use (Barnard et al., 2014). Due to the possible

SOCIAL SUPPORT AND DIABETES MANAGEMENT

unfamiliar territory, many young adults with T1Dm are unaware of how to adjust insulin use and management task when using these substances. Therefore, it is important that young adults consult their health care providers regarding the matter of substance use. Similarly, health care providers should have an open policy, and routinely enquire about substance use, to provide focused education (Reynolds et al., 2011).

Erikson (1980) states that young adults are navigating their way through the age-related task of intimacy versus isolation during the challenging time of young adulthood. Erikson (1980) explains that intimacy means being able to relate to another individual while still maintaining your identity and self in the process. Young adults with diabetes may experience the task as more difficult than their counterparts as true intimacy involves trusting others to such an extent that one feels comfortable to reveal personal thoughts and feelings in addition to having a clear sense of who they are (Monaghan et al., 2015). Peer relationships at tertiary institutions and/or the workplace become the individual's primary support system and thus replaces the parent's role as primary provider of support. If the individual fails to establish social relations with peers, he/she can become lonely, and experience isolation (Erikson, 1980). However, each young adult enters the phase with the possibilities to develop new assumptions, perform a variety of new tasks, and to foster and change existing and new relationships (Erikson, 1980). During the transition into the young adulthood phase, they tend to create new relationships with a variety of individuals and re-characterize their remaining relationships with family and friends. Aspects such as communications, academics and interpersonal relationships enable the individual to establish a supportive social network.

The social context of T1DM vicissitudes throughout young adulthood. Parental involvement decreases, while interactions with friends and romantic relationships increases (Wiebe et al., 2016). Young adults face an added challenge of transitioning from the paediatric to the adult health care system. The transition proves challenging as there is a

SOCIAL SUPPORT AND DIABETES MANAGEMENT

substantial difference between paediatric and adult health care's approach to diabetes management (Peters et al., 2011). Challenges include a decline in clinic attendance and decreased glycaemic control. Clinic attendance is vital as it has been linked to improved glycaemic control (Bowen, Henske, & Potter, 2010) and is necessary to identify early diabetes-related complications. Risks during this period are magnified by inconsistent engagement with the health care system. Young adults are less likely than any other age group to maintain a usual source of medical care (Callahan & Cooper, 2010); this problem is likely exacerbated by the need for young adults to transfer from paediatric to adult medical care systems. Relatively high rates of emergency department use among young adults with and without chronic illness suggest decreased engagement in preventive care and increased engagement in risky behaviours that may negatively impact health (Fortuna, Robbins, Mani, & Halterman, 2010; Nakhla, Daneman, To, Paradis, & Guttmann, 2009; Pyatak et al., 2014). It is important to systematically identify risk and protective factors and evaluate spheres of influence for young adults with T1DM to develop targeted services, interventions, and supports that can be executed during young adulthood.

1.5 Management of diabetes mellitus

1.5.1 Introduction

Diabetes as a multifaceted, chronic illness requires ongoing multidisciplinary medical care from endocrinologists, dieticians, diabetes educators, psychiatrists, psychologists, gastroenterologists, podiatrists, nephrologists, and social workers (WHO, 2016). The ADA (2017a) states that diabetes management outcomes can only be optimized if each management plan is tailored to the individual's needs, preferences, and values; thus, providing a person-centred approach to management. Management care plans cannot be rigid in its approach and requires a collaborative and flexible style.

1.5.2 Medical intervention for diabetes mellitus

Self-management is central to the prognosis of diabetes once it has been diagnosed (ADA, 2017b). The overarching goal of management is to replace endogenous with exogenous insulin. Additionally, the individual's diet and physical activity must be adjusted to decrease abnormalities in circulating glucose outside the physiological range. Due to the self-managed aspect, great demands are placed on individuals and thus a partnership between various health care providers, family and friends are key. The ADA (2017b) describes lifestyle management and psychosocial care as the foundation of diabetes management. The key referrals when diagnosed with diabetes include education regarding self-management; self-management support services; medical nutritional therapy and psychosocial support (ADA, 2017b). The focus on these aspects highlights the patient-centred approach that health care professionals are leaning towards and ensures that the decision-making process is guided by the values of the patient.

Early diagnosis is vital for managing diabetes efficaciously (WHO, 2016). Diabetes mellitus can be detected by measuring the glucose in a blood sample when the individual has been in a fasting state, or 2 hours after 75 g oral load of glucose has been administered (Patton & Clements, 2012). An additional measure to diagnose diabetes is by measuring glycated haemoglobin (HbA1c). This measure can be utilized even when the individual is not in a fasting state (WHO, 2016). A blood sample gives an indication of the current blood glucose concentration, whereas HbA1c reflects the average blood glucose concentration over the past few weeks (WHO, 2016). It is essential for blood glucose to be monitored, as it plays an active role in preventing possible complications.

The preferred method for monitoring blood glucose for young adults living with T1DM is the glycated haemoglobin method. This method proves beneficial as the individual does not have to enter fasting periods. It is necessary that a specialized physician measures

SOCIAL SUPPORT AND DIABETES MANAGEMENT

the average plasma glucose levels of the young adult living with diabetes every three to six months (Hirsch & Edelman, 2005). Contrary, the young adult must take responsibility for daily personal examination and recordkeeping of blood-glucose volumes. This regimen and the frequency of blood glucose self-examining depends on the individual, but generally occurs prior to settling down for the night and the consumption of food and drink (Hirsch & Edelman, 2005). Noteworthy is that the proposed number of self-monitoring glucose is at least three times per day (Patton & Clements, 2012).

Several researchers indicate that the most popular measure for monitoring blood-glucose volumes will remain the finger stick blood glucose test (Patton & Clements, 2012; Ziegler, Heidtmann, Hilgard, Hofer, Rosenbauer, & Holl, 2011). This method entails an individual to prick their finger with a needle and to place the sample on a test strip that is then inserted into a compact computerised blood-glucose monitor. The test and self-monitoring provide a guideline for young adults living with T1DM to determine how their glucose levels coincide with those proposed by their health practitioners. (Goldstein, Little, Lorenz, Malone, Nathan, & Peterson, 2003; Hirsch, 2005, Patton & Clements, 2012). Furthermore, suitable interventions can be tailored according to everyone's readings (Benjamin, 2002; Goldstein et al., 2003; Hirsch, 2005). Another method for measuring glucose in the blood stream is by means of a continuous glucose monitoring monitor (Patton & Clements, 2012). The monitor is a glucose oxidase platinum electrode. It is inserted just under the individual's skin, and can produce measurements every five minutes, due to the electrical current that the monitor creates (Nardacci, Bode, & Hirsch, 2010; Wadwa, Fiallo-Scharer, Vanderwel, Messer, Cobry, & Chase, 2009).

Insulin administration is fundamental with regards to the management of glycated haemoglobin (HbA1c) or average plasma-glucose levels (Cavallerano & Stanton, 2010). By measuring glycated haemoglobin (HbA1c), clinicians can get an overall picture of the

SOCIAL SUPPORT AND DIABETES MANAGEMENT

average blood sugar levels over a period of weeks or months. The treatment plan for young adults living with T1DM entails administration of exogenous insulin by either syringe insulin injections or insulin secreting pumps (Bismuth & Laffel, 2010; IDF, 2015; Silverstein et al., 2005). Insulin administration by syringe requires numerous manual injections daily, whereas an insulin secreting pump dispenses insulin by means of a needle or catheter inserted underneath the skin of the patient (Bismuth & Laffel, 2010). Despite the method of administration, a sufficient dosage of insulin is required to reduce pathophysiological diabetes-related insulin deficiency (Mazze et al., 2012).

1.5.3 Nutritional management of type 1 diabetes mellitus

Management of T1DM is a complex task, incorporating numerous factors, but it is ultimately focused on the approach to nutrition. Appropriate attention to diet is a key factor in minimizing hypoglycaemia and weight gain while achieving glycaemic control (ADA, 2014). As a result, the likelihood of chronic diabetic complications, namely, neuropathy, nephropathy, retinopathy, and coronary artery disease (CAD), in patients with T1DM can be greatly reduced (Patton, 2011). Nutrition is a challenging aspect of the diabetes management care plan. Each case of diabetes is unique and thus a tailored eating plan needs to be compiled for everyone (ADA, 2017a). It is essential that the individual receives education regarding a healthy and appropriate diet and be actively involved in creating an individualized eating plan. A meal plan should highlight various healthy food choices in order for the individual to meet the recommended nutrient intakes for essential vitamins and minerals; energy; and fibre, and to provide for normal growth and development (Abdelghaffar, 2015).

Nutrition management for young adults with T1DM is based on five fundamental principles. The first principle highlights the need to establish carbohydrate consistency at mealtimes. Secondly, young adults with T1DM should focus on weight management by balancing and controlling calorie intake and expenditure. The third principle incorporates

SOCIAL SUPPORT AND DIABETES MANAGEMENT

balancing nutritional content of foods. Fourthly, individuals must adjust their insulin administration with their meals accordingly. The five principle involves adjusting insulin according to glucose, food, and physical activity (Abdelghaffar, 2015). Underlying these principles, in addition to T1DM dietary management, is monitoring carbohydrate intake and balancing carbohydrate intake and insulin levels (Bantle et al., 2008). The relationship between insulin adjustment and carbohydrate intake is complex and not as simple as reducing medication or insulin when carbohydrate intake is decreased. Hence, it is recommended that carbohydrate intake is minimized to avoid fluctuating blood glucose. Managing carbohydrate intake is vital, as close adherence to daily recommendations specifically for T1DM is associated with improved glycaemic control (Mehta et al., 2008; Patton, Dolan, & Powers, 2007). Noteworthy, is the fact that there are no diabetes-specific nutrition guidelines for young adults with T1DM. Thus, a carbohydrate and insulin discrepancy may occur, resulting in hypo- and hyperglycaemia consequences (Silverstein et al., 2005). Furthermore, young adults with T1DM are especially at risk for cardiovascular disease and dyslipidaemia (Kershner et al., 2006; Margeirsdottir, Larsen, Brunborg, Overby, & Dahl-Jorgensen, 2008; Overby et al., 2007). Hence, close consideration regarding young adults' nutritional intake is vital and it is recommended that young adults with T1DM consume a diet that incorporates fruits and vegetables, whole grain foods, and foods low in fat. Saturated fats should be avoided as far as possible. It is recommended that young adults with T1DM refrain from consuming more than 7% of kilojoules from saturated fat (Bantle et al., 2008).

Insulin replacement is fundamental to the dietary management of T1DM as it is an autoimmune disease that requires lifelong insulin replacement therapy (Wiley et al., 2014). It puts added strain on individuals as they must devise their own tailor-made insulin replacement reliant on a compound array of interactive physiological parameters (Grant et al., 2013). Metabolism, consideration for dietary carbohydrate content, glycaemic patterns and

SOCIAL SUPPORT AND DIABETES MANAGEMENT

physical activity are all parameters that need to be considered (Heptulla, Rodriguez, Mason, & Haymond, 2008; MacDonald, Lowe, Barker, Mensch, & Attia, 2008; Marsh, Barclay, Colagiuri, & Brand-Miller, 2011; Parillo et al., 2011; Porcellati, Bolli, & Fanelli, 2011; Wiley et al., 2014).

1.5.4 Physical activity and type 1 diabetes mellitus

Physical activity (PA) for people of all ages living with T1DM is associated with many well-established health benefits, including improved cardiovascular fitness, better bone-health and enhanced psychological well-being. Despite these benefits, most adults with T1DM participate less frequently in PA than their nondiabetic counterparts and may adopt unhealthy lifestyles that contribute to cardiometabolic risk (Colberg, Laan, Dassau, & Kerr, 2015). Health professional often advocate PA for individuals diagnosed with T1DM as it entails benefits such as cardiovascular improvement, weight management, improved blood glucose management, and reduced blood pressure (Mascarenhas, Decimo, Lima, Kraemer, Lacerda, & Nesi-França, 2016).

PA is considered safe for patients with T1DM, however, individuals should frequently consult with members of their multidisciplinary health team to ensure that the exercises that they engage in are safe and advantageous. It is recommended that individuals with T1DM, together with their health care providers, set up well-defined, individualised exercise programs. Throughout the process of developing an exercise program and engaging in PA, individuals should be conscious of any negative effects, namely proliferative diabetic retinopathy, uncontrolled hypertension, and metabolic ketoacidosis (Camacho, Glassetti, & Davis, 2005). PA is associated with metabolic demands that depend on the type of exercise (stretching and strength training, or high intensity), form (continuous or sets of exercises), intensity (light to maximum intensity) and duration (brief or lengthy) (Colberg et al., 2015).

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Furthermore, the metabolic demands are influenced by the time of day, the weather, altitude, and the individual's fitness level (Mascarenhas et al., 2016).

Hypoglycaemia is a common and dreaded complication in young adults with T1DM, especially when engaging in physical activity (Kivela et al., 2006). While engaging in routine PA and in order to prevent hypoglycaemia, individuals with T1DM's blood glucose levels should be maintained between 120 and 180 mg/dL. High-intensity intermittent exercises reduce the decrease blood glucose levels (Ramalho, & Soares, 2008). According to Harmer et al. (2008), 30 seconds of high-intensity exercises cause an increase in blood glucose levels during and after the exercise in individuals with T1DM. During high-intensity training, the body produces lactate in order to provide more energy to the body so that the exercise can be completed (Garber et al., 2011). Therefore, there is a simultaneous increase in blood glucose levels and insulin levels. As a result, this type of training is associated with better insulin clearance, reduced catecholamine stimulation, and increased cellular content of glucose transporter type 4 (GLUT4) (Mascarenhas et al., 2016). The transport of blood glucose to the muscle cells is mainly performed by GLUT4. Interestingly, studies indicate that only 10 seconds of high-intensity aerobic exercise are required to prevent postexercise hypoglycaemia in patients with T1DM (Robertson, Riddell, Guinhouya, Adolfsson, & Hanas, 2014). Similarly, the practice of exercising with weights before aerobic exercises attenuates the decrease in blood glucose (Mascarenhas et al., 2016).

In summary, many neuroendocrine disorders may influence the regulation of blood glucose during exercise (Shetty et al., 2016). Researchers opine that aerobic exercises promote reductions in blood glucose levels, whereas anaerobic exercises may promote transient hyperglycaemia (McAuley et al., 2016). Blood glucose control, insulin modifications, and nutritional preparation are foundational to maximise the benefits and effects of PA. The health improvement accompanying regular physical exercise in T1DM

SOCIAL SUPPORT AND DIABETES MANAGEMENT

individuals distinctly demonstrates the significance of PA in these individuals' health and quality of life (Shetty et al., 2016).

1.5.5 Mental health and type 1 diabetes mellitus

Mental health is considered an important facet of diabetes care and self-management (Hamilton et al., 2017). Psychological difficulties may impair the individual's and/or the family's ability to perform the various tasks associated with managing diabetes and thus could impede on the individual's health (ADA, 2017b).

Living with diabetes can be unyielding. Young adults with T1DM must try to balance their diet, activity, and insulin replacement along with navigating the developmental tasks of young adulthood (Christie & Viner, 2005). The outcome of this balancing act is often an increased risk of developing psychological difficulties that may include depression, anxiety, and eating disorders associated with increasingly poor glycaemic control (De Wit et al., 2007; Grey, Whittemore, & Tamborlane, 2002). Additional consequences may involve hypervigilant parents and health care professional, increased family conflict and higher levels of frustration with the influence diabetes has on the individual's life. Therefore, the demand for well-regulated education is increasing, to ensure that young adults have the access to information and interventions that encourages self-management and empowerment.

A key component of effective chronic care management involving young adults and their families, is establishing, and maintaining engagement with the young adult living with T1DM (Christie, 2013). Therapeutic interventions based on person-centred theory, behavioural principles, motivational interviewing (MI), communication skills training, and collaborative problem-solving skills training's potential positive influence on glycaemic control have been investigated. However, some interventions display moderate improvements for the young adult's diabetes management outcomes. Therefore, the focus should be on providing multidisciplinary support and not unitary interventions.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

If daily diabetes care plans are not adhered to and monitored, diabetes can be a catalyst for severe health impediments such as heart disease, vascular disease, kidney disease, retinopathy, neuropathy and contracting infections (Deshpande, Harris-Hayes, & Schootman, 2008; IDF, 2015; Speight, 2013). Thus, it is vital to maintain one's blood glucose levels and blood pressure and routine checking for complications (IDF, 2015). Diabetes mellitus is not a competently managed disease and less than 50% of individuals attain adequate glycaemic targets (Amod et al., 2012). Inadequate glycaemic control can potentially cause hypoglycaemia, prompting seizures and may trigger cardiac arrhythmias (Barnard et al., 2014). Thus, to achieve an effective diabetes management and adequate glycaemic control, an individual must assume an active role in making behavioural changes to adapt living with diabetes (Haltiwanger & Brutus, 2012). Adequate glycaemic control can be achieved if one sets clear short-term and long-term goals, with disciplined adherence to them (Amod et al., 2012). Furthermore, by upholding a suitable diet; participating in routine exercise; checking glucose levels and administering insulin medication; diabetes can be effectively managed (ADA, 2017; Brouwer & Mosack, 2012). An additional component in diabetes management involves the role of social support.

Young adult's relationships with members in their social network are characterised by growth and change (Wiebe et al., 2016). These relationships can be a key determinant in aiding the young adult with effectively managing their T1DM. However, continued conflict and/or abrupt changes in relationship dynamics may impede diabetes management (Monaghan et al., 2015). As young adults develop and grow older, it is necessary for them to take sole responsibility for managing their diabetes as there are becoming increasingly autonomous. Nevertheless, support from various loved ones has been proven to assist the young adult with management tasks and high quality of life (Monaghan et al., 2015). Relevant research findings regarding this matter are presented (as discussed in Section 2).

1.6 The role of social support and diabetes management

1.6.1 Introduction

Social support is vital for fostering positive mental health, health behaviour, and effectual management (Chew, Khoo, & Chia, 2015). Saeed et al. (2012) assert that an effective support system enhances an individual's adaption to diabetes. Accordingly, researchers have described that social support plays a fundamental role with regards to self-management as well as effective management (Albright, Parchman, & Burge, 2001; Anderson & Christison-Lagay, 2008; Bai, Chiou, & Chang, 2009; Ciechanowski et al., 2010; Gallant, 2003). Chew et al. (2015) define social support as the satisfaction of an individual's needs (whether aware or unaware) through the interactions with another individual or the community. Luszczynska, Mohamed, and Schwarzer (2005) add that social support is a resource that can be used to alter rigorous life stresses. Thus, social support is the perception that a person is an affiliate of a multifaceted system in which one can give and receive love, assistance, and understanding (Saeed et al., 2012). Thus, comprehending the role of social support is essential as effective diabetes management is an intricate social occurrence and because diabetes is a complex disease (Vaccaro, Exebio, Zarini, & Huffman, 2014).

Within each social support network there are facilitating factors providing informational support provided by parents, extended family, friends, and medical practitioners that is imperative in maintaining the psychological, social, and physical integrity of the recipient (Saeed et al., 2012). Social support is displayed through emotional encouragement and instrumental help with management tasks such as blood glucose monitoring, medical check-ups, meal preparation, and participating in physical activity (Albright et al., 2001; Anderson & Christison-Lagay, 2008; Bai et al., 2009; Ciechanowski et al., 2010; Gallant, 2003). Fundamentally, family and friends played the most significant supportive role in relation to young adults' health outcomes (Gamarra, Paz, & Griep, 2009).

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Social support is defined as the young adult's perception of functions that are performed for them by important individuals, such as parents, other family members, friends, and colleagues that can provide emotional, informational, appraisal, and instrumental aid (Saeed et al., 2012). Social support plays a significant role in helping the young adult marshal psychological reserves and surmounts his/her emotive encumbrances (Saeed et al., 2012). Relevant social support fosters development in interpersonal relationships (Luszczynska et al., 2005).

1.6.2 Parental support

Parental involvement is conceptualised as parents who comprehend the interaction between parenting proficiencies and the adolescent's success in the different developmental facets; is aware of and involved; and is committed to communicating with the young adult (An & Hodge, 2013). It comprises parental morals and prospects, participation, and parent guidance in making decisions through participation in the community (Epstein, 2010; Weiss, Kreider, Lopez, & Chatman, 2005). Diabetes consigns a high encumbrance on parents (Hansen, Schwartz, Weissbrod, & Taylor, 2012). At times, this has a negative influence on the individuals with diabetes. Due to family members' anxieties relating to young adults' diabetes management, they are faced with regulating their family's emotions in addition to their own (Young-Hyman et al., 2016). The young adult could feel that the family is trying to control their social readiness. Families feel that they are trying their best and are not aware that their actions negatively influence the young adults.

In general, families provide young adults with tangible support in the form of awareness and insight. (Pyatak et al., 2017). Diabetes related social support from family has proven to aid the individual in a feeling of mastering their diabetes and in reducing anxiety related to acute diabetes complications, such as hypoglycaemia (Wiebe et al., 2016). Parental

SOCIAL SUPPORT AND DIABETES MANAGEMENT

guidance and involvement remains important in addition to a gradual transition towards independence in diabetes management (Comeaux & Jaser, 2010). When the parents and the young adult with diabetes have a collaborative relationship with shared responsibilities regarding the diabetes management regime, adherence can be better, and it provides the needed support for improved emotional functioning (Helgeson, Reynolds, Siminerio, Escobar, & Becker, 2008). Parenting styles characterised as emotionally encouraging and accepting has lasting effects in improved diabetes management and family interaction (Moore et al., 2013). According to Rosenberg and Shields (2009) stronger parental attachment and constructive family dynamics is needed to provide a foundation upon which knowledge about diabetes management can be built. Social support provided by the family does not exist in isolation. Social support from friends, an extensive peer group and health care professionals seems to signify an essential resource of emotional support that supplements the contributory support young adults with diabetes receive from their parents (Delamater, De Wit, McDarby, Malik, & Acerini, 2014).

1.6.3 Support from friends

Friends play a key role in helping young adults with diabetes to regulate their negative emotions (Strom & Egede, 2012). Additionally, friendships are a priceless aspect in the lives of young adults, and the care and support they receive regarding their diabetes are much valued (Dickinson & O'Reilly, 2004). Friends who display an interest in learning about diabetes ask questions, and their aid provides a sense of solace (Dickinson & O'Reilly, 2004). Conversely, friends can be insensitive at times and forgetful about the rigorous routine that accompanies diabetes (Dickson & O'Reilly, 2004). Nevertheless, friends appear to remain an important source of social and emotional support system for young adults with diabetes. Ashruff, Siddiqui, and Carline (2013) affirm that the social support from friends increases the young adult's adherence to a regimen and thus promotes effective diabetes management

SOCIAL SUPPORT AND DIABETES MANAGEMENT

(glycaemic control) (Ashruff et al., 2013; Palladino & Helgeson, 2012; Wysocki & Greco, 2006). Support from friends and peers lessen the feelings of isolation and anxiousness and are viewed as positive by receivers (Hughes, Wood, & Smith, 2009). The type of support received from friends are instrumental and require close attention as young adults increase their time spent with friends and decrease their time spent with their family (Malik & Koot, 2011; Peters et al., 2014).

Social support provided by friends are positively observed in general (Carroll, 2006; Karlsson, 2008). However, support may be received negatively. Negative impacts of social support can range from less perceived freedom; as well as peer pressure and fear of reactions (Delamater et al., 2014). Ashruff et al. (2013) explains that the reasons could be that they more likely conform to the social pressure and partake in activities that may influence their management requirements negatively. Young adults often feel overwhelmed because their diabetes diagnosis requires them to plan for activities and make sufficient provision for that. This leaves them with less time for freedom and spending time with their friends (Kay, Juth, Silver, & Sender, 2017). Delamater et al. (2014) state that foremost obstacles that withhold young adults from receiving desired and adequate social support from friends are fear of stigmatization and sense of autonomy. This likely flawed interpretation of events may result in poor behavioural decisions in addition to emotional distress (Hains, Berlin, Davies, Parton, & Alemzadeh, 2006). Young adults develop sufficient problem-solving knowledge regarding effective diabetes management. However, this knowledge becomes influenced due to fear of disapproval from friends (Hansen et al., 2012). Consequently, remaining focused on possible negative reactions from friends and always expecting the worst are related to general feelings of stress regarding diabetes management (Hansen et al., 2012). Young adults who neglect their management regime due to the preconceptions of unfavourable outcomes from friends augment their risk of difficulties and prevent their friends from supplying progressive social

SOCIAL SUPPORT AND DIABETES MANAGEMENT

support (Hains et al., 2006). Therefore, it is vital to understand the impact of friends as social support system and the fact that peer and family support do not exist in isolation (Ashruff et al., 2013).

Kay et al. (2017) assert that support from family and friends do not exist in isolation and that these two types of social support systems can complement each other. Colarossi (2001) confirms that family and friend support cannot replace each other but can build on one another. Moreover, Ingadottir and Halldorsdottir (2008) commented that support received from family and friends in addition to health care providers interrelated with effective diabetes management

Ultimately, wide-ranging research regarding the psychosocial factors in diabetes care is needed (De Boera, Pijl, & Minnaerta, 2013). The impact of social support on young adults' diabetes management and health outcomes is not fully understood (Carcone, Ellis, Weisz, & Naar-King, 2011). Additionally, the role of family and friends in diabetes management behaviour warrants further investigation (Berg et al., 2013). Similarly, within a South African context, little is known about how young adults with T1DM receive diabetes-related support (Masoudi Alavi et al., 2012). Overall, there is a need for more culture- and context-specific research on diabetes. Therefore, further investigation into the influence of social networks on young adults' diabetes self-management is warranted (Moore et al., 2013). In the light of this need it is worth examining the characteristics of family, friends and social networks associated with successful diabetes management. Such an undertaking may facilitate a more comprehensive understanding of the specific social support characteristics that enable young adults to effectively manage their diabetes.

1.7 Research paradigms

1.7.1 Qualitative research design

A qualitative research design employs an interpretive theoretical framework to explicate the perceptions, opinions, and understandings that individuals attach to a social or human phenomenon (Lipscomb, 2016). Qualitative research proves beneficial as it enables individuals to attach meaning to a complex situation. It follows an inductive reasoning style and does not aim to provide a solitary description and understanding of the research topic. Founded in social constructivism, a qualitative research design supports the fact that individuals develop their own, and subjective meanings regarding a problem (Creswell & Poth, 2017).

1.7.2 Social constructivism

The social constructivist theory proposes that everyone's perception and understanding of the world is-constructed through interaction and communication (Burr & Dick, 2017). The main underlying principle of the social constructivist view is to emphasize that individuals' experiences are (to some extent) unique, thus there is not a single, unitary reality (Stewart, 2010). Meanings and perceptions are varied and multiple, thus the researcher is led to explore the complexity of views, rather than categorize the information in predetermined ideas (Creswell, 2014). Furthermore, this theory postulates that people seek and construct an understanding of the world through reflecting on their various experiences (Burr & Dick, 2017). Hence the goal of research utilizing the social constructivist theory, including this study, is to depend as far as possible on the participant's understanding of the situation being studied (Creswell, 2014). By utilizing semistructured questions that provide the researcher with flexibility, the participants can expand on their experiences and perceptions while fostering reciprocity between the researcher and the

SOCIAL SUPPORT AND DIABETES MANAGEMENT

participant (Kallio, Pietila, Johnson, & Kangasniemi, 2016). Undertaking research from this framework as the underpinning allows the researcher to acknowledge how participants' past has shaped their interpretations and to become aware of how they position themselves within the interviewing process (Burr & Dick, 2017). Additionally, the intent is to discover the different meanings that others have of the situation. Thus, a pattern of meaning is explored (Creswell, 2014).

1.8 Contextualization of this study

This study forms part of a larger overarching research project titled: 'Psycho-social variables in adjusting to diabetes management in adolescents and young adults'. The larger overarching research project commenced in August 2015 and is ongoing. The current study commenced in January 2016 and was concluded in November 2017.

1.9 Research question

The research question that this study aims to address is formulated as follows:

How do young adults with well-controlled type 1 diabetes experience social support in the context of their illness?

The research study is of a qualitative nature and thus, the research questions aims to guide the study. Henceforth, a prior hypothesis was not formulated as the research is not of a quantitative nature.

1.10 Research methodology

The research question informed the decision regarding the selection of the most appropriate research methods for execution of this study. The methodology applied in the

SOCIAL SUPPORT AND DIABETES MANAGEMENT

current study therefore aimed to explore the social support experiences regarding a phenomenon as described by the participants (Creswell, 2009).

1.10.1 Research approach and design

The study was conducted by means of a qualitative research approach to explore the personal and social perceptions young adults who effectively manage their diabetes. Qualitative research enables the exploration regarding the meaning of an individual's existence within several contexts and roles (Yin, 2015). Additionally, it provides the researcher with the opportunity to seek patterns in, and explore the complexity of human behaviour. This prospect enables the researcher to produce a holistic picture of contextual states, individual perspectives, thus providing alternative and novel theories of social behaviour (Yilmaz, 2013; Yin, 2015). Finally, according to Yin (2015), a qualitative research approach highlights the importance and use of various data sources.

A qualitative research approach was considered the most applicable as this method aided the exploration of the role that families and other support systems played in managing diabetes. It also facilitated an in-depth understanding of the way in which social care contributed to the successful management of a life-threatening condition.

1.10.2 Research context

This study was conducted at two branches of the Centre for Diabetes and Endocrinology, namely in Houghton and Parktown, Johannesburg, Gauteng, South Africa. The research context was an urban suburb characterized by a high socio-economic standard of living.

1.10.3 Participants

Participants were selected by means of a nonrandom sampling method, namely purposive sampling. Purposive sampling is defined as “purposely choosing a participant according to certain qualities that the person possesses” (Tongco, 2007). Consequently, it was necessary for the participants exemplify the required, clearly defined, and predetermined inclusion criteria prior to being suitable for participation in the study (Ritchie, Lewis, Elam, Tennant, & Rahim, 2013; Tongco, 2007).

The following inclusion and exclusion criteria for the study were established.

The inclusion criterion constitutes that:

- Foremost, participants must be willing to participate voluntarily.
- Participants should be within the developmental period of young adulthood, therefore between the ages of 18 and 25 years.
- Young adults were chosen as literature suggests that during this developmental period they are faced with many changes in their lives, and that social support might aid the adequate management of their diabetes.
- Participants should have received a diagnosis of type 1 diabetes more than 12 months before; have an HbA1C of 8% or less during the last 12 months for diabetes management to be considered effective and the diabetes controlled. Prof. D. G. Segal, primary gatekeeper, and a specialist endocrinologist at the Centre for Diabetes and Endocrinology in Houghton, Johannesburg, contended that young adults upholding average haemoglobin percentages of 8% (or less) also managed their type 1 diabetes effectively (personal communication, February 21, 2016). Young adults face developmental challenges such as increased responsibilities, inconsistent routines, and

SOCIAL SUPPORT AND DIABETES MANAGEMENT

increased autonomy. Thus, a HbA1C of 8% or less is deemed as effective management.

- Participants should be patients at the Centre for Diabetes and Endocrinology in Houghton, Johannesburg or the allocated private medical practice specializing in paediatric diabetes in Parktown, Johannesburg to minimise treatment variables and enhance trustworthiness of the study.
- The participants must be able and willing to communicate, understand and respond in English and/or Afrikaans; and can be male or female, and of any ethnic or racial background.
- Participants who are suffering from another chronic medical condition in addition to type 1 diabetes, and/or are receiving psychotherapy will be excluded from the study.
- The languages of English and/or Afrikaans have been chosen as the use of an interpreter can compromise the trustworthiness of the data.

The exclusion criteria entail that:

- Individuals currently engaged in any form of psychotherapy was excluded from the current research study as the psychotherapeutic process in which they are involved can possibly influence their perception of their social support network.
- Individuals who also suffered from another chronic medical condition were excluded from the study because the social support experiences of managing another chronic illness might have had an influence on the social support of managing type 1 diabetes.

Adherence to the abovementioned inclusion and exclusion criteria ensured that the selected sample embodied a symbolic representation of the criterion-defined group observed during this study (Ritchie et al., 2013).

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Table 2

Characteristics of the nonrandom purposive sample utilized in this study

Participant Number	Gender	Race	First Language	Current Age	Age at time of diagnosis	HbA1C
YA1*	Female	White	English	20	18	<8*
YA2	Male	White	Afrikaans	19	13	<8
YA3	Female	African	English	19	13	<8
YA4	Male	White	Afrikaans	25	18	6.3
YA5	Female	White	Afrikaans	24	2	6.8
YA6	Female	White	Afrikaans	23	11	7.5
YA7	Male	White	English	24	15	<8
YA8	Female	White	English	25	21	7.3

*YA- Young adult

*An average HbA1C of <8% was obtained, but exact % is unknown

1.10.4 Data generation

The data for this study was generated and utilised in conjunction with the previously mentioned larger overarching research study, namely ‘Psycho-social variables in adjusting to diabetes management in adolescents and young adults’. Data generated for this study (‘Young adults’ experience of social support in effective diabetes management’) was collected at two branches of the Centre for Diabetes and Endocrinology, namely in Houghton

SOCIAL SUPPORT AND DIABETES MANAGEMENT

and Parktown, Johannesburg, from January 2017.

Data was generated by means of semistructured interviews. The semistructured interview uses a comparatively comprehensive interview schedule and aims to ascertain subjective accounts from individuals regarding the research topic (McIntosh & Morse, 2015). Advantageous of this method is that the semistructure enables the researcher to explore topics of interest that arise during the interview (Wilson, 2016). Therefore, it gives the researcher an adaptable approach and creates a conversational interaction that centres around the topic (McIntosh & Morse, 2015). The flexibility of this technique enables the deviation and waive of certain questions, in addition to using probing for clarification (Whiting, 2008).

An interview agenda consisting of six semistructured questions guided the interviewing process. The following questions pertained to this research study:

- How does support from family and friends influence how you manage your diabetes?

In addition, the following probing questions were formulated to aid the depth of the data:

- Who do you turn to for support?
- What things have others (friends, family, health care providers) done for you that was helpful or supportive with regards to your diabetes management?
- Could you tell me more about key role-players that provided support when you were first diagnosed?
- How have they continued to support you?

The aim of the interviews was to gather data that will describe a comprehensive picture of the diverse social support experiences of diabetes management in individuals diagnosed with type 1 diabetes. Furthermore, it allowed the researcher to ask essential questions and be flexible and adaptable to the participant's responses (Bernard, 2012).

1.10.5 Data analysis

After the interviews were conducted, the recordings thereof were transcribed verbatim¹. Thereafter, the data was analysed according to Braun and Clarke's (2006) model of thematic analysis. Furthermore, an inductive approach was used to analyse the data; the approach used to develop concepts and themes from raw data or observations (Percy, Kostere, & Kostere, 2015).

The data was interpreted and analysed systematically according to the six steps as set out by Braun and Clark (2006):

Phase 1: Familiarizing the self with the data. The researcher personally transcribed the audio data attained from the eight semistructured interviews, which contributed to gaining more familiarity and insight prior to the data analysis process. Immersion of the dataset was obtained through repeated reading and increased familiarity thereof (Crowe, Inder, & Porter, 2015). Throughout this process, notes and ideas for coding were made as patterns and meanings emerged. These initial coding notes were referred to throughout the process of analysis the dataset (Braun & Clarke, 2014).

Phase 2: Generating initial codes. During this phase, initial codes were generated from the preliminary codes that developed from the transcribed data scripts. The systematic and meticulous examination of the dataset resulted in the generation of codes (Braun & Clarke, 2006). The data was organised into meaningful categories, which is essential to the data analysis process as it forms the base for the emergence of themes (Miles & Huberman, 1994; Tuckett, 2005). These codes aided the researcher to identify the rudimentary elements of the raw data and facilitated her to assess the dataset in a meaningful way. Finally, this phase concluded with the dataset coded and arranged within each distinctive code (Percy et al., 2015).

¹ Translated from Afrikaans to English to reflect the essence of the responses

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Phase 3: Searching for themes. During the third phase the researcher analysed the codes formed in the former phases and deliberated on how these codes could be combined to form an overarching theme. Subsequently, the researcher commenced in forming a composite of themes and subthemes (Vaismoradi, Jones, Turunen, & Snelgrove, 2016).

Phase 4: Revising themes. The aim of the reviewing process was to ensure that the data within each theme interlinked in a meaningful way. The researcher had to take the responsibility to refine and review the collection of themes and subthemes to ensure it reflected the quintessence of the eight data transcripts (Braun & Clarke, 2006). This process initially focused on revising the initial codes given to the data extracts. It aimed at establishing and validating a coherent pattern. Thereafter, the eight datasets were reviewed by the researcher to authenticate the prospective, main themes and to ascertain that it represented the extensive content of the complete dataset. The process of coding data is apparent throughout the phases of data analysis (Braun & Clarke, 2014). Through discussion and deliberation with supervisors, initial codes and themes were altered to demonstrate more suitable codes and overarching themes.

Phase 5: Defining and naming themes. The themes that were constructed throughout the previous phases was thoroughly analysed to determine each distinctive theme's facets and interrelatedness to one another. Primarily, each theme was defined idiosyncratically and arranged within the complete dataset. Thereafter, subthemes were identified. The subthemes were reviewed several times to ensure that it captured the essence of the main theme while still complementing the overarching dataset and research question to warrant validity (Crowe et al., 2015). Furthermore, the researcher revised the identified themes to ensure that there was clear a distinction. Finally, the names of the themes and subthemes were amended to adequately represent the description it entailed.

Phase 6: Producing the report. During the sixth phase, the researcher assimilated

SOCIAL SUPPORT AND DIABETES MANAGEMENT

the data analysis process of coding the eight transcripts; thematically organising the codes; and reviewing and refining themes into the final research report, titled: 'Young adults' experience of social support in effective diabetes management'. The findings of the study were supported by munificent extracts from the eight transcribed data scripts, and presented in article format (Braun & Clarke, 2006). The article provides a coherent and abridged description of the dataset utilised in the study.

1.10.6 Trustworthiness

Trustworthiness the research study was ensured by using the didactic model for quality in qualitative research developed by Tracy (2010). Tracy (2010) suggests the following framework to be used as a pedagogical tool and a platform to ensure trustworthiness:

Worthy topic. The current researcher had chosen a topic that has significant relevance in South Africa (Guba & Lincoln, 2005). Throughout the consultation of literature, the limited available research within the South African context, and the increased prevalence of the phenomena under study became pertinent. Therefore, the study was deemed appropriate and significant.

Rich rigor. Weick (2007) explains that a rich rigor is obtained through a variety of descriptions and explanations that are rich. A rich rigor was ensured by establishing a rich and applicable theoretical paradigm, specifically the social constructivist theory. Furthermore, a rich rigor was attained as the researcher engaged in conducting semistructured interviews, transcribing the audio recorded interviews, auditing the transcripts, employing thematic analysis, and collaboration with co-coders.

Sincerity. The researcher employed self-reflexivity, vulnerability, honesty, and transparency during data collection. Through the means of regular supervision, research biases were eradicated and reflexivity of the researcher, in addition to research transparency,

SOCIAL SUPPORT AND DIABETES MANAGEMENT

were promoted.

Credibility. The comprehensive description of the research approach, namely the research design; data collection and analysis; and ethical considerations substantiated the study's credibility. Moreover, first-level member checking was employed during the semistructured interviews to clarify any indistinctness within the data.

Resonance. Resonance is aimed at generating insight into the lived experiences of the participants. The study promoted resonance through the inclusion of suitable, verbatim data extracts in the findings of the final research report (Levitt, Motulsky, Wertz, Morrow, Ponterotto, 2016). The findings of the research study will be utilised in future presentation and can be a form of reference when South African policies regarding type 1 diabetes and diabetes management are revised and refined.

Significant contribution. This research aimed to make a significant contribution by answering the following questions:

Does the study extend knowledge? The study extends knowledge about the significance of social support with regards to diabetes management within a South African context and can thus contribute to expanding knowledge.

Does the study generate on-going research? The forms part of an ethically approved comprehensive research project which will continue for duration of ten years. Furthermore, the study will be used to form suitable interventions for the population that information was received from.

Does the study liberate or empower? By gaining knowledge, the research study can empower those living with diabetes by facilitating a comprehensive understanding of the facets involved in diabetes management.

Does the study form a meaningful coherence? Meaningful coherence was obtained

SOCIAL SUPPORT AND DIABETES MANAGEMENT

by safeguarding that the data collection methods were suitable with regards to the aims and objectives of the study.

1.11 Ethical considerations

The estimated ethical risk level of this study was medium because the participants belonged to a physically and potentially psychologically vulnerable group. Hence thorough deliberation was expended, and the national and international ethical guidelines and principals were adhered to. Ethical approval of both the larger overarching research project, *Psycho-social variables in adjusting to diabetes management in adolescents and young adults* (NWU-HS-2016-0111) and this study, *Young adults' experience of social support in effective diabetes management*, (NWU-HS-2016-0085) was obtained from the Humanities and Health Research Ethics Committee (HHREC) of the Faculty of Humanities of the North-West University prior to proceeding with this study (**please refer to attached addendums B and C respectively**).

Moreover, this study conducted research with strict adherence to principles and guidelines delineated by the National Health Research Ethics Council, as well as The Code of Ethics of the World Medical Association (International Declaration of Helsinki). Independent, informed, written consent from the participant were obtained prior to any data generation (**please refer to attached addendum D**). Foremost, participation in this study was entirely voluntary and the participants maintained the right to withdraw their participation at any stage. Anonymity and confidentiality was ensured by giving each participant a specific code. Reporting of findings was kept anonymous by strictly referring only to the participant code. Furthermore, the data is kept secure by being stored in a locked cupboard in the researcher's offices. All electronic data is password protected.

The rights of the participants were essential to uphold and thus the contextual setting of this research study also required adherence to the supreme law of the Republic of South

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Africa, namely the Constitution of the Republic of South Africa and the National Health Act, act 61 of 2003 of the Republic of South Africa.

1.12 Outline of study

Section I of this mini-dissertation includes a wide-ranging description of the phenomenon defined as diabetes mellitus; a delineation of several facets pertaining to the management of diabetes; and the social support experiences that are related to the management of a chronic illness. Furthermore, it entails an outline of the social constructionist theory, and a description of the research paradigms and methodology utilized to conduct this study.

Section II specifies the author guidelines for the *Health SA Gesondheid Journal of Interdisciplinary Health Sciences*. The article titled: ‘Young adults’ experience of social support in effective diabetes management’ will be submitted to this journal.

Section III includes a critical reflection of the research, completed by the researcher, as well as a complete reference list.

References

- Abdelghaffar, S. (2015). Nutritional management of type 1 diabetes. In K. Nunes (Ed.), *Major topics in type 1 diabetes* (pp. 121–135). doi:10.5772/61150.
- Albright, T. L., Parchman, M., & Burge, S. K. (2001). Predictors of self-care behaviour in adults with type 2 diabetes: An RRNeST study. *Family Medicine*, *33*(5), 354–360.
Retrieved from
<http://www.stfm.org/Portals/49/Documents/FMPDF/FamilyMedicineVol33Issue5Albright354.pdf>
- Ali, O. (2010). Type 1 diabetes mellitus: Epidemiology, genetics, pathogenesis, and clinical manifestations. In L. Poretsky (Ed.), *Principles of diabetes mellitus* (2nd ed.) (pp. 181–201). New York, NY: Springer.
- Altamirano-Bustamante, N., Islas-Ortega, L., Robles-Valdés, C., Garduno-Espinosa, J., Morales-Cisneros, G., Valderrama, A., ...Altamirano-Bustamante, M. M. (2008). Economic family burden of metabolic control in children and adolescents with type 1 diabetes mellitus. *Journal of Pediatric Endocrinology and Metabolism*, *21*(12), 1163–1168. doi:10.1515/JPEM.2008.21.12.1163
- American Diabetes Association (ADA). (2017a). Standards of Medical Care in Diabetes. *Journal of Clinical and Applied Research and Education*, *40*(1). doi:10.2337/dc17-S001
- American Diabetes Association (ADA). (2014). Diagnosis and classification of diabetes mellitus. *Diabetes Care*, *37*(1), 81–90. <https://doi.org/10.2337/dc14-S081>
- American Diabetes Association (ADA). (2017b). Lifestyle management: Section 4. *Diabetes Care*, *40*(1), 33–43. doi:10.2337/dc17-S007

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Amod, A., Motala, A., Levitt, N., Berg, J., Young, M., Grobler, N., ... Raubenheimer, P. (2012). The 2012 SEMDSA guideline for the management of type 2 diabetes. *Journal of Endocrinology, Metabolism and Diabetes of South Africa*, 17(1), 1–94. Retrieved from https://www.semDSA.org.za/images/2012_SEMDSA_Guideline_July_FINAL.pdf
- An, J., & Hodge, S. R. (2013). Exploring the meaning of parental involvement in physical education for students with developmental disabilities. *Adapted Physical Activity Quarterly*, 30(2), 147–163. <https://doi.org/10.1123/apaq.30.2.147>
- Anderson, D., & Christison-Lagay, J. (2008). Diabetes self-management in a community health center: Improving health behaviours and clinical outcomes for underserved patients. *Clinical Diabetes*, 26(1), 22–27. <https://doi.org/10.2337/diaclin.26.1.22>
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <http://dx.doi.org/10.1037/0003-066X.55.5.469>
- Ashruff, S., Siddiqui, M. A., & Carline, T. E. (2013). The psychosocial impact of diabetes in adolescents: A review. *Oman Medical Journal*, 28(3), 159–162. doi:10.5001/omj.2013.46
- Atkinson, M. A., von Herrath, M., Powers, A. C., & Clare-Salzler, M. (2015). Current Concepts on the Pathogenesis of Type 1 Diabetes—Considerations for Attempts to Prevent and Reverse the Disease. *Diabetes Care*, 38(6), 979–988. doi:10.2337/dc15-0144

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Bai, Y. L., Chiou, C. P., & Chang, Y. Y. (2009). Self-care behaviour and related factors in older people with Type 2 diabetes. *Journal of Clinical Nursing, 18*(23), 3308-3315. doi:10.1111/j.1365-2702.2009.02992.x
- Balfe, M., Brugha, R., Smith, D., Sreenan, S., Doyle, F., & Conroy, R. (2014). Why do young adults with type 1 diabetes find it difficult to manage diabetes in the workplace? *Health & Place, 26*, 180–187. doi:10.1016/j.healthplace.2013.12.016
- Bantle, J. P., Wylie-Rosett, J., Albright, A. L., Apovian, C. M., Clark, N. G., Franz, M. J., ... Wheeler, M. L. (2008). Nutrition recommendations and interventions for diabetes: A position statement of the American Diabetes Association [Abstract]. *Diabetes Care, 31*, 61–78. doi:10.2337/dc08-S061
- Barnard, K. D., Dyson, P., Sinclair, J. M. A., Lawton, J., Anthony, D., Cranston, M., & Holt, R. I. G. (2014). Alcohol health literacy in young adults with type 1 diabetes and its impact on diabetes management. *Diabetic Medicine, 31*(12), 1625–1630. doi:10.1111/dme.12491
- Barrett, J. C., Clayton, D. G., Concannon, P., Akolkar, B., Cooper, J. D., Erlich, H. A., ... Type 1 Diabetes Genetics Consortium. (2009). Genome-wide association study and meta-analysis find that over 40 loci affect risk of type 1 diabetes. *Nature Genetics, 41*(6), 703–707. doi:10.1038/ng.381
- Beaser, R. S. (2010). Definition and pathophysiology. In R.S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 1–24). Boston, MA: Joslin Diabetes Centre Publications Department
- Beck, R. W., Tamborlane, W. V., Bergenstal, R. M., Miller, K. M., DuBose, S. N., & Hall, C. A. (2012). The T1D exchange clinic registry. *Journal of Clinical Endocrinology Metabolism, 97*(12), 4383–4389. doi:10.1210/jc.2012-1561

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Benjamin, E. (2002). Self-monitoring of blood glucose: The basics. *Clinical Diabetes*, 20(1), 45–47. <https://doi.org/10.2337/diaclin.20.1.45>
- Berg, C. A., Butner, J. E., Butler, J. M., King, P. S., Hughes, A. E., & Wiebe, D. J. (2013). Parental persuasive strategies in the face of daily problems in adolescent type 1 diabetes management. *Health Psychology*, 32(7), 719–728. doi:10.1037/a0029427
- Bernard, R. H. (2012). *Social research methods: Qualitative and quantitative approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Bishu, K. G., Gebregziabher, M., Dismuke, C. E., & Egede, L. E. (2015). Quantifying the incremental and aggregate cost of missed workdays in adults with diabetes. *Journal of General Internal Medicine*, 30(12), 1773–1779. doi:10.1007/s11606-015-3338
- Bismuth, E., & Laffel, L. M. (2010). Treatment of children with diabetes. In R. S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 613–640). Boston, MA: Joslin Diabetes Centre Publications Department.
- Bluestone, J. A., Herold, K., & Eisenbarth, G. (2010). Genetics, pathogenesis and clinical interventions in type 1 diabetes. *Nature*, 464(7293), 1293–1300. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4959889/>
- Bowen, M. E., Henske, J. A., & Potter, A. (2010). Health care transition in adolescents and young adults with diabetes. *Clinical Diabetes*, 28, 99–106. <http://dx.doi.org/10.2337/diaclin.28.3.99>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77–101. <http://dx.doi.org/10.1191/1478088706qp063oa>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Braun, V., & Clarke, V. (2014). What can thematic analysis offer health and wellbeing researchers? *International Journal of Qualitative Studies on Health and Well-being*, 9. doi: 10.3402/qhw.v9.26152
- Brouwer, A. M., & Mosack, K. E. (2012). “I am a blood sugar checker”: Intervening effects of self-as-doer identity on the relationship between self-efficacy and diabetes self-care behaviours. *Self and Identity*, 11(4), 472–491. <https://doi.org/10.1080/15298868.2011.603901>
- Bryden, K. S., Dunger, D. B., Mayou, R. A., Peveler, R. C., & Neil, H. A. (2003). Poor prognosis of young adults with type 1 diabetes: A longitudinal study. *Diabetes Care*, 26(4), 1052–1057. <http://dx.doi.org/10.2337/diacare.26.4.1052>
- Burr, V., & Dick, P. (2017). Social constructionism. In B. Gough (Ed.), *The Palgrave handbook of critical social psychology*. London: Palgrave Macmillan. Retrieved from https://doi-org.nwulib.nwu.ac.za/10.1057/978-1-137-51018-1_4
- Callahan, S. T., & Cooper, W. O. (2010). Changes in ambulatory health care use during the transition to young adulthood. *Journal of Adolescent Health*, 46(5), 407–413. doi: 10.1016/j.jadohealth.2009.09.010
- Camacho, R. C., Galassetti, P., & Davis, S. N. (2005). Glucoregulation during and after exercise in health and insulindependent diabetes. *Exercise and Sport Science Reviews*, 33(1), 17–23. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/15640716>
- Carcone, A. I., Ellis, D., Weisz, A., & Naar-King, S. (2011). Social support for diabetes illness management: supporting adolescents and caregivers. *Journal of Developmental Behaviour Pediatrics*, 32(8), 581-590. doi:10.1097/DBP.0b013e31822c1a27

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Carroll, A. E. (2006). The role of significant others in adolescent diabetes: A qualitative study. *The Diabetes Educator*, 32(2), 243–252. doi:10.1177/0145721706286893
- Cavallerano, J.D., & Stanton, R.M. (2010). Micro vascular complications. In R. S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 445–463). Boston, MA: Joslin Diabetes Centre Publications Department.
- Céspedes-Knadle, Y. M., & Muñoz, C. E. (2011). Development of a group intervention for teens with type 1 diabetes. *The Journal for Specialists in Group Work*, 36(4), 278–295. <https://doi.org/10.1080/01933922.2011.613898>
- Chawla, R. (2012). *Complications of diabetes*. New Delhi, ND: Jaypee Brothers Medical Publishers (P) Ltd.
- Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health*, 50(2), 154–163. doi:10.1016/j.jadohealth.2011.05.013
- Chew, B. H., Khoo, E. M., & Chia, Y. C. (2015). Social support and glycemic control in adult patients with type 2 diabetes mellitus. *Asia-Pacific Journal of Public Health*, 27(2), 166–173. <https://doi.org/10.1177/1010539511431300>
- Chiang, J. L., Kirkman, M. S., Laffel, L. M. B., & Peters, A. L. (2014). Type 1 diabetes through the lifespan: A position statement of the American Diabetes Association. *Diabetes Care*, 37(7), 2034–2054. doi:10.2337/dc14-1140
- Chinnappan, S., Sivanandy, P., Sagarán, R. & Molugulu, N. 2017. Assessment of knowledge of diabetes mellitus in the urban areas of Klang District, Malaysia. *Pharmacy*, 5(1), 11. doi:10.3390/pharmacy5010011

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Christie, D. (2013). Current recommendations and considerations for psychosocial and psychoeducational support of adolescents with Type 1 diabetes. *Diabetes Management, 3*(2), 161–169. doi:10.2217/dmt.12.90
- Christie, D., & Viner, R. (2005). Adolescent development. *British Medical Journal, 330*(7486), 301–304. doi:10.1136/bmj.330.7486.301.
- Ciechanowski, P., Russo, J., Katon, W. J., Lin, E. H. Ludman, E., Heckbert, S., ... Young, B. A. (2010). Relationship styles and mortality in patients with diabetes. *Diabetes Care, 33*(3), 539–544. doi:10.2337/dc09-1298
- Coffen, R. D. (2009). The 600-step program for type 1 diabetes self management in youth: The magnitude of the self-management task. *Postgraduate Medicine, 121*(5), 119–139. doi:10.3810/pgm.2009.09.2059
- Colarossi, L. G. (2001). Adolescent gender differences in social support: Structure, function, and provider type. *Social Work Research, 25*(4), 233–241.
<http://dx.doi.org/10.1093/swr/25.4.233>
- Colberg, S. R., Laan, R., Dassau, E., & Kerr, D. (2015). Physical activity and type 1 diabetes: Time for a rewire? *Journal of Diabetes Science and Technology, 9*(3), 609–618. doi:10.1177/1932296814566231
- Comeaux, S. J., & Jaser, S. S. (2010). Autonomy and insulin in adolescents with type 1 diabetes. *Pediatric Diabetes, 11*(7), 498–504. doi:10.1111/j.1399-5448.2009.00625.x
- Cooppan, R., Beaser, R., & Shetty, G. K. (2010). Acute Complications. In R. S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 419–443). Boston, MA: Joslin Diabetes Centre Publications Department.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Couper, J. J., & Donaghue, K. C. (2009). Phases of Diabetes in children and adolescents.

Pediatric Diabetes, 10(12), 13–16. doi:10.1111/j.1399-5448.2009.00574.x

Craig, M. E., Jefferies, C., Dabelea, D., Balde, N., Seth, A., & Donaghue, K. C. (2014).

Definition, epidemiology, and classification of diabetes in children and adolescents.

Pediatric Diabetes, 15(20), 4–17. doi:10.1111/pedi.12186

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed method*

approaches (4th ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Creswell, J. W., & Poth, C. N. (2017). *Qualitative Inquiry & Research Design: Choosing*

Among 5 Approaches (4th ed.). Thousand Oaks, CA: SAGE Publications.

Creswell, J.W. (2009). *Research design: Qualitative, quantitative, and mixed method*

approaches (3rd ed.). Thousand Oakes, CA: SAGE Publications Incorporated.

Crowe, M., Inder, M., & Porter, R. (2015). Conducting qualitative research in mental health:

Thematic and content analyses. *Australian & New Zealand Journal of Psychiatry*,

49(7), 616–623. doi:10.1177/0004867415582053

Das, A. K., & Shah, S. (2011). History of diabetes: From ants to analogs. *Journal of*

Associated Physicians of India, 59, 6–7. Retrieved from

http://japi.org/special_issue_april_2011/01_Diabetic_History.pdf

Das, A. K., Raghupathy, P., & Tripathy, B. B. (2012). Type 1 diabetes mellitus: Clinical

features. In B. B. Tripathy (Ed.), *RSSDI Textbook of diabetes mellitus* (2nd ed.) (pp.

367–373). New Delhi, ND: Jaypee Brothers Medical Publishers (P) Ltd.

Davis, S. N. (2013). Hypoglycemia and hypoglycemic syndromes. In G. C. Weir, J. L.

Jameson, & L. J. De Groot (Eds.), *Endocrinology adult and pediatric: Diabetes*

SOCIAL SUPPORT AND DIABETES MANAGEMENT

mellitus and obesity (6th ed.) (pp. 420–427). Philadelphia, PA: Elsevier Health Sciences.

De Boera, A., Pijl, S. J., & Minnaerta, A. (2012). Students' attitudes towards peers with disabilities: A review of the literature. *International Journal of Disability, Development and Education*, 59(4), 379–392. doi:10.1080/1034912X.2012.723944

De Wit, M., Delemarre-van de Waal, H. A., Bokma, J. A., Haasnoot, K., Houdijk, M. C., Gemke, R. J., & Snoek, F. J. (2007). Self-report and parent-report of physical and psychosocial well-being in Dutch adolescents with type 1 diabetes in relation to glycemic control. *Health and Quality of Life Outcomes*, 5, 10.
<http://doi.org/10.1186/1477-7525-5-10>

Delamater, A. M., De Wit, M., McDarby, V., Malik, J., & Acerini, C. L. (2014). Psychological care of children and adolescents with type 1 diabetes. *Pediatric Diabetes*, 15(20), 232–244. doi:10.1111/pedi.12191

Deshpande, A. D., Harris-Hayes, M., & Schootman, M. (2008). Epidemiology of diabetes and diabetes-related complications. *Physical Therapy*, 88(11), 1254–1264.
doi:10.2522/ptj.20080020

Dickinson, J. K., & O'Reilly, M. M. (2004). The lived experience of adolescent females with type 1 diabetes. *The Diabetes Educator*, 30(1), 99–107.
doi:10.1177/014572170403000117

Epstein, J. (2010). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Boulder, CO: Westview Press.

Erikson, E. (1980). *Identity and the Life Cycle*. New York, NY: W. W. Norton & Company, Inc.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Fortuna, R. J., Robbins, B. W., Mani, N., & Halterman, J. S. (2010). Dependence on Emergency Care among Young Adults in the United States. *Journal of General Internal Medicine, 25*(7), 663–669. doi:10.1007/s11606-010-1313-1.
- Gallant, M. P. (2003). The influence of social support on chronic illness and self-management: A review and directions for research. *Health Education and Behaviour, 30*(2), 170–195. doi:10.1177/1090198102251030
- Gamarra, C. J., Paz, E. P. A., & Griep, R. H. (2009). Social support and cervical and breast cancer screening in Argentinean women from a rural population. *Public Health Nursing, 26*(3), 269–276. doi:10.1111/j.1525-1446.2009.00779.x
- Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I., ... Swain, D. P. (2011). American college of sports medicine position stand. Quantify and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine & Science in Sports & Exercise, 43*(7), 1334–1359. doi:10.1249/MSS.0b013e318213fefb
- Glassford, M. A. (2017). Recognizing type 1 diabetes mellitus in children & adolescents. *The Nurse Practitioner, 42*(6), 17–22. doi:10.1097/01.NPR.0000516121.77126.61
- Goldstein, D. E., Little, R. R., Lorenz, R. A., Malone, J. I., Nathan, D. M., & Peterson, C. M. (2003). Tests of glycemia in diabetes. *Diabetes Care, 26*(1), 106–108. <https://doi.org/10.2337/diacare.26.2007.S106>
- Grant, L., Lawton, J., Hopkins, D., Elliott, J., Lucas, S., Clark, M., ... Cooke, D. (2013). Type 1 diabetes structured education: what are the core self-management behaviours? *Diabetic Medicine, 30*(6), 724–730. doi:10.1111/dme.12164.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Grey, M., Whittemore, R., & Tamborlane, W. (2002). Depression in type 1 diabetes in children: natural history and correlates. *Journal of Psychosomatic Research, 53*(4), 907–911. [http://dx.doi.org/10.1016/S0022-3999\(02\)00312-4](http://dx.doi.org/10.1016/S0022-3999(02)00312-4)
- Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 191–216). Thousand Oaks, CA: Sage.
- Hains, A. A., Berlin, K. S., Davies, W. H., Parton, E. A., & Alemzadeh, R. (2006). Attributions of adolescents with type 1 diabetes in social situations: relationship with expected adherence, diabetes stress, and metabolic control. *Diabetes Care, 29*(4), 818-822. <https://doi.org/10.2337/diacare.29.04.06.dc05-1828>
- Haltiwanger, E. P., & Brutus, H. (2012). A culturally sensitive diabetes peer support for older Mexican-Americans. *Occupational Therapy International, 19*(2), 67–75. doi:10.1002.
- Hamilton, H., Knudsen, G., Vaina, C. L., Smith, M., & Prosad, S. (2017). Children and young people with diabetes: recognition and management. *British Journal of Nursing, 26*(6), 340–347. doi:10.12968/bjon.2017.26.6.340
- Hansen, J. A., Schwartz, D. D., Weissbrod, C., & Taylor, W. P. (2012). Paternal involvement in pediatrics type 1 diabetes: Fathers' and mothers' psychological functioning and disease management. *Families, Systems & Health, 30*(1), 47–59. doi:10.1037/a0027519
- Harmer, A. R., Chisholm, D. J., McKenna, M. J., Hunter, S. K., Ruell, P. A., Naylor, J. M., ... Flack, J. R. (2008). Sprint training increases muscle oxidative metabolism during high-intensity exercise in patients with type 1 diabetes. *Diabetes Care, 31*(11), 2097–2102. <http://doi.org/10.2337/dc08-0329>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Heinonen, M. T., Moulder, R., & Lahesmaa, R. (2015). New insights and biomarkers for type 1 diabetes: Review for Scandinavian Journal of Immunology. *Scandinavian Journal of Immunology*, 82(3), 244–253. doi:10.1111/sji.12338

Helgeson, V. S., Reynolds, K. A., Siminerio, L., Escobar, O., & Becker, D. (2008). Parent and adolescent distribution of responsibility for diabetes self-care: Links to health outcomes. *Journal of Pediatrics Psychology*, 33(5), 497–508. doi:10.1093/jpepsy/jsm081

Hendricks, M., Monaghan, M., Soutor, S., Chen, R., & Holmes, C. S. (2013). A profile of self-care behaviours in emerging adults with type 1 diabetes. *The Diabetes Educator*, 39, 195–203. <http://dx.doi.org/10.1177/0145721713475840>

Heptulla, R. A., Rodriguez, L. M., Mason, K. J., & Haymond, M. W. (2008). Gastric emptying and postprandial glucose excursions in adolescents with type 1 diabetes. *Pediatric Diabetes*, 9(6), 561–566. doi:10.1111/j.1399-5448.2008.00430.

Hirsch, I. B. (2005). Glycemic variability: it's not just about A1C anymore! *Diabetes Technology and Therapeutics*, 7(5), 780–783. doi:10.1089/dia.2005.7.780

Hirsch, I.B., & Edelman, S.V. (2005). *Practical management of type 1 diabetes* (1st ed.). New York, NY: Professional Communications.

Hughes, J., Wood, E., & Smith, G. (2009). Exploring kidney patients' experiences of receiving individual peer support. *Health Expectations*, 12(4), 396–406. doi:10.1111/j.1369-7625.2009.00568.

Hynes, L., Byrne, M., Dinneen, S. F., McGuire, B. E., O'Donnell, M., & Mc Sharry, J. (2016). Barriers and facilitators associated with attendance at hospital diabetes clinics

SOCIAL SUPPORT AND DIABETES MANAGEMENT

among young adults (15-30 years) with type 1 diabetes mellitus: a systematic review.

Pediatric Diabetes, 17(7), 509–518. doi:10.1111/pedi.12198.

Ingadottir, B., & Halldorsdottir, S. (2008). To discipline a "dog": The essential structure of mastering diabetes. *Qualitative Health Research*, 18(5), 606–619.

doi:10.1177/1049732308316346

Insel, R. A., Dunne, J. L., Atkinson, M. A., Chiang, J. L., Dabelea, D., Gottlieb, P. A., Greenbaum, C. J., ... Ziegler, A. G. (2015). Staging presymptomatic type 1 Diabetes: A scientific statement of JDRF ,the Endocrine Society, and the American Diabetes Association. *Diabetes Care*, 38(10), 1964–1974. doi:10.2337/dc15-1419.

International Diabetes Federation. (2017). *IDF Diabetes Atlas* (8th ed.) [De Visu Digital Document Design version]. Available from <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas.html>

International Diabetes Federation. (2015). *IDF Diabetes Atlas* (7th ed.) [De Visu Digital Document Design version]. Available from <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas.html>

Islam, S. T., Abraham, A., Donaghue, K. C., Chan, A. K., Lloyd, M., Srinivasan, S., & Craig, M. E. (2014). Plateau of adiposity in Australian children diagnosed with type 1 diabetes: A 20-year study. *Diabetic Medicine*, 31(6), 686–690. doi:10.1111/dme.12402.

James, S., Perry, L., Gallagher, R., Lowe, J., Dunbabin, J., McElduff, P., ... Steinbeck, K. (2014). Service usage and vascular complications in young adults with type 1 diabetes. *BMC Endocrine Disorders*, 14, 39. <http://doi.org/10.1186/1472-6823-14-39>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Jones, P. M., & Persaud, S. J. (2010). Islet function and insulin secretion. In R. I. G. Holt, C. S. Cockram, A. Flyvbjerg, & B. J. Goldstein (Eds.), *Textbook of diabetes* (4th ed.) (pp. 87–103). West Sussex, UK: Wiley-Blackwell.
- Josifova, T., & Henrich, P. B. (2013). Diabetic retinopathy: The need for predictive, preventive and personalised approach to management. In M. S. Mozaffari (Ed.), *New strategies to advance pre/diabetes care: Integrative approach by PPPM* (pp. 211–232). Berlin, DE: Springer Science & Business Media.
- Kakleas, K., Kandyla, B., Karayianni, C., & Karavanaki, K. (2009). Psychosocial problems in adolescents with type 1 diabetes mellitus. *Diabetes & Metabolism*, 35(5), 339–350. doi:10.1016/j.diabet.2009.05.002
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semistructured interview guide. *Journal of Advanced Nursing*, 72(12), 2954–2965. doi:10.1111/jan.13031
- Kapellen, T. M., Gausche, R., Dost, A., Wiegand, S., Flechtner-Mors, M., Keller., ...Holl, R. W. (2014). Children and adolescents with type 1 diabetes in Germany are more overweight than healthy controls: Results comparing DPV database and CrescNet database. *Journal of Pediatric Endocrinology Metabolism*, 27(3-4), 209-214. <https://doi.org/10.1515/jpem-2013-0381>.
- Karlsson, A. (2008). Teenagers with type 1 diabetes—a phenomenological study of the transition towards autonomy in self-management. *International Journal of Nursing Studies*, 45(4), 562–570. doi:10.1016.
- Kaur, K. K., Gautam, A., & Singh, M. (2016). An update on etiopathogenesis and management of type 1 diabetes Mellitus. *Journal of Endocrinology*, 1(2), 1–23.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Kay, J. S., Juth, V., Silver, R. C., & Sender, L. S. (2017). Support and conflict in relationships and psychological health in adolescents and young adults with cancer. *Journal of Health Psychology*, 1–16. doi:10.1177/1359105316676629.
- Kershner, A. K., Daniels, S. R., Imperatore, G., Palla, S. L., Petitti, D. B., Pettitt, D. J., ... Rodriguez, B. L. (2006). Lipid abnormalities are prevalent in youth with type 1 and type 2 diabetes: the SEARCH for diabetes in youth study. *The Journal of Pediatrics*, 149, 314–319. doi:10.1016/j.jpeds.2006.04.065
- Khyndeit E., Rao, P. A., Narayanan, P., & Mayya, S. (2016). Social support influencing diabetes self-management behaviours: A cross-sectional study in Udupi Taluk. *Indian Journal of Health Science and Biomed Research*, 9(2), 153–157. doi:10.4103/2349-5006.191255
- Kivela, R., Silvennoinen, M., Touvra, A. M., Lehti, T. M., Kainulainen, H., & Vihko, V. (2006). Effects of experimental type 1 diabetes and exercise training on angiogenic gene expression. and capillarization in skeletal muscle. *The FASEB Journal*, 20(9), 1570–1572. doi:10.1096/fj.05-4780fje
- Kota, S. K., Meher, L. K., Jammula, S., Kota, S. K., & Modi, K. D. (2012). Clinical profile of coexisting conditions in type 1 diabetes mellitus patients. *Diabetes & Metabolic Syndrome: Clinical Research and Reviews*, 6(2), 70–76. doi:10.1016/j.dsx.2012.08.006
- Lakhtakia, R. (2013). The History of Diabetes Mellitus. *Sultan Qaboos University Medical Journal*, 13(3), 368–370. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3749019/>
- Lancaster, B., Pfeffer, B., McElligott, M., Ferguson, A., Miller, M., Wallace, D., & Lane, J. (2010). Assessing treatment barriers in young adults with Type 1 diabetes. *Diabetes*

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Research and Clinical Practice, 90(3), 243–249.

<https://doi.org/10.1016/j.diabres.2010.07.003>

- Landel-Graham, J., Yount, S. E., & Rudnicki, S. R. (2003). Diabetes Mellitus. In I. B. Weiner, & D. K. Freedheim (Eds.), *Handbook of psychology: Health psychology* (Vol. 9) (pp. 191–217). New Jersey, NJ: John Wiley & Sons, Inc.
- Lee, P., Greenfield, J. R., & Campbell, L. V. (2009). Managing young people with type 1 diabetes in a ‘rave’ new world: Metabolic complications of substance abuse in type 1 diabetes. *Diabetes Medicine*, 26(4), 328–333. doi:10.1111/j.1464-5491.2009.02678.x
- Levitt, H. M., Motulsky, S. L., Wertz, F. J., Morrow, S. L., & Ponterotto, J. G. (2017). Recommendations for designing and reviewing qualitative research in psychology: Promoting methodological integrity. *Qualitative Psychology*, 4(1), 2–22. doi:2326-3601/17.
- Lin, E. H., Von Korff, M., Alonso, J., Angermeyer, M. C., Anthony, J., Bromet, E., ... Williams, D. (2008). Mental disorders among persons with diabetes – results from the World Mental Health Surveys. *Journal of Psychosomatic Research*, 65(6), 571–580. doi:10.1016/j.jpsychores.2008.06.007
- Lipscomb, M. (2016). *Social theory and nursing*. New York, NY: Routledge.
- Llorente, M. D., & Urrutia, V. (2006). Diabetes, psychiatric disorders, and the metabolic effects of antipsychotic medications. *Clinical Diabetes*, 24(1), 18–24. doi:10.2337/diaclin.24.1.18
- Luszczynska, A., Mohamed, N. E., & Schwarzer, R. (2005). Self-efficacy and social support predict benefit finding 12 months after cancer surgery: The mediating role of coping strategies. *Psychology, Health & Medicine*, 10(4), 365–375. doi:10.1080/13548500500093738

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Luthra, A., & Misra, A. (2008). Erectile dysfunction in diabetic males: Plausible mechanisms and management strategies. *Diabetes & Metabolic Syndrome: Clinical Research and Reviews*, 2(1), 81–86. doi:10.1016/j.dsx.2007.11.005
- MacDonald, K., Lowe, J. M., Barker, D., Mensch, M., & Attia, J. (2008). Effect of popular takeaway foods on blood glucose levels in type 1 diabetes mellitus patients on intensive insulin therapy. *International Journal of Clinical Practice*, 63(2), 189-194. doi:10.1111/j.1742-1241.2008.01970.x.
- Malik, J. A., & Koot, H. M. (2011). Assessing diabetes support in adolescents: Factor structure of the Modified Diabetes Social Support Questionnaire (M-DSSQFamily). *Pediatrics Diabetes*, 12, 258–265. doi:10.1111/j.1399-5448.2010.00691.x
- Margeisdottir, H. D., Larsen, J. R., Brunborg, C., Overby, N. C., & Dahl-Jorgensen, K. (2008). High prevalence of cardiovascular risk factors in children and adolescents with type 1 diabetes: a population-based study. *Diabetologia*, 51(4), 554–561. doi:10.1007/s00125-007-0921-8
- Marsh, K., Barclay, A., Colagiuri, S. & Brand-Miller, J. (2011). Glycemic index and glycemic load of carbohydrates in the diabetes diet. *Current Diabetes Reports*, 11(2), 120–127. doi:10.1007/s11892-010-0173-8.
- Mascarenhas, L. P. G., Decimo, J. P., Lima, V. A., Kraemer, G. C., Lacerda, K. R. C., & Nesi-França, S. (2016). Physical exercise in type 1 diabetes: Recommendations and care. *Motriz Rio Claro*, 22(4), 223-230. <http://dx.doi.org/10.1590/S1980>.
- Masoudi Alavi, N., Ghofranipour, F., Ahmadi, F., Babae, G., Rajab, A., & Emami, A. (2012). Explanatory model of diabetes management; an experience from Iran. *Nurse Midwifery Studies*, 1(2), 100–106. doi:10.5812/nms.8675

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Matthews, D. M. (2007). What is diabetes? In J. R. S McDowell, D. M. Matthews, & F. J.

Brown (Eds.), *Diabetes: A handbook for the primary healthcare team* (pp. 1–20).

Philadelphia, PA: Elsevier Limited.

Mazze, R. S., Strock, E. S., Bergenstal, R. M., Criego, A., Cuddihy, R., Langer, O., ...

Powers, M. A. (2012). *Staged diabetes management* (3rd ed.). West Sussex, UK: John

Wiley & Sons.

McAuley, S. A., Horsburgh, J. C., Ward, G. M., Gerche, A. L., Gooley, J. L., Jenkins, A. J.,

...O'Neal, D. N. (2016). Insulin pump basal adjustment for exercise in type 1

diabetes: A randomised crossover study. *Diabetologia*, *59*(8), 1636–1644.

doi:10.1007/s00125-016-3981-9.

McCarthy, G. M., Rodríguez Ramírez, E. R., & Robinson, B. J. (2017). Design experiments.

Identifying areas for intervention and designing medical technology for adolescents

and young adults with type 1 diabetes. *The Design Journal*, *20*(1), 2044–2056.

doi:10.1080/14606925.2017.1352723

McIntosh, M., & Morse, J. M. (2015). Situating and constructing diversity in semistructured

interviews. *Global Qualitative Nursing Research*, 1–12.

doi:10.1177/2333393615597674

Mehta, S. N., Volkening, L. K., Anderson, B. J., Nansel, T., Weissberg-Benchell, J.,

Wysocki, T., & Laffel, L. M. (2008). Dietary behaviours predict glycemic control in

youth with type 1 diabetes. *Diabetes Care*, *31*(7), 1318–1320. doi:10.2337/dc07-

2435

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded*

sourcebook (2nd ed.). Thousand Oakes, CA: SAGE Publications.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Misra, A., Wasir, J. S., & Vikram, N. K. (2012). An approach to management of diabetes mellitus. In B. B. Tripathy (Ed.), *RSSDI Textbook of diabetes mellitus* (2nd ed.) (pp. 447–454). New Delhi, ND: Jaypee Brothers Medical Publishers (P) Ltd.
- Monaghan, M., Helgeson, V., & Wiebe, D. (2015). Type 1 diabetes in young adulthood. *Current Diabetes Reviews*, *11*(4), 239–250.
doi:10.2174/1573399811666150421114957
- Moore, S. M., Hackworth, N. J., Hamilton, V. E., Northam, E. P., & Cameron, F. J. (2013). Adolescents with Type 1 Diabetes: parental perceptions of child health and family functioning and their relationship to adolescent metabolic control. *Health and Quality of Life Outcomes*, *11*(50). <http://doi.org/10.1186/1477-7525-11-50>
- Nakhla, M., Daneman, D., To, T., Paradis, G., & Guttman, A. (2009). Transition to adult care for youths with diabetes mellitus: Findings from a universal health care system. *Journal of Pediatrics*, *124*(6), 1134–1141. doi:10.1542/peds.2009-0041
- Nardacci, E. A., Bode, B. W., & Hirsch, I. B. (2010). Individualizing care for the many: the evolving role of professional continuous glucose monitoring systems in clinical practice. *Diabetes Education*, *36*(1), 4S-19S.
<https://doi.org/10.1177/0145721710362798>
- National Diabetes Education Program (NDEP). (2014). *Overview of Diabetes in Children and Adolescents*. Retrieved from www.YourDiabetesInfo.org/schools.
- National Institute for Health and Care Excellence (NICE). (2016). *Diabetes in children and young people* (Quality standard). Retrieved from <https://www.nice.org.uk/>
- National Institute for Health and Care Excellence (NICE). (2015). *Diabetes (type 1 and type 2) in children and young people: Diagnosis and management* (Guideline 18). Retrieved from <https://tinyurl.com/zhwhj35>.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Noble, J. A., Valdes, A. M., Cook, M., Klitz, W., Thomson, G., & Erlich, H. A. (1996). The role of HLA class II genes in insulin-dependent diabetes mellitus: molecular analysis of 180 Caucasian, multiplex families. *American Journal of Human Genetics*, 59(5), 1134–1148. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1914851/>
- Overby, N. C., Flaaten, V., Veierod, M. B., Bergstad, I., Margeirsdottir, H. D., Dahl-Jorgensen, K., & Andersen, L. F. (2007). Children and adolescents with type 1 diabetes eat a more atherosclerosis-prone diet than healthy control subjects. *Diabetologia*, 50(2), 307–316. <https://doi.org/10.1007/s00125-006-0540-9>
- Palladino, D. K., & Helgeson, V. S. (2012). Friends or foes? A review of peer influence on self-care and glycemic control in adolescents with type 1 diabetes. *Journal of Pediatric Psychology*, 37(5), 591–603. <http://doi.org/10.1093/jpepsy/jss009>
- Parillo, M., Annuzzi, G., Rivellese, A. A., Bozzetto, L., Alessandrini, R., Riccardi, G., & Capaldo, B. (2011). Effects of meals with different glycaemic index on postprandial blood glucose response in patients with Type 1 diabetes treated with continuous subcutaneous insulin infusion. *Diabetic Medicine*, 28(2), 227–229. doi:10.1111/j.1464-5491.2010.03176.
- Park, M. J., Scott, J. T., Adams, S. H., Brindis, C. D., & Irwin, C. E. (2014). Adolescent and young adult health in the United States in the past decade: Little improvement and young adults remain worse off than adolescents. *Journal of Adolescent Health*, 55(1), 3–16. doi:10.1016/j.jadohealth.2014.04.003.
- Patton, S. R. (2011). Adherence to Diet in Youth with Type 1 Diabetes. *Journal of the American Dietetic Association*, 111(4), 550–555. <http://doi.org/10.1016/j.jada.2011.01.016>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Patton, S. R., & Clements, M. A. (2012). Continuous glucose monitoring versus self-monitoring of blood glucose in children with type 1 diabetes – Are there pros and cons for both? *US Endocrinology*, 8(1), 27–29.
- Patton, S. R., Dolan, L. M., & Powers, S. W. (2007). Dietary adherence and associated glycemic control in families of young children with type 1 diabetes. *Journal of the American Dietetic Association*, 107(1), 46–52. doi:10.1016/j.jada.2006.10.012
- Paun, A., & Danska, J. S. (2016). Modulation of type 1 and type 2 diabetes risk by the intestinal microbiome. *Journal of Pediatric Diabetes*, 12(7), 469–477. doi:10.1111/pedi.12424
- Percy, W. H., Kostere, K., & Kostere, S. (2015). Generic qualitative research in psychology. *The Qualitative Report*, 20(2), 76–85. Retrieved from <http://nsuworks.nova.edu/tqr/vol20/iss2/7>
- Peters, A., Laffel, L., & the American Diabetes Association Transitions Working Group. (2011). Diabetes Care for emerging adults: Recommendations for transition from pediatric to adult diabetes care systems. *Diabetes Care*, 34(11), 2477–2485. <http://dx.doi.org/10.2337/dc11-1723>
- Peters, L. W., Nawijn, L., & Van Kesteren, N. (2014). How adolescents with diabetes experience social support from friends: two qualitative studies. *Scientifica*, 89. <http://dx.doi.org/10.1155/2014/415849/>
- Phillips, A. (2016). Supporting patients with type 1 diabetes. *British Journal of Nursing*, 25(6), 330–334. <https://dx.doi.org/10.12968/bjon.2016.25.6.330>
- Pinhas-Hamiel, O., Levek-Motola, N., Kaidar, K., Boyko, V., Tisch, E., Mazor-Aronovitch K., ... Frumkin, B. R. (2015). Prevalence of overweight, obesity and metabolic syndrome components in children, adolescents and young adults with type 1 diabetes

SOCIAL SUPPORT AND DIABETES MANAGEMENT

mellitus. *Diabetes Metabolism Research and Reviews*, 31, 76–84.

doi:10.1002/dmrr.2565

Porcellati, F., Bolli, G. B., & Fanelli, C. G. (2013). Pharmacokinetics and pharmacodynamics of basal insulins. *Diabetes Technology & Therapeutics*, 13(1), 15–24. doi:10.1089/dia.2011.0038

Pyatak, E. (2011). Participation in occupation and diabetes self-management in emerging adulthood. *The American Journal of Occupational Therapy*, 65(4), 462–469.

Pyatak, E. A., Sequeira, P. A., Vigen, C. L. P., Weigensberg, M. J., Wood, J. R., Montoya, ... & Peters, A. L. (2017). Clinical and psychosocial outcomes of a structured transition program among young adults with type 1 diabetes. *Journal of Adolescent Health*, 60(2), 212–218. doi:10.1016/j.jadohealth.2016.09.004

Pyatak, E. A., Sequeira, P. A., Whittemore, R., Vigen, C. P., Peters, A. L., & Weigensberg, M. J. (2014). Challenges contributing to disrupted transition from paediatric to adult diabetes care in young adults with type 1 diabetes. *Diabetes Medicine*, 31(12), 1615–1624.

Qin, J., Fu, S., Speake, C., Greenbaum, C. J., & Odegard, J. M. (2016). NETosis-associated serum biomarkers are reduced in type 1 diabetes in association with neutrophil count. *Clinical & Experimental Immunology*, 184(3), 318–322. doi:10.1111/cei.12783

Ramalho, A. C., & Soares, S. (2008). The role of exercise in the treatment of type 1 diabetes. *Brazilian Archives of Endocrinology and Metabolism*, 52(2), 260–267.

Rasmussen, B., Ward, G., Jenkins, A., King, S. J., & Dunning, T. (2011). Young adults' management of type 1 diabetes during life transitions. *Journal of Clinical Nursing*, 20(13–14), 1981–1992. doi:10.1111/j.1365-2702.2010.03657.x.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Rewers, M., & Ludvigsson, J. (2016). Environmental risk factors for type 1 diabetes. *Lancet*, 387(10035), 2340–2348. doi:10.1016/S0140-6736(16)30507-4
- Reynolds, K., Liese, A. D., Anderson, A. M., Dabelea, D., Standiford, D., Daniels, S. R., ... Lawrence, J. M. (2011). Prevalence of tobacco use and association between cardiometabolic risk factors and cigarette smoking in youth with type 1 or type 2 diabetes mellitus. *The Journal of Pediatrics*, 158(4), 594–601. <http://doi.org/10.1016/j.jpeds.2010.10.011>
- Ritchie, J., Lewis, J., Elam, G., Tennant, R., & Rahim, N. (2013). Designing and selecting samples. In J. Ritchie, J. Lewis, C. McNaughton Nicholls, & R. Ormston (Eds.), *Qualitative research practice: A guide for social science students researchers* (2nd ed.) (pp. 234–246). Los Angeles, LA: SAGE Publications Incorporated
- Roberts, F. R., Hupple, C., Norowski, E., Walsh, N. C., Przewozniak, N., & Aryee K. E., ... Yang, C. (2017). Possible type 1 diabetes risk prediction: Using ultrasound imaging to assess pancreas inflammation in the inducible autoimmune diabetes BBDR model. *Plos One*, 12(6): 0178641. <https://doi.org/10.1371/journal.pone.0178641>
- Robertson, K., Riddell, M. C., Guinhouya, B. C., Adolfsson, P., & Hanas, R. (2014). Exercise in children and adolescents with diabetes. *Pediatric Diabetes*, 15(20), 203–223. doi:10.1111/pedi.12176
- Robins, R. W., Fraley, D. R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality*, 69(4), 617–640. doi:10.1111/1467-6494.694157
- Rollo, A., Salardi, S., Ciavarella, A., Forlani, G., Scipione, M., Maltoni, G., ... Zucchin, S. (2014). Transition from pediatric to adult care. Eight years after the transition from

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- pediatric to adult diabetes care: metabolic control, complications and associated diseases. *Journal of Endocrinological Investigation*, 37(7), 653–659.
- Rosenberg, T., & Shields, G. C. (2009). The role of parent-adolescent attachment in glycemic control of adolescents with type 1 diabetes: A pilot study. *Family Systems Health*, 27(3), 237–248. <http://dx.doi.org/10.1037/a0017117>
- Rostami, S., Parsa-Yekta, Z., Ghezeljeh, T. N., & Vanaki, Z. (2014). Supporting adolescents with type 1 diabetes mellitus: A qualitative study. *Nursing and Health Sciences*, 16, 84–90. doi:10.1111/nhs.12070
- Saeed, T., Mansor, N. N. A., Naz, F., Fatima, K., & Ishaq, S. H. (2012). Perceived social support: Impact on quality of life in diabetics. *International Journal of Academic Research*, 4(3), 89-95.
- Seshiah, V. (2009). Preface. In V. Seshiah (Ed.), *Microvascular complications of diabetes*, (p. v). Philadelphia, PA: Elsevier Health Sciences.
- Shetty, V. B., Fournier, P. A., Davey, R. J., Retterath, A. J., Paramalingam, N., Roby, H. C., ... Jones, T. W. (2016). Effect of exercise intensity on glucose requirements to maintain euglycemia during exercise in type 1 diabetes. *The Journal of Clinical Endocrinology & Metabolism*, 101(3), 972–980. <https://doi.org/10.1210/jc.2015-4026>
- Silverstein, J., Klingensmith, G., Copeland, K., Plotnick, L., Kaufman, F., Laffel, L., ... Clark, N. (2005). Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care*, 28(1), 186-212. <https://doi.org/10.2337/diacare.28.1.186>
- Simmons, K. M., & Michels, A. W. (2015). Type 1 diabetes: A predictable disease. *World Journal of Diabetes*, 6(3), 380–390.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Sivanandy, P., Sagar, R., & Molugulu, N. (2017). Assessment of knowledge of diabetes mellitus in the urban areas of Klang District, Malaysia. *Pharmacy*, 5 (1),11.
doi:10.3390/pharmacy5010011
- Sosenko, J. M. (2012). Diabetes. In D. M. Becker, & L. B. Gardner (Eds.), *Prevention in clinical practice* (pp. 165–177). New York, NY: Springer.
- Speight, J. (2013). Managing diabetes and preventing complications: What makes the difference? *Medical Journal of Australia*, 198(1), 16–17. doi:10.5694/mja12.11489
- Stewart, D. L. (2010). Researcher as instrument: Understanding “shifting” findings in constructivist research. *Journal of Student Affairs Research and Practice*, 47(3), 291-306.
- Strom, J. L., & Egede, L. E. (2012). The impact of social support on outcomes in adult patients with type 2 diabetes: A systematic review. *Current Diabetes Reports*, 12(6), 769–781. doi:10.1007/s11892-012-0317-0
- Symons, J., Crawford, R., Isaac, D., & Thompson, S. (2015). The whole day revolves around it: Families’ experiences of living with a child with type 1 diabetes – A descriptive study. *Neonatal, Paediatric and Child Health Nursing*, 18(1), 7–11. Retrieved from <http://www.cambridgepublishing.com.au/publications/neonatal,-paediatric-childhealth-nursing/about-the-journal.aspx>
- Tipton, M. C. (2008). Susruta of India, an unrecognized contributor to the history of exercise physiology. *Journal of Applied Physiology*, 104(6), 1553–1556.
doi:10.1152/jappphysiol.00925.2007
- Tongco, D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research and Applications*, 5, 147–158. Doi: <http://hdl.handle.net/10125/227>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837–851. doi:10.1177/1077800410383121.
- Tuckett, A. G. (2005). Applying thematic analysis theory to practice: A researcher’s experience. *Contemporary Nurse*, 19(1–2), 75–87. doi:10.5172/conu.19.1-2.75
- Turner, H. E., & Wass, J. A. H. (2009). Diabetes. In H. E. Turner, & J. A. H. Wass (Eds.), *Oxford handbook of endocrinology and diabetes* (2nd ed.) (pp. 724–822). Oxford, NY: Oxford University Press.
- Vaccaro, J. A., Exebio, J. C., Zarini, G. G., & Huffman, F. G. (2014). The role of family/friend social support in diabetes self-management for minorities with type 2 diabetes. *Journal of Nutrition and Health*, 2(1), 1–9.
- Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 6(5), 100–110. doi:10.5430/jnep.v6n5p100.
- Wadwa, R. P., Fiallo-Scharer, R., Vanderwel, B., Messer, L. H., Cobry, E., & Chase, H. P. (2009). Continuous glucose monitoring in youth with type 1 diabetes. *Diabetes Technologies and Therapies*, 11(1), S83–S91.
- Weick, K. E. (2007). The generative properties of richness. *Academy of Management Journal*, 50(1), 14–19.
- Weir, G. C., & Bonner-Weir, S. (2017). Glucose driven changes in beta cell identity are important for function and possibly autoimmune vulnerability during the progression of type 1 diabetes. *Frontiers in Genetics*, 8, 2.
<http://doi.org/10.3389/fgene.2017.00002>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Weiss, H. B., Kreider, H., Lopez, M. E., & Chatman, C. M. (2005). *Preparing educators to involve families: From theory to practice*. Thousand Oaks, CA: Sage Publications.
- Wennick, A., Lundqvist, & A., Hallstrom, I. (2009). Everyday experiences of families three years after diagnosis of type 1 diabetes in children: a research paper. *Journal of Pediatric Nursing, 24*(3), 222–230. <https://doi.org/10.1016/j.pedn.2008.02.028>
- Whiting, L. S. (2008). Semi-structured interviews: Guidance for novice researchers. *Nursing Standard, 22*(23), 35–40.
- Wiebe, D. J., Helgeson, V., & Berg, C. A. (2016). The social context of managing diabetes across the life span. *American Psychological Association, 71*(7), 526–538.
<http://dx.doi.org/10.1037/a0040355>
- Wiley, J., Westbrook, M., Long, J., Greenfield, J. R., Day, R. O., & Braithwaite, J. (2014). Diabetes education: The experiences of young adults with type 1 diabetes. *Diabetes Therapy, 5*(1), 299–321. <http://doi.org/10.1007/s13300-014-0056-0>
- Wilson, V. (2016). Research Methods: Interviews. *Evidence Based Library and Information Practice, 11*(1), 47–49. <http://dx.doi.org/10.18438/B8404H>
- Wolpert, H. A., & Anderson, B. J. (2001). Young adults with diabetes: Need for a new treatment paradigm. *Diabetes Care, 24*, 1513–1514.
<http://dx.doi.org/10.2337/diacare.24.9.1513>
- World Health Organization (2016). *Global report on diabetes*. France: WHO Press.
- Wysocki, T., & Greco, P. (2006). Social support and diabetes management in childhood and adolescence: influence of parents and friends. *Current Diabetes Reports, 6*(2), 117–122.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education, 48*(2), 311–325.
- Yin, R.K. (2015). *Qualitative research from start to finish* (2nd ed.). New York, NY: The Guilford Press.
- Young-Hyman, D., De Groot, M., Hill-Briggs, F., Gonzalez, J. S., Hood, K., & Peyrot, M. (2016). Psychosocial care for people with diabetes: A position statement of the American Diabetes Association. *Diabetes Care, 39*(12), 2126–2140.
doi:10.2337/dc16-2053
- Ziegler, R., Heidtmann, B., Hilgard, D., Hofer, S., Rosenbauer, J., & Holl, R. (2011). Frequency of SMBG correlates with HbA1c and acute complications in children and adolescents with type 1 diabetes. *Pediatric Diabetes, 12*(1), 11–17.
doi:10.1111/j.1399-5448.2010.00650.x

SOCIAL SUPPORT AND DIABETES MANAGEMENT

SECTION 2: ARTICLE

Young adults' experience of social support in effective diabetes management

2.1 Guidelines for authors: *Health SA Gesondheid – Journal of Interdisciplinary Health Sciences*

Overview

The author guidelines include information about the types of articles received for publication and preparing a manuscript for submission. Other relevant information about the journal's policies and the reviewing process can be found under the about section.

The **compulsory cover letter** form part of a submission and is on the first page of the manuscript. It should always be presented in English. **See full structure of cover letter below.** After the cover letter the manuscript body starts.

Original Research Article

An original article provides an overview of innovative research in a particular field within or related to the focus and scope of the journal, presented according to a clear and well-structured format. **See full structure of original research articles below.**

Word limit	5000 words (excluding the structured abstract and references)
Structured abstract	250 words to include a Background, Aim, Setting, Methods, Results and Conclusions
References	40 or less
Tables/Figures	no more than 7 Tables/Figure
Ethical statement	should be included in the manuscript

A **systematic review** follows the same basic structure as an original research article:

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Structured abstract: Background, aim, setting, methods, results, conclusion.
- Aim and objectives: Focus on a clinical question that will be addressed in the review.
- Methods section: Describe in detail the search strategy, criteria used to select or reject articles, attempts made to obtain all important and relevant studies and deal with publication bias (including grey and unpublished literature), how the quality of included studies was appraised, the methodology used to extract and/or analyse data.
- Results: Describe the homogeneity of the different findings; clearly present the overall results and any meta-analysis.

Review Article

Review topics should be related to clinical aspects interdisciplinary health sciences and should reflect trends and progress or a synthesis of data in the following format. **See full structure of review articles below.** Systematic reviews are considered under original research.

Word limit	4000 words (excluding the abstract and references)
References	40 or less
Abstract	up to 150 words, unstructured
Tables/Figures	data in the text should not be repeated extensively in tables or figures

Editorial

Editorials are solicited by the HSAG EIC or editorial board members in the following format:

Word limit	1200 words
Table/Figures	A maximum of 1 figure or table
References	10 or less
Conclusion	Ensure that there is a clear message in the conclusion

Cover Letter

The format of the compulsory cover letter forms part of your submission. It is located on the first page of your manuscript and should always be presented in English. You should provide the following elements:

- Article title: Provide a short title of 50 characters or less.
- Full author details: The title(s), full name(s), position(s), affiliation(s) and contact details (postal address, email, telephone and cell phone number) of each author.
- Corresponding author: Identify to whom all correspondence should be addressed.
- Authors' contributions: Briefly summarise the nature of the contribution made by each of the authors listed.
- Summary: Lastly, a list containing the number of words, pages, tables, figures and/or other supplementary material should accompany the submission.

Anyone that has made a significant contribution to the research and the paper must be listed as an author in your cover letter. Contributions that fall short of meeting the criteria as

stipulated in our policy should rather be mentioned in the ‘Acknowledgements’ section of the manuscript. Read our **authorship** guidelines and **author contribution** statement policies.

Original Research Article full structure

Title: The article’s full title should contain a maximum of 95 characters (including spaces).

Abstract: The abstract, written in English, should be no longer than 250 words and must be written in the past tense. The abstract should give a succinct account of the objectives, methods, results and significance of the matter. The structured abstract for an Original Research article should consist of six paragraphs labelled Background, Aim, Setting, Methods, Results and Conclusion.

- **Background:** Summarise the social value (importance, relevance) and scientific value (knowledge gap) that your study addresses.
- **Aim:** State the overall aim of the study.
- **Setting:** State the setting for the study.
- **Methods:** Clearly express the basic design of the study, and name or briefly describe the methods used without going into excessive detail.
- **Results:** State the main findings.
- **Conclusion:** State your conclusion and any key implications or recommendations.

Do not cite references and do not use abbreviations excessively in the abstract.

Introduction: The introduction must contain your argument for the social and scientific value of the study, as well as the aim and objectives:

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- **Social value:** The first part of the introduction should make a clear and logical argument for the importance or relevance of the study. Your argument should be supported by use of evidence from the literature.
- **Scientific value:** The second part of the introduction should make a clear and logical argument for the originality of the study. This should include a summary of what is already known about the research question or specific topic, and should clarify the knowledge gap that this study will address. Your argument should be supported by use of evidence from the literature.
- **Conceptual framework:** In some research articles it will also be important to describe the underlying theoretical basis for the research and how these theories are linked together in a conceptual framework. The theoretical evidence used to construct the conceptual framework should be referenced from the literature.
- **Aim and objectives:** The introduction should conclude with a clear summary of the aim and objectives of this study.

Research methods and design: This must address the following:

- **Study design:** An outline of the type of study design.
- **Setting:** A description of the setting for the study; for example, the type of community from which the participants came or the nature of the health system and services in which the study is conducted.
- **Study population and sampling strategy:** Describe the study population and any inclusion or exclusion criteria. Describe the intended sample size and your sample size calculation or justification. Describe the sampling strategy used. Describe in practical terms how this was implemented.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Intervention (if appropriate): If there were intervention and comparison groups, describe the intervention in detail and what happened to the comparison groups.
- Data collection: Define the data collection tools that were used and their validity. Describe in practical terms how data were collected and any key issues involved, e.g. language barriers.
- Data analysis: Describe how data were captured, checked and cleaned. Describe the analysis process, for example, the statistical tests used or steps followed in qualitative data analysis.
- Ethical considerations: Approval must have been obtained for all studies from the author's institution or other relevant ethics committee and the institution's name and permit numbers should be stated here.

Results: Present the results of your study in a logical sequence that addresses the aim and objectives of your study. Use tables and figures as required to present your findings. Use quotations as required to establish your interpretation of qualitative data. All units should conform to the **SI convention** and be abbreviated accordingly. Metric units and their international symbols are used throughout, as is the decimal point (not the decimal comma).

Discussion: The discussion section should address the following four elements:

- Key findings: Summarise the key findings without reiterating details of the results.
- Discussion of key findings: Explain how the key findings relate to previous research or to existing knowledge, practice or policy.
- Strengths and limitations: Describe the strengths and limitations of your methods and what the reader should take into account when interpreting your results.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Implications or recommendations: State the implications of your study or recommendations for future research (questions that remain unanswered), policy or practice. Make sure that the recommendations flow directly from your findings.

Conclusion: Provide a brief conclusion that summarises the results and their meaning or significance in relation to each objective of the study.

Acknowledgements: Those who contributed to the work but do not meet our authorship criteria should be listed in the Acknowledgments with a description of the contribution. Authors are responsible for ensuring that anyone named in the Acknowledgments agrees to be named.

Also provide the following, each under their own heading:

- Competing interests: This section should list specific competing interests associated with any of the authors. If authors declare that no competing interests exist, the article will include a statement to this effect: *The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.* Read our **policy on competing interests**.
- Author contributions: All authors must meet the criteria for authorship as outlined in the **authorship** policy and **author contribution** statement policies.
- Funding: Provide information on funding if relevant
- Disclaimer: A statement that the views expressed in the submitted article are his or her own and not an official position of the institution or funder.

References: Authors should provide direct references to original research sources whenever possible. References should not be used by authors, editors, or peer reviewers to promote

self-interests. Refer to the journal referencing style downloadable on our *Formatting Requirements* page.

Review Article full structure

Title: The article's full title should contain a maximum of 95 characters (including spaces).

Abstract: The abstract, written in English and French, should be no longer than 250 words and must be written in the past tense. The abstract should give a concise account of the objectives, methods, results and significance of the matter. The abstract can be structured and should consist of five paragraphs labelled Background, Aim, Method, Results and Conclusion.

- **Background:** Why is the topic important to us? State the context of the review
- **Aim:** What is the purpose of your review? Describe the aim or purpose of your review.
- **Method:** How did you go about performing the review? Describe the methods used for searching, selecting and appraising your evidence.
- **Results:** What are the findings? What are the main findings of your literature review.
- **Conclusion:** What are the implications of your answer? Briefly summarise any potential implications.

Introduction: Present an argument for the social and scientific value of your review that is itself supported by the literature. Present the aim and objectives of your literature review.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Methods: Although this is not a systematic review (see instructions on original research for this type of article) it is still necessary to outline how you searched for, selected and appraised the literature that you used. Discuss any methodological limitations.

Review findings: Present your review of the literature and make use of appropriate sub-headings. Your review should be a critical synthesis of the literature.

Implications and recommendations: Discuss the findings of your review in terms of the implications for policy makers and clinicians or recommendations for future research.

Conclusion: This should clearly state the main conclusions of the review in terms of addressing the original aim and objectives.

Acknowledgements: Those who contributed to the work but do not meet our authorship criteria should be listed in the Acknowledgments with a description of the contribution. Authors are responsible for ensuring that anyone named in the Acknowledgments agrees to be named.

Also provide the following, each under their own heading:

- **Competing interests:** This section should list specific competing interests associated with any of the authors. If authors declare that no competing interests exist, the article will include a statement to this effect: *The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.* Read our **policy on competing interests**.
- **Author contributions:** All authors must meet the criteria for authorship as outlined in the **authorship** policy and **author contribution** statement policies.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- **Funding:** Provide information on funding if relevant
- **Disclaimer:** a statement that the views expressed in the submitted article are his or her own and not an official position of the institution or funder.

References: Authors should provide direct references to original research sources whenever possible. References should not be used by authors, editors, or peer reviewers to promote self-interests. Refer to the journal referencing style downloadable on our *Formatting Requirements* page.

Formatting Requirements

The document uploaded during Step 2 of the submission process:

- **Microsoft Word (.doc/.docx):** We can accept Word 2003 DOC files and Word 2007 DOCX files.
- **Rich Text Format (RTF):** Users of other word processing packages should save or convert their files to RTF before uploading. Many free tools are available that will make this process easier.

The AOSIS house style

The manuscript must adhere to the **AOSIS house style guide**.

Referencing style guide

The manuscript must adhere to the **Harvard referencing style**.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Language

Manuscripts must be written in British English, according to the Oxford English Dictionary [avoid Americanisms (e.g. use ‘s’ and not ‘z’ spellings), set your version of Microsoft Word to UK English]. Refer to the AOSIS house style guide for more information.

Page and line numbers

Include page numbers and line numbers in the manuscript file.

Font type

Use a standard font size in any standard font family.

Special characters

Refer to our AOSIS house style guide on math and Unicode font guidelines.

Line spacing

1.5

Headings

Ensure that formatting for headings is consistent in the manuscript. Limit manuscript sections and sub-sections to four heading levels. Make sure heading levels are clearly indicated in the manuscript text. Do not number headings.

Checklist

Please review the checklist below to prepare your manuscript. This will help to make sure your submission is complete and gets handled as quickly as possible.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- **CHECK 1:** Make sure your manuscript is the right fit for the journal by reviewing the **journal information**.
- **CHECK 2:** Read the **publication fees**
- **CHECK 3:** Review if the journal publishes the type of article that you wish to submit. Read the **types of articles published**
- **CHECK 4:** You must be comfortable with publishing in an open access journal. Read our **copyrights and licensing policy**.
- **CHECK 5:** The entire manuscript must be neatly prepared, spell-checked, and adhere to the **formatting requirements** stipulated in our submission guidelines.
- **CHECK 6:** Prepare the cover letter and licensing forms as required on the **submissions guidelines**
- **CHECK 7:** Read our **publication policies**, **privacy policy** and **terms of use**.
- **CHECK 8:** We recommend authors to have ORCID iDs, which can only be assigned by the **ORCID Registry**. ORCID (Open Researcher and Contributor ID) is a nonproprietary alphanumeric code to uniquely identify scientific and other academic authors and contributors. You must conform to their standards for expressing ORCID iDs, and will have the opportunity to include the full URL (e.g. <https://orcid.org/0000-0002-1825-0097>) during the submission process, that will link to your name when the manuscript is published.

Licensing Forms

The following documents need to be submitted as supplementary files with the manuscript; please download below:

1. **Author declaration and publication licence.**
2. **Author account form.**

Where a manuscript is not accepted for publication by the Editor-in-Chief, the sections of the publication agreement in respect of the publishing licensing shall be null and void and the authors will be free to submit the manuscript to any other publication for first publication.

Note to the reader

- The article in Section II of this minidissertation, titled ‘Young adults’ experience of social support in effective diabetes management’ is written in accordance with the author guidelines of the *Health SA Gesondheid Journal of Interdisciplinary Health Sciences* (please refer to pp. 72–84 of this minidissertation). These guidelines stipulate adherence to the AOSIS House style guide and the Harvard referencing style.
- The author guidelines of the *Health SA Gesondheid Journal of Interdisciplinary Health Sciences* stipulate that original articles should not exceed 5000 words or 40 references (please refer to p. 72 of this minidissertation). The article in Section II of this mini-dissertation, titled: ‘Young adults’ experience of social support in effective diabetes management’ has a total word count of 4999 words and 38 references in the text and the reference list.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Young adults' experience of social support in effective diabetes management

Elné Visagie*

Prof. Esmé van Rensburg

Dr. Elmarí Deacon

School of Psychosocial Behavioural Sciences: Psychology

North-West University, Potchefstroom, South Africa

*Corresponding author: Elné Visagie

P.O. Box 236

Aliwal North

9750

+27 72 842 5974

elne.visagie@gmail.com

Prof. Esmé van Rensburg

Compres

Private Bag X6001

Potchefstroom 2520

South Africa

+27 18 299 1727

10194118@nwu.ac.za

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Dr. Elmarí Deacon

Optentia

Private Bag X6001

Potchefstroom 2520

South Africa

+27 18 299 1728

Elmari.Deacon@nwu.ac.za

2. Manuscript

Abstract

Background: Young adults living with type 1 diabetes are faced with many management challenges and are at risk of developing serious acute and chronic diabetes-related physical and psychological complications. Social support appears to be a valuable resource for effective diabetes management.

Aim: To explore and describe the social support experiences of diabetes management among young adults with well-controlled type 1 diabetes.

Setting and Method: A qualitative research design was implemented. Eight young adults with well-controlled type 1 diabetes attending the Centre for Diabetes and Endocrinology in Houghton or Parktown, Johannesburg, Gauteng, South Africa, were selected by means of a nonrandom purposive sampling method. Subsequently, semistructured interviews were conducted and thematically analysed.

Results: The participants indicated that increased knowledge regarding diabetes mellitus facilitates the effective maintenance of their diabetes management regimen. Key role players in the participants' social network include family members, friends, diabetes specialists and fellow diabetics. Supportive behaviours are primarily manifested as knowledge regarding management requirement; fostering a sense of belonging and companionship and practical assistance with daily regimen tasks.

Conclusions: The social support experienced by the participants provided by their social network highlights the significant role that it plays in diabetes management. Moreover, the need for more extensive research on peer support and intervention to promote diabetes-related knowledge throughout society is evident in the participants' accounts.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Keywords: diabetes mellitus, type 1 diabetes, effective diabetes management, young adult, social constructionist theory

Young adults' experience of social support in effective diabetes management

1. Introduction

Type 1 diabetes mellitus (T1DM) is a chronic endocrine disorder which occurs when insulin-producing pancreatic beta-cells are swiftly destroyed by an auto-immune response (Glassford, 2017:17-22). This reaction results in a severe deficiency of endogenous insulin and thus, increased glycaemic variability which requires the administration of exogenous insulin (Oram et al., 2016:1111). Symptoms such as increased thirst and hunger, and excessive urination in addition to visual difficulties may be indicative of T1DM (International Diabetes Federation (IDF), 2017:17).

Diabetes as a multifaceted illness requires ongoing health care and self-management (Bai, Chiou & Chang, 2009:3310; World Health Organisation (WHO), 2016:54). An intensive self-management regimen needs to be adopted that includes blood-glucose monitoring, administering insulin, and regulating diet and exercise to maintain optimal glycaemic control. Osan et al. (2016:332-338) conclude that effective diabetes management is when the average glycated haemoglobin levels is approximately 7.5% for three months. It is necessary that a specialized physician measures the average plasma glucose levels of the young adult living with diabetes every three to six months (Chamberlain et al., 2016:545). Additionally, individuals should take responsibility daily for personal examination and record keeping of blood-glucose volumes.

Daily management responsibilities pose many challenges, especially for young adults as their lifestyles are more variable than those of their adolescent and older counterparts (Hynes et al., 2016:509–518). Many young adults enter a transition phase, shifting from a stable environment to contexts which encompasses less support and structure. Often, daily regimens are not adhered to. Thus, T1DM can be a catalyst for severe health impediments such as heart disease, vascular disease, kidney disease, retinopathy, neuropathy,

SOCIAL SUPPORT AND DIABETES MANAGEMENT

and contracting infections (Rydén et al., 2016:1279). Therefore, a structured approach to the management of diabetes is required.

Social support is a significant factor in diabetes management. Ingadottir and Halldorsdottir (2008:606) commented that social support plays an essential role in the experience of chronic illness. Family, friends, and health care professionals form an integral part of the social support network. Furthermore, by adopting responsive conduct, the social support network can provide optimal environments for good adherence (Kay et al., 2017:1–16). Accordingly, social support plays a fundamental role in helping the young adult marshal psychological reserves and surmounts emotive encumbrances (Saeed et al., 2012:89).

Consequently, the exploration of the young adult's social support network with regards to effective diabetes management may contribute to a more comprehensive understanding of the importance of social support in diabetes management care plans.

2. Problem statement

Globally, the WHO (2016:6) estimates reveal that 422 million (8.5%) adults are living with diabetes and this figure is predicted to rise to 640 million in less than 40 years. In South Africa limited data regarding diabetes prevalence exist, however the available information proposes that approximately 7% (3.85 million people) of the country's inhabitants, aged between 20 and 75, are diagnosed with the disease (Amod et al., 2012:1–94). Furthermore, it is suggested that two thirds of these individuals glycated haemoglobin (HbA1c) level is above 7%.

Many young adults living with T1DM battle with their glycaemic control, causing meagre outcomes. McKnight et al. (2015:1036–1050) discovered through international comparison of glycaemic control that 15- to 24-year olds were most likely to have HbA1c values greater than 7.5%. Consequently, these individuals experience many short- and long-term problems.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Accordingly, sufficient knowledge regarding diabetes management, self-management, as well as additional support is needed to make informed decisions and reduce complications and dangers associated with metabolic diseases (Chinnappan et al., 2017:11). Ultimately, this may lead to appropriate interventions to predict, explain, and manipulate reactions toward diabetes management. Considering the challenging nature of a diabetes management regimen and the suggested impact it can have on young adults living with T1DM, the following research question was formulated: How do young adults with well-controlled type 1 diabetes experience social support in the context of their illness?

3. Central theoretical statement

Social constructionism provided the theoretical framework of this study. Its main underlying principle is that individuals generate knowledge from the dynamics and interactions with their social networks (Losantos et al., 2016:29-42). Collective practices steers individuals to construct knowledge needed for personal growth (Brown, 2007:1-20). Similarly, through interaction with their social support network, participants discovered the role of support in their diabetes management.

4. Research method and design

The research aim was to explore and develop a composite depiction of the social support experiences of young adults who effectively manage their T1DM. The study employed a qualitative research design to sufficiently explore and condense the essence of the social support experiences. The research was conducted at the Centre for Diabetes and Endocrinology (CDE), in Houghton and Parktown, Johannesburg, Gauteng Province, South Africa. The CDE aims to improve the health of individuals living with diabetes through management programs, education, and research. The population constituted of young adults aged between 18 to 25 with well-controlled T1DM. A nonrandom purposive sampling method was used. The sample had to adhere to strict, predetermined inclusion criteria. The

SOCIAL SUPPORT AND DIABETES MANAGEMENT

criteria facilitated the acquisition of participants who hold greater knowledge about the phenomena (Palinkas et al., 2013:533–544). The final sample included eight young adults ($n = \text{eight}$) with well-controlled T1DM (three males; five females). The home languages were either English or Afrikaans (three English; five Afrikaans). The mean age at the time of diagnosis with T1DM of the final sample was 13.88 (SD = 5.82), while the current mean age was 22.38 (SD = 2.62). The glycated haemoglobin percentage of the final sample was 7.49 (SD = 0.65).

The inclusion criterion constituted that, foremost, participants had to be willing to participate voluntarily in an interview in English or Afrikaans. Participants had to be within the young adulthood developmental period, therefore between the ages of 18 and 25 years. Participants should have received a diagnosis of T1DM more than 12 months ago and have an HbA1C of 8% or less. Participants had to patients at the Centre for Diabetes and Endocrinology in Houghton or Parktown, Johannesburg, Gauteng, South Africa.

Data was generated through semistructured individual interviews aimed at obtaining a rich narrative description of the participants' social support experiences of T1DM management. An agenda with six semistructured questions guided each interview. The current study focused on the following question:

‘How does support from family and friends play a role in how you manage your diabetes?’

Subsequently, further probing questions were posed to obtain supplementary information regarding the responses to the six interview questions (Creswell, 2014:65). Probing questions enables the researcher to ask questions that fills the gap of knowledge as it enables the researcher to be flexible to the participants' responses (Wilson, 2016:47). The semistructured interviews were audio recorded.

The verbatim transcription of the audio recordings ensued the interviews. Thereafter,

SOCIAL SUPPORT AND DIABETES MANAGEMENT

data was explored using Braun and Clarke's (2006:77–101) model of thematic analysis. It entails a six-step process to ensure a rich description of the data obtained. These steps include: acquainting oneself with the data; engendering initial codes; examining themes; revising themes; outlining themes; and finally, generating the report.

Trustworthiness of the research was ensured by using the criteria proposed by Tracy (2010:837–851). The research explored a topic that have significant relativeness in South Africa and ensured that it had an educative authenticity by raising a level of awareness of the topic chosen for the research (Guba & Lincoln, 2005:192). A rich rigor was obtained by conducting semistructured interviews with each participant and gathering rich sources of information. Sincerity was upheld by employing self-reflexivity, vulnerability, honesty, transparency during data collection. Trustworthiness, verisimilitude, and plausibility of the research findings ensured credibility of the research. Resonance aimed to render the findings transferable to those who have direct and no direct experience with the topic discussed. Furthermore, trustworthiness was ensured by means of meaningful coherence which entailed member checking with each participant whether the themes that were develop relate to their social support experiences with regards to their diabetes management. The research was performed in strict adherence to the national and international ethical guidelines and the efficacious attainment of the research objective.

The physical and (potential) psychological susceptibility of the sample contributed to a higher ethical risk level. Ethical approval of the study, 'Young adults' experience of social support in effective diabetes management' (ethical clearance number, NWU-HS-2016-0085) was attained from the Humanities and Health Research Ethics Committee (HHREC) of the Faculty of Humanities of the North-West University. Furthermore, the study adhered to the national and international ethical guidelines and principals pertaining to human subjects namely, the Constitution of the Republic of South Africa; the National Health Act 61 of 2003

SOCIAL SUPPORT AND DIABETES MANAGEMENT

of the Republic of South Africa; the National Health Research Ethics Council; and the Code of Ethics of the World Medical Association (International Declaration of Helsinki). In accordance with these guidelines, informed, written consent was obtained prior to any data generation. Moreover, anonymity and confidentiality were maintained by allocating a specific code to each participant.

5. Results

Through the course of thematic analysis of the data corpus, four main themes with subthemes emerged. Throughout this section, verbatim extracts of participant interviews were incorporated to support the reported findings.

Table 1 - *Summary of themes and subthemes reflecting the social support experiences of diabetes management among young adults who effectively manage their T1DM.*

Main Theme	Sub-themes
1. The value of diabetes-related education	1.1 Perceived social support after diagnosis 1.2 Reciprocal sharing of knowledge and information 1.3 The important role of ongoing professional support 1.4 The vital role of educational support from fellow diabetics
2. Disclosure leads to increased social support	
3. Participatory assistance and support	3.1 Dietary attentiveness 3.2 Financial assistance from parents

	3.3 Practical support from friends
4. Fostering a sense of belonging	4.1 Familial behaviours reflecting companionship
	4.2 A unique connection and understanding amongst fellow diabetics

5.1 The value of diabetes-related education in social support

The participants' accounts accentuated the value of family members, friends, health care professionals, and the wider diabetic community's knowledge regarding diabetes and how this facilitated their management challenges:

5.1.1 Perceived social support after diagnosis. Several of the participants reported that they received ample social support after their diagnosis of T1DM. Participant YA7 stated that the informative support shortly after being diagnosed was *a 'huge help, because it was in the beginning, and it seemed impossible.'* Similarly, after receiving information of diabetes, participant YA2 mentioned that, *'You know what is going to happen, you know what might happen. That is the thing that helped me the most.'* Participants explained that increased knowledge regarding diabetes facilitated their approach to management. Consultations with professionals, and research done by parents especially expedited this process. Participant YA8 elucidated, *'So I started off with my one doctor for 6 months. The care that I received there was what probably kept me alive. Just having that person to go to. She was very knowledgeable, very helpful, very kind.'* Participant YA7 emphasized, *'When I started out, I had a lot of help here from the diabetes educator, the nutritionist, and a different lady who helped me setting up the pump.'* Participant YA2 and YA6 respectively conveyed the value of parental involvement: *'She got a dietician to explain to me, she got videos from the internet to explain to me,'* and *'she read immensely, she tried to find out as*

SOCIAL SUPPORT AND DIABETES MANAGEMENT

much as possible and printed articles.’ The process of receiving support in the form of knowledge facilitated a sense of mastering, which made diabetes management governable. Participant YA5 highlighted, *‘knowledge, knowledge is the power in this game that you are playing every day’.*

5.1.2 Ongoing reciprocal sharing of knowledge and information. A continuous influx of knowledge remained evident throughout the participants’ diabetes management course. Loved ones continuously shared knowledge with participants, as participant YA1 affirmed, *‘My mother got two or three books for me that explained everything, this is what you feel, this is what you are going to feel, and this is what is going to happen to you’* and participant YA4 noted *‘They (parents) want me to get the pump. They went to speak to someone; whose wife is a diabetic and she got the pump and it works much better.’* Additionally, friends participated in sharing knowledge, as highlighted by participant YA4 and YA8: *‘They will google diabetic type 1 diabetes, or if anything is on the news or there’s information, they will send it to me,’* and *‘She was also one of those people (a friend) who stood up and said, when I was not getting the care that I needed, did you hear about ketones? And I was like no, what is a ketone? You know ketogenesis, and you can die from it if you are a type 1 and I was like no, I didn’t check anything, so that knowledge was a huge help.’*

5.1.3 The important role of ongoing professional support. Professional knowledge regarding diabetes and diabetes management is crucial, as participant YA5 noted; it is essential, *‘to learn the right things from the start.’* There is an inevitable link between knowledge of diabetes and support. Participant YA7 explained the informational support received from a professional, *‘I think we have a really good understanding and we have like 15-minute session, but I learn a lot every three months. I learned something else and he gives me stuff to read.’* Similarly, participant YA8 shared, *‘Their knowledge is invaluable. All those kind of, the medical side of things and stuff that you can’t figure out on your own.’* However,

SOCIAL SUPPORT AND DIABETES MANAGEMENT

although knowledge is imperative in supporting diabetes management, the collaborative relationship plays a role in the perceived support from professionals, as elucidated by participant YA6, *'I think how she (diabetes educator) handles you makes a big difference. It almost felt as if she is on your side and if she is doing this thing with you and not against you or that you are not doing something entirely wrong. She kind of worked around your conditions.'* Likewise, participant YA8 collaborated with a dietician: *'We actually started working together to see what would work for me. I was like telling her this is what is working for me. So, it became more of a science.'*

5.1.4 The vital role of educational support from fellow diabetics. Interacting with fellow diabetic counterparts provided participants with a unique set of information that was gained by connecting with individuals who have undergone a similar experience. Participant YA5, a diabetes educator, often tells her clients, *'you know what, it is going to be okay. I am also a type 1 diabetic and I have had it since I was 2 years old, and I am fine.'* Participant YA2 explained the value of being able to relate to someone: *'It was somebody else that was like me and we could share stories.'* Similarly, Participant YA1 shared how another individual with diabetes assisted, *'When I didn't know what was going on, and I said to him I don't know what to do, he would say, here, do this.'* Participant YA8 summarized this sub-theme with her shared experience: *'So I connected on an Instagram community of type 1 diabetics and that has just exploded my world into a new perspective. So that support structure and also learning via them. It helps to see what happens with other people and then you are like maybe I should try that or maybe that's why that's happening to me and then you like learn something different from them. My type one friend, you know I've helped her, her HbA1c has improved just from me being more hands on and helping her and showing that initiative to help other people.'*

5.2 Disclosure leads to increased social support

The participants indicated that they used the disclosure of diabetes as an opportunity to educate others. Several of the participants expressed that many individuals they have encountered, have a fallacy about diabetes and thus, there are several perceptions regarding it as noted by Participant YA5: *'there are a lot of perceptions about it.'* Participant YA4 coincided that, *'few people actually know what it is.'* Hence, it may cause individuals to feel uncertain and uncomfortable around individuals diagnosed with diabetes. Participant YA1 explained that *'people are not comfortable with it because they don't understand. No one is comfortable with something they can't really capture.'* Therefore, at times, participants informed individuals about diabetes. Participant YA5 stated *'I used it as an opportunity to educate people about it'* and participant YA8 explained that, *'understanding is key, and education is so important.'* By informing others, it could play a crucial role when support is needed. As demonstrated by Participant YA6 and YA8 respectively: *'Most people know that I am diabetic, and I think it does help you should something happen or if you are not feeling well. So, I think it helps that people at least know'* and *'It is so much easier when you are open to people and when you go down to that human level, you share, and you say sorry this is my situation, do you mind if this and this, or please just look after me and I'm telling you, people are just like great.'*

5.3 Participatory assistance and support

This theme conveys the positive impact that practical assistance, from family members and friends had, on the participants' ability to maintain management tasks:

5.3.1 Dietary attentiveness. Dietary attentiveness was displayed by members in the participants' social networks through awareness of dietary needs and meal preparation. Several participants indicated that loved ones' awareness of their diabetes-specific needs

SOCIAL SUPPORT AND DIABETES MANAGEMENT

made it easier to perform self-management behaviours. Participant YA5 explained that her husband displayed support by adjusting his diet to support her, *'and when I change something in my diet, he will do it with me to support me.'* Moreover, Participant YA8 emphasised how her dietary needs were considered by a friend: *'one of them is getting married and they sent me the menu and was like can you eat what's on this menu, otherwise we will accommodate for you.'* Other participants explained that some of their family members were involved in the preparation of meals. Participant YA4 and YA7 stated respectively, *'My mom is more on the food side, which she also tries to keep healthy,'* and *'then she would like make a little something for me where she'd just skip out the carbs or something like that.'*

5.3.2 Financial assistance from parents. Some of the participants reported their appreciation for their parents' financial assistance. The shared accounts of participant YA7 and YA4 demonstrated this, *'I was on my parents' medical aid, bank med, so firstly that sort of indirect support was great because they covered everything'* and *'I didn't have to worry about medical aid and so on. I got it easy. I get the insulin for free and just like I said, I have wonderful parents and supporters.'* Participant YA8 shared a similar supportive experience, *'He (my dad) is very supportive financially. Diabetes is an expensive disease as well, so in that aspect, I couldn't have done that without my dad. Like when I wanted to go on the Dexcom, it comes out of his savings and he covers it.'*

5.3.3 Practical support from friends. Friends involvement in the daily, practical tasks relating to management and general responsibilities provided participants with a sense of support. Practical assistance comprised of checking in on the individual's sugar levels, as participant YA1 shared *'So many mates will be like, how are the sugars doing? Are we good? And I'm like yes, I've checked them.'* Participant YA6 noted *'She will ask me sometimes, or when she sees I am testing my sugar, if I am okay or something.'* Moreover, other participants' experiential accounts show how sharing diabetes-related knowledge, enabled

SOCIAL SUPPORT AND DIABETES MANAGEMENT

friends to assist with in daily tasks. Participant YA2 and YA5 explained respectively *'all my friends understood I am a diabetic. They knew, don't give him this and that. So, it was actually much easier for me'* and *'my friend that studied with me, also knew a lot about it and she knows how to handle everything. I had trained her on how to inject me and do whatever is needed. I let her know if I don't show up for class just call me and find out what is wrong.'* Similarly, Participant YA8 explained the role of friends, *'In terms of if I couldn't make it to class or if I was low, I remembered I had to leave class because I was just feeling terrible and I was like please get notes for me. Once I was diagnosed they were like what can we do?'*

5.4 Fostering a sense of belonging

Spending quality time with family, and not being defined by the diagnosis of diabetes, enabled the participants to foster a sense community. Furthermore, feelings of motivation and hope were elicited when participants connected to the larger diabetic communities:

5.4.1 Familial behaviours reflecting mutuality and companionship. Family members appeared to be attuned to the participants' needs and thus, their provided support fostered feelings of togetherness which aided with management. Participant YA6 and YA3 shared their experiences respectively: *'When I get disheartened or when I feel like things aren't working out, my mom will say okay let's go talk to someone else or let's go find out about this, it really helps to have someone you can talk to about it'* and *'she's always there telling me that, like she's picking me up, she's usually a big help.'* Participant YA1's account reflected the companionship experienced by family *'My dad, he was just always there. He is the one that went with me to doctor's appointments'* while participant YA8 recalled, *'I have started competing again with my horses and he (father) normally is at the horse competitions with me and he loves it. He was very supportive of me trying to, cause horse riding was always our passion and we always did it together and he was very supportive in that aspect.'* Companionship was demonstrated through exercising together as mentioned by participant

SOCIAL SUPPORT AND DIABETES MANAGEMENT

YA4, *'My dad, he just wants to exercise. They are in this together with you.'* Lastly, participant YA5 experienced amity through spousal support, *'if I am low and too lazy to get up out of bed, he will get up anytime and bring me a sweetie. He will help me with my insulin pump, to change it and do things like that, that actually helps me a lot.'*

5.4.2 A unique connection and understanding amongst fellow diabetics. Several participants mentioned the significant support that they received from individuals who had undergone similar experiences. The unique relatability amongst a community provided participants with support, through direct and indirect contact. Participant YA6 explained, *'It is kind of nice on Facebook and Instagram to see the nice photos that people post about their pumps or something and to read other people's experiences and how they deal with it. You don't feel so alone, you don't feel as if you are the only person that has this.'* Likewise, participant YA1 mentioned that seeing other people's journey regarding diabetes fostered support, *'I follow other diabetic accounts and I will have a bad day and I see their posts and I'm like okay, there is light at the end of the tunnel.'* The participants' received empathetic understanding, as demonstrated by Participant YA2 and YA1 respectively *'furthermore, I got support from Wesley, someone else who was like me. Someone who I can share stories with'* and *'my mom would be like why did you eat all of that. And I'm like but mama, I was low. You don't understand what it does to you. She's like but no, you should just, and I'm like no. But when I speak to my brother, he is just like, I hear you. It was another co-diabetic, and he was like, I will do it with you.'* Participant YA8's description of support from synthesised this experience, *'in my Instagram community, it is nice to relate to people that also get frustrated, that also don't understand it, and 'I was at a conference the other day and I saw this guy and we were talking. I stopped him in the midst of the conversation and I was like are you a type 1 diabetic and he was like yes, how do you know? There's your pump (pointing with finger). I'm also one and we just like, the other conversation faded and we*

SOCIAL SUPPORT AND DIABETES MANAGEMENT

just like instantly connected, exchanged numbers, we could tell our funny stories and it is just that instant relatability. People always have that need in anything in life, they need to feel a part of something and part of someone who can understand you and I think it is an instant connection with any diabetic.’ Ultimately, participant YA6 summarizes, *‘it definitely helps seeing that other people also goes through this even if you don’t know them personally. I think it just helps to see that you are not alone in this.*

6. Discussion

The study’s objective was to explore and recapitulate the social support experiences of diabetes management among a group of young adults with well-controlled T1DM. The outcome of this study resulted in an abounding description of the shared heuristic descriptions of the social support facets related to diabetes management of the population under study. According to the social constructivist theory’s ontology, multiple realities may exist and thus, participants’ descriptive reports could be entirely subjective (Christiansen & Chandan, 2017:24). The epistemology of this theory delineates that the participants’ reported social support experiences were not imposed on them, but stems from personal accounts formed through interaction with others (Rogers et al., 2011:56). An abridged description of the participants’ descriptions was encapsulated, depicting the following:

Knowledge regarding diabetes mellitus and its intensive management seemed to underpin the effective management thereof as noted by Fatema et al. (2017:364). Family, friends, health care professionals and fellow diabetics played a significant role in obtaining and providing the participants with knowledge. Family members were especially involved in searching and sharing related information. Sparud-Lundin and Hallström (2015:1340) highlighted active parental involvement and participation in obtaining knowledge regarding the disease. Medical knowledge, provided by professionals, often enhanced the knowledgeable foundation laid by parents. Furthermore, more constructive information was

SOCIAL SUPPORT AND DIABETES MANAGEMENT

obtained by the participants when professional consultations were tailored to their individual needs. O'Hara et al. (2017:769) comparably reported that effective interventions were experienced when consultation were adjusted to the young adult's preference. An additional dimension of knowledge obtained by participants where provided by fellow diabetics. It provided a collective perspective filled with insight and support. Research by De Hoff et al. (2016:10) denoted these findings. As participants gained knowledge and got more accustomed to management requirements, they shared information with others regarding the disease.

Participants acknowledged that several perspectives regarding diabetes and its management subsists. Participants used the disclosure of their diagnosis as an opportunity to educate and provide accurate diabetes-related information as portrayed in a study by Konduru et al. (2017:32-38). Furthermore, the disclosure of diabetes enabled the participants' family and friends to assist with self-management tasks. A study conducted by Carroll and Marrero (2006:252) supports the notion that disclosure of diabetes promotes feelings of security and acceptance. Accordingly, Spencer, Cooper, and Milton (2013:31) discovered a positive effect when young adults disclosed their type 1 diagnosis to peers as they could aid with management tasks. Correspondingly, having shared more in-depth knowledge with family and friends, the participants enabled members of their social support network to assist in various aspects of their diabetes management.

Furthermore, family and friends provided practical support in the form of dietary attentiveness; financial aid, and assistance with daily tasks. These findings correspond to those of Ramkisson, Pillay, and Sibanda (2017:6) who determined that participants regarded practical support as valuable and positively influenced diabetes management. Comparable findings are notable in a meta-analytic review conducted by DiMatteo (2004). The review of 122 empirical studies found that when participants received practical support, their adherence

SOCIAL SUPPORT AND DIABETES MANAGEMENT

to management task were 27% higher.

The participants support system extended beyond practical involvement and included an emotional supportive component. Participants especially valued the diabetic communities with whom they connected. Joensen, Filges, and Willaing (2016:1443-1451) found that support from fellow diabetics calls attention to the collective significance of sharing experiences between individuals with T1DM. Participants received support from their diabetic counterparts either through direct interactions or by making use of social media platforms. Both type of interactions elicited feelings of motivation, inspiration, and a sense of not being alone. These findings affirm similar observations made by Gilbert et al. (2012:190), and Witt (2016).

Social support extends to several spheres of the participants' diabetes management and principally includes being knowledgeable about diabetes, providing emotional support and providing practical assistance where necessary. Discoveries by Song et al. (2017:412) indicated that when loved ones are involved in diabetes management, it aided the participants in reaching effective management outcomes.

7. Conclusion

The young adults with well-controlled T1DM who participated in this study, emphasized the key role of their social support structure in relation to diabetes management. The strong social support received from family, friends, and communities cultivated increased confidence and capabilities in participants, to administer required management tasks. These finding suggests that the key role of social support must be acknowledged within diabetes management.

7.1 Limitations of the study

The applicability of the study's findings to the entire populations of young adults with

SOCIAL SUPPORT AND DIABETES MANAGEMENT

T1DM in South Africa is restricted due to the restricted demographic, socio-economic, and cultural variability of the sample.

7.2 Recommendations

Supplementary research regarding the characteristics of young adults' social support network in terms of gender, age and culture is warranted. It could highlight which aspects need to be focused on to increase social support networks, and thus, enhance diabetes management.

8. Acknowledgements

1. Professor D. G. Segal and the supporting physicians from the Centre for Diabetes and Endocrinology in Parktown and Houghton, Johannesburg.
2. The participants for their participation in the study.

9. Competing Interests

None

10. Declarations

1. No funding was received.
2. The views expressed in the article are that of the researcher and not an official position of the institution.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

References

- Amod, A., Motala, A., Levitt, N., Berg, J., Young, M., Grobler, N., ... Raubenheimer, P. (2012). The 2012 SEMDSA guideline for the management of type 2 diabetes. *Journal of Endocrinology, Metabolism and Diabetes of South Africa*, 17(1):1–94.
- Bai, Y. L., Chiou, C. P. & Chang, Y. Y. 2009. Self-care behaviour and related factors in older people with Type 2 diabetes. *Journal of Clinical Nursing*, 18(23), 3308–3315.
- Braun, V. & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2):77–101.
- Brown, H. D. 2007. Principles of language learning and teaching. White Plains, NY: Pearson.
- Carroll, A. E. & Marrero, D. G. 2006. The role of significant others in adolescent diabetes: A qualitative study. *The Diabetes Educator*, 32(2):243–252. doi: 10.1177/0145721706286893.
- Chamberlain, JJ., Rhinehart, A. S., Shaefer, C. F. & Neuman, A. 2016. Diagnosis and management of diabetes: Synopsis of the 2016 American Diabetes Association standards of medical care in diabetes. *Annals of Internal Medicine*, 164:542–552. doi:10.7326/M15–3016.
- Chinnappan, S., Sivanandy, P., Sagar, R. & Molugulu, N. 2017. Assessment of knowledge of diabetes mellitus in the urban areas of Klang District, Malaysia. *Pharmacy*, 5(1), 11. doi:10.3390/pharmacy5010011
- Christiansen, B. & Chandan, H. C. 2017. Handbook on research on organizational culture and diversity in the modern workplace. Hershey, PA: IGI Global.
- Creswell, J. W. 2014. Research design: Qualitative, quantitative and mixed method approaches. 4th ed. Thousand Oaks, CA: SAGE Publications, Inc.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- De Hoff, B. A., Staten, L. K., Rodgers, R. C. & Denne, S. C. 2016. The role of online social support in supporting and educating parents of young children with special health care needs in the United States: A scoping review. *Journal of International Research*, 18(12):1-13.
- DiMatteo, R. 2004. Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Medical Care*, 42(3):200–209. doi:15076819.
- Fatema, K., Hossain, S., Natasha, K., Chowdhury, H. A., Akter, J., Khan, T. & Ali, L. 2017. Knowledge attitude and practice regarding diabetes mellitus among nondiabetic and diabetic study participants in Bangladesh. *BMC Public Health*, 17:364. <http://doi.org/10.1186/s12889-017-4285-9>
- Glassford, M. A. 2017. Recognizing type 1 diabetes mellitus in children & adolescents. *The Nurse Practitioner*, 42(6):17–22.
- Gilbert, K., Dodson, S., Gill, M., & McKenzie. 2012. Online communities are valued by people with type 1 diabetes for peer support: How well do health professionals understand this? *Diabetes Spectrum*, 25(3):180–191. <https://doi.org/10.2337/diaspect.25.3.180>
- Guba, E. G. & Lincoln, Y. S. 2005. Paradigmatic controversies, contradictions, and emerging confluences. (In Denzin, N. K & Lincoln, Y. S eds. *The Sage handbook of qualitative research*. 3rd ed. Thousand Oaks, CA: Sage. p. 191–216).
- Hynes, L., Byrne, M., Dinneen, S. F., McGuire, B. E., O'Donnell, M. & McSharry, J. 2016. Barriers and facilitators associated with attendance at hospital diabetes clinics among young adults (15–30 years) with type 1 diabetes mellitus: A systematic review. *Pediatric Diabetes*, 17(7):509–518. doi: 10.1111/pedi.12198.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Ingadottir, B. & Halldorsdottir, S. 2008. To discipline a "dog": The essential structure of mastering diabetes. *Qualitative Health Research*, 18(5):606–619. doi: 10.1177/1049732308316346.
- International Diabetes Federation. 2017. IDF Diabetes Atlas. 8th ed. (De Visu Digital Document Design version). <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas.html> Date of access: Aug. 2017
- Joensen, L. E., Filges, T. & Willaing, I. 2016. Patient perspectives on peer support for adults with type 1 diabetes: A need for diabetes-specific social capital. *Patient Preference and Adherence*, 10:1443–1451. <http://doi.org/10.2147/PPA.S111696>
- Kay, J. S., Juth, V., Silver, R. C. & Sender, L. S. 2017. Support and conflict in relationships and psychological health in adolescents and young adults with cancer. *Journal of Health Psychology*, 1–16. doi: 10.1177/1359105316676629.
- Konduru, S. S. T., Karthik, A. R., Muddada, S., Shaik, S. & Vakkapatla, L. S. 2017. Assessment of diabetes related knowledge, attitude and practice among diabetics and non-diabetics using self prepared questionnaire for awareness of health promotion. *Indian Journal of Pharmacy Practice*, 10(1):32–38. doi: 10.5530/ijopp.10.1.8
- Losantos, M., Montoya, T., Exeni, S., Santa Cruz, M. & Loots, G. 2016. Applying social constructionist epistemology to research in psychology. *International Journal of Collaborative Practice*, 6(1):29–42.
- McKnight, J. A., Wild, S. H., Lamb, M. J., Cooper, M. N., Jones, T. W., Davis, E. A. Miller, K. M. 2015. Glycaemic control of Type 1 diabetes in clinical practice early in the 21st century: an international comparison. *Diabetic Medicine*, 32:1036–1050.
- O'Hara, M. C., Hynes, L., O'Donnell, M., Nery, N., Byrne, M., Heller, S. R. & the Irish Type 1 Diabetes Young Adult Study Group. 2017. A systematic review of interventions to

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- improve outcomes for young adults with Type 1 diabetes. *Diabetic Medicine*, 34(6):753–769. doi:10.1111/dme.13276.
- Oram, R. A., Patel, K., Hill, A., Shields, B., McDonald, T. J., Jones, A. & Weedon, M. N. 2016. A type 1 diabetes genetic risk score can aid discrimination between type 1 and type 2 diabetes in young adults. *Diabetes Care*, 39:337–344. doi: 10.2337/dc15-1111.
- Osan, K., Punch, J. D., Watson, M., Chan, Y. X., Barrie, P., Fegan, P. G. & Yeap, B. B. 2016. Associations of demographic and behavioural factors with glycaemic control in young adults with type 1 diabetes mellitus. *Internal Medicine Journal*, 46(3):332–338. doi: 10.1111/imj.12991.
- Palinkas, L. A., Horwits, S. M., Green, C. A., Wisdom, J. P., Duan, N. & Hoagwood, K. 2013. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5):533–544. doi: 10.1007/s10488-013-0528-y.
- Ramkisson, S., Pillay, B. & Sibanda, W. 2017. Social support and coping in adults with type 2 diabetes. *African Journal of Primary Health Care & Family Medicine*, 9(1):1-8. doi: 10.4102/phcfm.v9i1.1405.
- Rogers, V. A., Vassilev, I., Sanders, C., Kirk, S., Chew-Graham, C., Kennedy, A. & Richardson, G. 2011. Social networks, work and network-based resources for the management of long-term conditions: a framework and study protocol for developing self-care support. *Implementation Science*, 6:56. doi: 10.1186/1748-5908-6-56.
- Rydén, A., Sörstadius, E., Bergenheim, K., Romanovschi, A., Thorén, F., Witt, E. A. & Sternhufvud, C. 2016. The humanistic burden of type 1 diabetes mellitus in Europe: Examining health outcomes and the role of complications. *PLoS ONE*, 11(11):1279-1287. <https://doi.org/10.1371/journal.pone.0164977>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Saeed, T., Mansor, N. N. A., Naz, F., Fatima, K. & Ishaq, S. H. 2012. Perceived social support: Impact on quality of life in diabetics. *International Journal of Academic Research*, 4(3):89-95.
- Song, Y., Nam, S., Park, S., Shin, I. S. & Ku, B. J. 2017. The impact of social support on self-care of patients with type diabetes: What is the effect of diabetes type? Systematic review and meta-analysis. *The Diabetes Educator*, 43(4):396–412. doi: 10.1177/0145721717712457.
- Sparud-Lundin, C. & Hallstrom, I. 2015. Parents' experiences of two different approaches to diabetes care in children newly diagnosed with type 1 diabetes. *Qualitative Health Research*, 26(10):1331–1340. Retrieved from <https://doi.org/10.1177/1049732315575317>
- Spencer, J., Cooper, H. & Milton, B. 2013. Type 1 diabetes in young people: The impact of social environments on self-management issues from young people's and parents' perspectives. *Journal of Diabetes Nursing*, 18:22–31.
- Tracy, S. J. 2010. Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10):837–851. doi: 10.1177/1077800410383121.
- Wilson, V. 2016. Research Methods: Interviews. *Evidence Based Library and Information Practice*, 11(1):47–49. <http://dx.doi.org/10.18438/B8404H>
- Witt, S. 2016. Glu: An online type 1 diabetes information community. *SLIS Student Research Journal*, 6(1). Retrieved from <http://scholarworks.sjsu.edu/slissrj/vol6/iss1/3>
- World Health Organization. 2016. Global report on diabetes. France: WHO Press.

SECTION 3: CRITICAL REFLECTION

3.1 Introduction

The scope of the current study transpires within the discipline of the social sciences. Social science research aims to explore, conceptualize, analyses human nature, and seeks to find an understanding to unexplained phenomena's relating to human contact and behaviour (Packer, 2018; Weber, 2017). The contribution of the current study was established through critical reflection regarding the core components of the research and is delineated throughout Section III. Section III provides a concise overview of the conception and aim of this study. Concluding this section is the epilogue which elucidates the research process, findings, significance, limitations, and recommendations³

3.2 Conception of the study

Principally, an idiosyncratic, socially significant subject had to be identified and explored further to contribute to the social sciences field and enhance the present scientific understanding thereof. Type 1 diabetes is incurable. Thus, adequate self-management aimed at achieving glycaemic control is necessary for preventing and reducing the risk of diabetes-related complications (Brady, Song, & Butler, 2017). It is considered problematic from a social science perspective due to the psychological distress and behavioural difficulties that often stem from the incumbrance of the intense management regimen (Balfe et al., 2013). There have been some indications that social support plays a key role in managing and assisting with the diabetes management regimen. However, there has not been sufficient deliberation of the role of social support in the context of type 1 diabetes management, particularly for young adults (Spiegel et al., 2012). Therefore, the following research question arose: How do young adults with well-controlled type 1 diabetes experience social support in the context of their illness

3.3. Research aim

The aim of this study was to discover and capture the quintessence of the social support experiences of a group of young adults with well-controlled with type 1 diabetes; and, how this contributed to their diabetes management.

3.4 Epilogue

3.4.1 Research process

A qualitative research design was employed, and the theoretical framework was grounded in the social constructionist theory. A nonrandom purposive sampling method was utilized which ensured that selected participants met the distinct and predetermined inclusion criteria for participation in this study (Ritchie, Lewis, Elam, Tennant, & Rahim, 2013).

The final sample comprised of eight (3 male and 5 females; 4 Afrikaans and 4 English-speaking) young adults between the ages of 18 and 25 years living with well-controlled type 1 diabetes. Variations in the participants' prescribed diabetes management regimens were limited by sourcing individuals who attend a Centre for Diabetes and Endocrinology in Parktown or Houghton, Johannesburg. Moreover, participation was only possible if a diagnosis of type 1 diabetes was received one year prior to participation in the current study to constrain the effect of continued adjustment to the diagnosis of type 1 diabetes. Finally, the inclusive criteria maintained that, for a period of three months, an individual had to uphold average glycated haemoglobin levels of 8% or less. Literature states that an average glycated haemoglobin level of 7-7.5% is indicative of effective diabetes management. However, Segal, the primary gatekeeper of the study and a specialist paediatric endocrinologist, enforced the value of 8%. Young adults face developmental challenges such as increased autonomy and management responsibilities, thus Segal maintained that at 8%

SOCIAL SUPPORT AND DIABETES MANAGEMENT

these individuals were still effectively managing their type 1 diabetes (personal communication, 2016)

The participants were only receiving medical treatment for their type 1 diabetes and have not been diagnosed with chronic illness nor receiving psychotherapy at the time of the current study.

Data was obtained by means of semistructured interviews which aimed to acquire detailed descriptions of how the participants experienced social support regarding their diabetes management regimen. The interviews were recorded (audio), transcribed and thematic analysis was conducted according to the method designated by Braun and Clarke (2006). Subsequently, the abridged accounts of the participants' social support experiences with diabetes management were expounded and are depicted by the empirical findings of this study.

3.4.2 Findings of the study

The findings of the current study were captured by four explanatory themes and subthemes.

The first main theme conveyed the role of diabetes related knowledge and how it supported participant to gain more control over their management. Participants reported that initially it felt overwhelming and impossible to maintain an effective management regimen; however, with the involvement from family, friends, consultations with health care providers, and fellow diabetics, it gradually became easier. The increased perception and experiences of competency was especially rooted in obtaining adequate knowledge regarding diabetes and its management. Individuals in the participants support network especially contributed in this regard, by obtaining knowledge through various sources such as articles, interaction with individuals diagnosed with type 1 diabetes, and engaging with health care providers who had specialized knowledge regarding the endocrine disorder. Ultimately, informational support

SOCIAL SUPPORT AND DIABETES MANAGEMENT

was encapsulated by the participants' reports as members of their social community offering and seeking advice; in addition to obtaining and sharing knowledge.

Secondly, the participants' experiential descriptions regarding their social support of diabetes management was largely influenced by the knowledge that individuals encompassed. Participants did not feel the need to disclose their diagnosis in each social context they interacted with, but when disclosure did take place it enabled them to inform and educate individuals that displayed interest. There was a joint consensus from participants that there are several misinformed perceptions of diabetes and its management regimen, thus the need for increased awareness amongst society is vital. Similarly, the efforts to obtain knowledge to provide augment social support were evident in the first theme. It highlighted the imperative function that sufficient and adequate knowledge plays in fostering support for the participants' type 1 diabetes management regimen.

Predominately, participants described the practical support experiences of diabetes management as nutritional awareness, financial support, and daily involvement. This was the essence of the third theme. Participants especially valued having family members and friends who could assist them with daily management task due to being knowledgeable. Several participants stated appreciating a measure of interest in their diabetes through means of checking in on how they were doing and offering aid where needed with daily management tasks. Family and friends displaying interest in their diabetes, by asking how they were doing, was viewed by participants in a positive light. An additional sign of support was having knowledge about diabetes-related concerns, for example knowledge of the endocrine disease and a comprehension of management tasks. Having sufficient knowledge regarding management and checking up when a situation seems concerning founded feelings of support and interest for the participants.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

The fourth theme pertained to the participants' feelings of belonging and responsiveness that was fostered through family members and fellow individuals with diabetes. It enabled participants to believe that they have trusted allies, who are willing to face the challenging regimen with them of supportive. Hence, the participants felt like they did not have to carry the burdensome management obligations by themselves. Affective support was described by participants as a sense of companionship. The role of the larger diabetic community especially played a positive role in the participants' diabetes management. The participants' accounts demonstrated that peer support facilitated them in preparing for possible diabetes-related stressors and complications. Furthermore, being able to share and receive knowledge, reinforce existing knowledge, and sharing experiences provided the participants with a sense of not being alone and enabled them to gather motivation in times of hardships and tap into their internal capacity to cope. The unique understanding that fellow diabetics embody had a positive effect for participants as they were able to interact (directly or indirectly) with a network of individuals with a similar level of interest and understanding.

Fundamentally, the study's findings are grounded on empirical research and not on speculation (Conrad & Barker, 2010). As a result, the researcher affirms that the aim of the current study, namely to capture and explore the social support experiences of diabetes management among a group of young adults with well-controlled type 1 diabetes, has been met.

3.4.3 Limitations

The research of the current study was successfully achieved. However, some limitations are evident and should be contemplated:

- The inclusion of five to 25 participants is suggested by Polkinghorne (as cited in Creswell, 2007) when interviews are conducted with individuals who have undergone

SOCIAL SUPPORT AND DIABETES MANAGEMENT

a similar experience. The final sample consisted of eight participants. Although eight participants are deemed sufficient, a larger sample would have enabled a more comprehensive insight and possible transferability to the population under study.

- Another aspect of the study that may be considered a limitation was the variability in the participants' socio-economic status. An accurate representation of different socio-economic groups was not obtained as all the participants had access to medical aid there was no inclusion of participants from a lower socio-economic status and/or who had no medical insurance.
- Due to the restricted demographic and socio-economic variability in this study's final sample, the relevance of the findings of the current study, to fellow young adults with effective diabetes management in South Africa, are limited.
- Conrad and Barker (2010) suggest that conducting semistructured interviews is sufficient to capture and validate the experiences. However, the findings of the study could not be triangulated as data was generated through means of semistructured interviews.

3.4.4 Recommendations

The current study establishes the need for expanded research to enrich empirical insight into the social support experiences of diabetes management among young adults with well-controlled type 1 diabetes. The subsequent is recommended:

- Research focusing specifically on the young adulthood developmental period is needed, as research on young adults with type 1 diabetes is scant. Several studies focus on both adolescents and young adults with type 1 diabetes. Longitudinal research studies could be conducted tracking young adults' diabetes management

SOCIAL SUPPORT AND DIABETES MANAGEMENT

regimens, and thereby accessing a more representative sample of young adults with type 1 diabetes.

- Studies can be conducted which aims to discover developmentally-appropriate interventions for young adults. For instance, young adults convey interest in harnessing peer support (especially on social media) for diabetes management, in addition to recognizing the vital role of their supportive network in diabetes management. Prospective research should conduct trail designs and other novel designs to systematically evaluate the effect of these different support networks on the young adults' diabetes management outcomes.
- Furthermore, more studies are warranted that aim to develop interventions which focuses on the role of social support of diabetes management among young adults. Although information regarding improved management is readily available internationally, more research is needed specifically within the South African context as it could facilitate improved diabetes management for young adults with type 1 diabetes.
- There is a need for augmented social awareness regarding type 1 diabetes and diabetes management within the South African context. Research should be conducted with the aim to incorporate and execute type 1 diabetes related education within the primary and secondary education sector of South Africa.

3.4.5 Significance of the study

- The current study aims to add to the limited literature that focuses on the topic of young adulthood and type 1 diabetes management. Most of the research in the South African context focuses on type 2 diabetes and social support experiences.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- The current study's findings could highlight the value of social support with respect to the diabetes management regimen. Hence, it could facilitate and motivate a review of contextual policy as set out by the National Department of Health of the Republic of South Africa to refine young adults' diabetes management guidelines.
- The study's findings will aid in the development of programs for managing diabetes, in addition to exploring possible therapeutic interventions for young adults with type 1 diabetes.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Complete reference list

- Abdelghaffar, S. (2015). Nutritional management of type 1 diabetes. In K. Nunes (Ed.), *Major topics in type 1 diabetes* (pp. 121–135). doi:10.5772/61150.
- Albright, T. L., Parchman, M., & Burge, S. K. (2001). Predictors of self-care behaviour in adults with type 2 diabetes: An RRNeST study. *Family Medicine, 33*(5), 354–360.
Retrieved from
<http://www.stfm.org/Portals/49/Documents/FMPDF/FamilyMedicineVol33Issue5Albright354.pdf>
- Ali, O. (2010). Type 1 diabetes mellitus: Epidemiology, genetics, pathogenesis, and clinical manifestations. In L. Poretsky (Ed.), *Principles of diabetes mellitus* (2nd ed.) (pp. 181–201). New York, NY: Springer.
- Altamirano-Bustamante, N., Islas-Ortega, L., Robles-Valdés, C., Garduno-Espinosa, J., Morales-Cisneros, G., Valderrama, A., ... Altamirano-Bustamante, M. M. (2008). Economic family burden of metabolic control in children and adolescents with type 1 diabetes mellitus. *Journal of Pediatric Endocrinology and Metabolism, 21*(12), 1163–1168. doi:10.1515/JPEM.2008.21.12.1163
- American Diabetes Association (ADA). (2017a). Standards of Medical Care in Diabetes. *Journal of Clinical and Applied Research and Education, 40*(1). doi:10.2337/dc17-S001
- American Diabetes Association (ADA). (2014). Diagnosis and classification of diabetes mellitus. *Diabetes Care, 37*(1), 81–90. <https://doi.org/10.2337/dc14-S081>
- American Diabetes Association (ADA). (2017b). Lifestyle management: Section 4. *Diabetes Care, 40*(1), 33–43. doi:10.2337/dc17-S007

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Amod, A., Motala, A., Levitt, N., Berg, J., Young, M., Grobler, N., ... Raubenheimer, P. (2012). The 2012 SEMDSA guideline for the management of type 2 diabetes. *Journal of Endocrinology, Metabolism and Diabetes of South Africa*, 17(1), 1–94. Retrieved from https://www.semDSA.org.za/images/2012_SEMDSA_Guideline_July_FINAL.pdf
- An, J., & Hodge, S. R. (2013). Exploring the meaning of parental involvement in physical education for students with developmental disabilities. *Adapted Physical Activity Quarterly*, 30(2), 147–163. <https://doi.org/10.1123/apaq.30.2.147>
- Anderson, D., & Christison-Lagay, J. (2008). Diabetes self-management in a community health center: Improving health behaviours and clinical outcomes for underserved patients. *Clinical Diabetes*, 26(1), 22–27. <https://doi.org/10.2337/diaclin.26.1.22>
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <http://dx.doi.org/10.1037/0003-066X.55.5.469>
- Ashruff, S., Siddiqui, M. A., & Carline, T. E. (2013). The psychosocial impact of diabetes in adolescents: A review. *Oman Medical Journal*, 28(3), 159–162. doi:10.5001/omj.2013.46
- Atkinson, M. A., von Herrath, M., Powers, A. C., & Clare-Salzler, M. (2015). Current Concepts on the Pathogenesis of Type 1 Diabetes—Considerations for Attempts to Prevent and Reverse the Disease. *Diabetes Care*, 38(6), 979–988. doi:10.2337/dc15-0144

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Bai, Y. L., Chiou, C. P., & Chang, Y. Y. (2009). Self-care behaviour and related factors in older people with Type 2 diabetes. *Journal of Clinical Nursing, 18*(23), 3308-3315. doi:10.1111/j.1365-2702.2009.02992.x
- Balfe, M., Brugha, R., Smith, D., Sreenan, S., Doyle, F., & Conroy, R. (2014). Why do young adults with type 1 diabetes find it difficult to manage diabetes in the workplace? *Health & Place, 26*, 180–187. doi:10.1016/j.healthplace.2013.12.016
- Balfe, M., Doyle, F., Diarmund, S., Sreenan, S., Brugha, R., Hevey, D., & Conroy, R. (2013). What's distressing about having type 1 diabetes? A qualitative study of young adults' perspective. *BMC Endocrine Disorders, 13*, 25. doi:10.1186/1472-6823-13-25
- Bantle, J. P., Wylie-Rosett, J., Albright, A. L., Apovian, C. M., Clark, N. G., Franz, M. J., ... Wheeler, M. L. (2008). Nutrition recommendations and interventions for diabetes: A position statement of the American Diabetes Association [Abstract]. *Diabetes Care, 31*, 61–78. doi:10.2337/dc08-S061
- Barnard, K. D., Dyson, P., Sinclair, J. M. A., Lawton, J., Anthony, D., Cranston, M., & Holt, R. I. G. (2014). Alcohol health literacy in young adults with type 1 diabetes and its impact on diabetes management. *Diabetic Medicine, 31*(12), 1625–1630. doi:10.1111/dme.12491
- Barrett, J. C., Clayton, D. G., Concannon, P., Akolkar, B., Cooper, J. D., Erlich, H. A., ... Type 1 Diabetes Genetics Consortium. (2009). Genome-wide association study and meta-analysis find that over 40 loci affect risk of type 1 diabetes. *Nature Genetics, 41*(6), 703–707. doi:10.1038/ng.381

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Beaser, R. S. (2010). Definition and pathophysiology. In R.S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 1–24). Boston, MA: Joslin Diabetes Centre Publications Department
- Beck, R. W., Tamborlane, W. V., Bergenstal, R. M., Miller, K. M., DuBose, S. N., & Hall, C. A. (2012). The T1D exchange clinic registry. *Journal of Clinical Endocrinology Metabolism*, *97*(12), 4383–4389. doi:10.1210/jc.2012-1561
- Benjamin, E. (2002). Self-monitoring of blood glucose: The basics. *Clinical Diabetes*, *20*(1), 45–47. <https://doi.org/10.2337/diaclin.20.1.45>
- Berg, C. A., Butner, J. E., Butler, J. M., King, P. S., Hughes, A. E., & Wiebe, D. J. (2013). Parental persuasive strategies in the face of daily problems in adolescent type 1 diabetes management. *Health Psychology*, *32*(7), 719–728. doi:10.1037/a0029427
- Bernard, R. H. (2012). *Social research methods: Qualitative and quantitative approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Bishu, K. G., Gebregziabher, M., Dismuke, C. E., & Egede, L. E. (2015). Quantifying the incremental and aggregate cost of missed workdays in adults with diabetes. *Journal of General Internal Medicine*, *30*(12), 1773-1779. doi:10.1007/s11606-015-3338-y
- Bismuth, E., & Laffel, L. M. (2010). Treatment of children with diabetes. In R. S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 613–640). Boston, MA: Joslin Diabetes Centre Publications Department.
- Bluestone, J. A., Herold, K., & Eisenbarth, G. (2010). Genetics, pathogenesis and clinical interventions in type 1 diabetes. *Nature*, *464*(7293), 1293–1300. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4959889/>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Bowen, M. E., Henske, J. A., & Potter, A. (2010). Health care transition in adolescents and young adults with diabetes. *Clinical Diabetes*, *28*, 99-106.
<http://dx.doi.org/10.2337/diaclin.28.3.99>
- Brady, P. J., Song, H., & Butler, J. (2017). Using an expert panel to develop social support program sequencing for young adults with type 1 diabetes. *Health Promotion Practice*, *18*(6), 789–797. doi:10.1177/1524839917720934.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77–101. <http://dx.doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2014). What can thematic analysis offer health and wellbeing researchers? *International Journal of Qualitative Studies on Health and Well-being*, *9*. doi: 10.3402/qhw.v9.26152
- Brouwer, A. M., & Mosack, K. E. (2012). “I am a blood sugar checker”: Intervening effects of self-as-doer identity on the relationship between self-efficacy and diabetes self-care behaviours. *Self and Identity*, *11*(4), 472–491.
<https://doi.org/10.1080/15298868.2011.603901>
- Brown, H. D. (2007). *Principles of language learning and teaching* (4th ed.). White Plains, NY: Pearson Education, Inc.
- Bryden, K. S., Dunger, D. B., Mayou, R. A., Peveler, R. C., & Neil, H. A. (2003). Poor prognosis of young adults with type 1 diabetes: A longitudinal study. *Diabetes Care*, *26*(4), 1052–1057. <http://dx.doi.org/10.2337/diacare.26.4.1052>
- Burr, V., & Dick, P. (2017). Social constructionism. In B. Gough (Ed.), *The Palgrave handbook of critical social psychology*. London: Palgrave Macmillan. Retrieved from https://doi-org.nwulib.nwu.ac.za/10.1057/978-1-137-51018-1_4

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Callahan, S. T., & Cooper, W. O. (2010). Changes in ambulatory health care use during the transition to young adulthood. *Journal of Adolescent Health, 46*(5), 407–413.

doi:10.1016/j.jadohealth.2009.09.010

Camacho, R. C., Galassetti, P., & Davis, S. N. (2005). Glucoregulation during and after exercise in health and insulindependent diabetes. *Exercise and Sport Science Reviews, 33*(1), 17–23. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/15640716>

Carcone, A. I., Ellis, D., Weisz, A., & Naar-King, S. (2011). Social support for diabetes illness management: supporting adolescents and caregivers. *Journal of Developmental Behaviour Pediatrics, 32*(8), 581-590.

doi:10.1097/DBP.0b013e31822c1a27

Carroll, A. E. (2006). The role of significant others in adolescent diabetes: A qualitative study. *The Diabetes Educator, 32*(2), 243–252. doi:10.1177/0145721706286893

Carroll, A. E., & Marrero, D. G. (2006). The role of significant others in adolescent diabetes: A qualitative study. *The Diabetes Educator, 32*(2), 243–252.

doi:10.1177/0145721706286893.

Cavallerano, J.D., & Stanton, R.M. (2010). Micro vascular complications. In R. S. Beaser, *Joslin's diabetes deskbook: A guide for primary care providers* (2nd ed.) (pp. 445–463). Boston, MA: Joslin Diabetes Centre Publications Department.

Céspedes-Knadle, Y. M., & Muñoz, C. E. (2011). Development of a group intervention for teens with type 1 diabetes. *The Journal for Specialists in Group Work, 36*(4), 278–

295. <https://doi.org/10.1080/01933922.2011.613898>

Chamberlain, J. J., Rhinehart, A. S., Shaefer, C. F., & Neuman, A. (2016). Diagnosis and management of diabetes: Synopsis of the 2016 American Diabetes Association

SOCIAL SUPPORT AND DIABETES MANAGEMENT

standards of medical care in diabetes. *Annals of Internal Medicine*, 164(8), 542–552.

doi:10.7326/M15-3016.

Chawla, R. (2012). *Complications of diabetes*. New Delhi, ND: Jaypee Brothers Medical Publishers (P) Ltd.

Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health*, 50(2), 154–163. doi:10.1016/j.jadohealth.2011.05.013

Chew, B. H., Khoo, E. M., & Chia, Y. C. (2015). Social support and glycemic control in adult patients with type 2 diabetes mellitus. *Asia-Pacific Journal of Public Health*, 27(2), 166–173. <https://doi.org/10.1177/1010539511431300>

Chiang, J. L., Kirkman, M. S., Laffel, L. M. B., & Peters, A. L. (2014). Type 1 diabetes through the lifespan: A position statement of the American Diabetes Association. *Diabetes Care*, 37(7), 2034–2054. doi:10.2337/dc14-1140

Chinnappan, S., Sivanandy, P., Sagarán, R., & Molugulu, N. (2017). Assessment of knowledge of diabetes mellitus in the urban areas of Klang District, Malaysia. *Pharmacy*, 5(1), 11. doi:10.3390/pharmacy5010011

Christiansen, B., & Chandan, H. C. (2017). *Handbook on research on organizational culture and diversity in the modern workplace*. Hershey, PA: IGI Global.

Christie, D. (2013). Current recommendations and considerations for psychosocial and psychoeducational support of adolescents with Type 1 diabetes. *Diabetes Management*, 3(2), 161–169. doi:10.2217/dmt.12.90

Christie, D., & Viner, R. (2005). Adolescent development. *British Medical Journal*, 330(7486), 301–304. doi:10.1136/bmj.330.7486.301.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Ciechanowski, P., Russo, J., Katon, W. J., Lin, E. H. Ludman, E., Heckbert, S., ... Young, B.

A. (2010). Relationship styles and mortality in patients with diabetes. *Diabetes Care*, 33(3), 539–544. doi:10.2337/dc09-1298

Coffen, R. D. (2009). The 600–step program for type 1 diabetes self management in youth:

The magnitude of the self-management task. *Postgraduate Medicine*, 121(5), 119–139. doi:10.3810/pgm.2009.09.2059

Colarossi, L. G. (2001). Adolescent gender differences in social support: Structure, function, and provider type. *Social Work Research*, 25(4), 233–241.

<http://dx.doi.org/10.1093/swr/25.4.233>

Colberg, S. R., Laan, R., Dassau, E., & Kerr, D. (2015). Physical activity and type 1

diabetes: Time for a rewire? *Journal of Diabetes Science and Technology*, 9(3), 609–618. doi:10.1177/1932296814566231

Comeaux, S. J., & Jaser, S. S. (2010). Autonomy and insulin in adolescents with type 1

diabetes. *Pediatric Diabetes*, 11(7), 498–504. doi:10.1111/j.1399-5448.2009.00625.x

Conrad, P., & Barker, K.K. (2010). The social construction of illness: Key insights and policy implications. *Journal of Health and Social Behaviour*, 51(1), 67–79.

doi:10.1177/0022146510383495

Cooppan, R., Beaser, R., & Shetty, G. K. (2010). Acute Complications. In R. S. Beaser,

Joslin's diabetes deskbook: A guide for primary care providers (2nd ed.) (pp. 419–443). Boston, MA: Joslin Diabetes Centre Publications Department.

Couper, J. J., & Donaghue, K. C. (2009). Phases of Diabetes in children and adolescents.

Pediatric Diabetes, 10(12), 13–16. doi:10.1111/j.1399-5448.2009.00574.x

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Craig, M. E., Jefferies, C., Dabelea, D., Balde, N., Seth, A., & Donaghue, K. C. (2014). Definition, epidemiology, and classification of diabetes in children and adolescents. *Pediatric Diabetes*, *15*(20), 4–17. doi:10.1111/pedi.12186
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed method approaches* (4th ed.). Thousand Oaks, CA: SAGE Publications, Inc.
- Creswell, J. W., & Poth, C. N. (2017). *Qualitative Inquiry & Research Design: Choosing Among 5 Approaches* (4th ed.). Thousand Oaks, CA: SAGE Publications.
- Creswell, J.W. (2009). *Research design: Qualitative, quantitative, and mixed method approaches* (3rd ed.). Thousand Oakes, CA: SAGE Publications Incorporated.
- Crowe, M., Inder, M., & Porter, R. (2015). Conducting qualitative research in mental health: Thematic and content analyses. *Australian & New Zealand Journal of Psychiatry*, *49*(7), 616–623. doi:10.1177/0004867415582053
- Das, A. K., & Shah, S. (2011). History of diabetes: From ants to analogs. *Journal of Associated Physicians of India*, *59*, 6–7. Retrieved from http://japi.org/special_issue_april_2011/01_Diabetic_History.pdf
- Das, A. K., Raghupathy, P., & Tripathy, B. B. (2012). Type 1 diabetes mellitus: Clinical features. In B. B. Tripathy (Ed.), *RSSDI Textbook of diabetes mellitus* (2nd ed.) (pp. 367–373). New Delhi, ND: Jaypee Brothers Medical Publishers (P) Ltd.
- Davis, S. N. (2013). Hypoglycemia and hypoglycemic syndromes. In G. C. Weir, J. L. Jameson, & L. J. De Groot (Eds.), *Endocrinology adult and pediatric: Diabetes mellitus and obesity* (6th ed.) (pp. 420–427). Philadelphia, PA: Elsevier Health Sciences.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- De Boera, A., Pijl, S. J., & Minnaerta, A. (2012). Students' attitudes towards peers with disabilities: A review of the literature. *International Journal of Disability, Development and Education*, 59(4), 379–392. doi:10.1080/1034912X.2012.723944
- De Hoff, B. A., Staten, L. K., Rodgers, R. C., & Denne, S. C. (2016). The role of online social support in supporting and educating parents of young children with special health care needs in the United States: A scoping review. *Journal of International Research*, 18(12), e333. doi:10.2196/jmir.6722.
- De Wit, M., Delemarre-van de Waal, H. A., Bokma, J. A., Haasnoot, K., Houdijk, M. C., Gemke, R. J., & Snoek, F. J. (2007). Self-report and parent-report of physical and psychosocial well-being in Dutch adolescents with type 1 diabetes in relation to glycemic control. *Health and Quality of Life Outcomes*, 5, 10.
<http://doi.org/10.1186/1477-7525-5-10>
- Delamater, A. M., De Wit, M., McDarby, V., Malik, J., & Acerini, C. L. (2014). Psychological care of children and adolescents with type 1 diabetes. *Pediatric Diabetes*, 15(20), 232–244. doi:10.1111/pedi.12191
- Deshpande, A. D., Harris-Hayes, M., & Schootman, M. (2008). Epidemiology of diabetes and diabetes-related complications. *Physical Therapy*, 88(11), 1254–1264.
doi:10.2522/ptj.20080020
- Dickinson, J. K., & O'Reilly, M. M. (2004). The lived experience of adolescent females with type 1 diabetes. *The Diabetes Educator*, 30(1), 99–107.
doi:10.1177/014572170403000117
- DiMatteo, R. 2004. Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Medical Care*, 42(3):200–209.
doi:15076819

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Epstein, J. (2010). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Boulder, CO: Westview Press.

Erikson, E. (1980). *Identity and the Life Cycle*. New York, NY: W. W. Norton & Company, Inc.

Fatema, K., Hossain, S., Natasha, K., Chowdhury, H. A., Akter, J., Khan, T. & Ali, L. (2017). Knowledge attitude and practice regarding diabetes mellitus among nondiabetic and diabetic study participants in Bangladesh. *BMC Public Health*, *17*(1), 364. <http://doi.org/10.1186/s12889-017-4285-9>

Fortuna, R. J., Robbins, B. W., Mani, N., & Halterman, J. S. (2010). Dependence on Emergency Care among Young Adults in the United States. *Journal of General Internal Medicine*, *25*(7), 663–669. doi:10.1007/s11606-010-1313-1.

Gallant, M. P. (2003). The influence of social support on chronic illness and self-management: A review and directions for research. *Health Education and Behaviour*, *30*(2), 170–195. doi:10.1177/1090198102251030

Gamarra, C. J., Paz, E. P. A., & Griep, R. H. (2009). Social support and cervical and breast cancer screening in Argentinean women from a rural population. *Public Health Nursing*, *26*(3), 269–276. doi:10.1111/j.1525-1446.2009.00779.x

Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I., ... Swain, D. P. (2011). American college of sports medicine position stand. Quantify and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine & Science in Sports & Exercise*, *43*(7), 1334-1359. doi:10.1249/MSS.0b013e318213fefb

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Gilbert, K., Dodson, S., Gill, M., & McKenzie. (2012). Online communities are valued by people with type 1 diabetes for peer support: How well do health professionals understand this? *Diabetes Spectrum, 25*(3), 180–191.
<https://doi.org/10.2337/diaspect.25.3.180>
- Glassford, M. A. (2017). Recognizing type 1 diabetes mellitus in children & adolescents. *The Nurse Practitioner, 42*(6), 17–22. doi:10.1097/01.NPR.0000516121.77126.61
- Goldstein, D. E., Little, R. R., Lorenz, R. A., Malone, J. I., Nathan, D. M., & Peterson, C. M. (2003). Tests of glycemia in diabetes. *Diabetes Care, 26*(1), 106–108.
<https://doi.org/10.2337/diacare.26.2007.S106>
- Grant, L., Lawton, J., Hopkins, D., Elliott, J., Lucas, S., Clark, M., ... Cooke, D. (2013). Type 1 diabetes structured education: what are the core self-management behaviours? *Diabetic Medicine, 30*(6), 724–730. doi:10.1111/dme.12164.
- Grey, M., Whittemore, R., & Tamborlane, W. (2002). Depression in type 1 diabetes in children: natural history and correlates. *Journal of Psychosomatic Research, 53*(4), 907–911. [http://dx.doi.org/10.1016/S0022-3999\(02\)00312-4](http://dx.doi.org/10.1016/S0022-3999(02)00312-4)
- Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 191–216). Thousand Oaks, CA: Sage.
- Hains, A. A., Berlin, K. S., Davies, W. H., Parton, E. A., & Alemzadeh, R. (2006). Attributions of adolescents with type 1 diabetes in social situations: relationship with expected adherence, diabetes stress, and metabolic control. *Diabetes Care, 29*(4), 818–822. <https://doi.org/10.2337/diacare.29.04.06.dc05-1828>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Haltiwanger, E. P., & Brutus, H. (2012). A culturally sensitive diabetes peer support for older Mexican-Americans. *Occupational Therapy International, 19*(2), 67–75. doi:10.1002.
- Hamilton, H., Knudsen, G., Vaina, C. L., Smith, M., & Prosad, S. (2017). Children and young people with diabetes: recognition and management. *British Journal of Nursing, 26*(6), 340–347. doi:10.12968/bjon.2017.26.6.340
- Hansen, J. A., Schwartz, D. D., Weissbrod, C., & Taylor, W. P. (2012). Paternal involvement in pediatrics type 1 diabetes: Fathers' and mothers' psychological functioning and disease management. *Families, Systems & Health, 30*(1), 47–59. doi:10.1037/a0027519
- Harmer, A. R., Chisholm, D. J., McKenna, M. J., Hunter, S. K., Ruell, P. A., Naylor, J. M., ... Flack, J. R. (2008). Sprint training increases muscle oxidative metabolism during high-intensity exercise in patients with type 1 diabetes. *Diabetes Care, 31*(11), 2097–2102. <http://doi.org/10.2337/dc08-0329>
- Heinonen, M. T., Moulder, R., & Lahesmaa, R. (2015). New insights and biomarkers for type 1 diabetes: Review for Scandinavian Journal of Immunology. *Scandinavian Journal of Immunology, 82*(3), 244–253. doi:10.1111/sji.12338
- Helgeson, V. S., Reynolds, K. A., Siminerio, L., Escobar, O., & Becker, D. (2008). Parent and adolescent distribution of responsibility for diabetes self-care: Links to health outcomes. *Journal of Pediatrics Psychology, 33*(5), 497–508. doi:10.1093/jpepsy/jsm081
- Hendricks, M., Monaghan, M., Soutor, S., Chen, R., & Holmes, C. S. (2013). A profile of self-care behaviours in emerging adults with type 1 diabetes. *The Diabetes Educator, 39*, 195–203. <http://dx.doi.org/10.1177/0145721713475840>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Heptulla, R. A., Rodriguez, L. M., Mason, K. J., & Haymond, M. W. (2008). Gastric emptying and postprandial glucose excursions in adolescents with type 1 diabetes. *Pediatric Diabetes, 9*(6), 561–566. doi:10.1111/j.1399-5448.2008.00430.
- Hirsch, I. B. (2005). Glycemic variability: it's not just about A1C anymore! *Diabetes Technology and Therapeutics, 7*(5), 780–783. doi:10.1089/dia.2005.7.780
- Hirsch, I.B., & Edelman, S.V. (2005). *Practical management of type 1 diabetes* (1st ed.). New York, NY: Professional Communications.
- Hughes, J., Wood, E., & Smith, G. (2009). Exploring kidney patients' experiences of receiving individual peer support. *Health Expectations, 12*(4), 396–406. doi:10.1111/j.1369-7625.2009.00568.
- Hynes, L., Byrne, M., Dinneen, S. F., McGuire, B. E., O'Donnell, M., & Mc Sharry, J. (2016). Barriers and facilitators associated with attendance at hospital diabetes clinics among young adults (15–30 years) with type 1 diabetes mellitus: a systematic review. *Pediatric Diabetes, 17*(7), 509–518. doi:10.1111/pedi.12198.
- Ingadottir, B., & Halldorsdottir, S. (2008). To discipline a "dog": The essential structure of mastering diabetes. *Qualitative Health Research, 18*(5), 606–619. doi:10.1177/1049732308316346
- Insel, R. A., Dunne, J. L., Atkinson, M. A., Chiang, J. L., Dabelea, D., Gottlieb, P. A., Greenbaum, C. J., ... Ziegler, A. G. (2015). Staging presymptomatic type 1 Diabetes: A scientific statement of JDRF, the Endocrine Society, and the American Diabetes Association. *Diabetes Care, 38*(10), 1964–1974. doi:10.2337/dc15-1419.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

International Diabetes Federation. (2017). *IDF Diabetes Atlas* (8th ed.) [De Visu Digital Document Design version]. Available from <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas.html>

International Diabetes Federation. (2015). *IDF Diabetes Atlas* (7th ed.) [De Visu Digital Document Design version]. Available from <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas.html>

Islam, S. T., Abraham, A., Donaghue, K. C., Chan, A. K., Lloyd, M., Srinivasan, S., & Craig, M. E. (2014). Plateau of adiposity in Australian children diagnosed with type 1 diabetes: A 20-year study. *Diabetic Medicine*, *31*(6), 686–690. doi:10.1111/dme.12402.

James, S., Perry, L., Gallagher, R., Lowe, J., Dunbabin, J., McElduff, P., ... Steinbeck, K. (2014). Service usage and vascular complications in young adults with type 1 diabetes. *BMC Endocrine Disorders*, *14*, 39. <http://doi.org/10.1186/1472-6823-14-39>

Joensen, L. E., Filges, T., & Willaing, I. (2016). Patient perspectives on peer support for adults with type 1 diabetes: A need for diabetes-specific social capital. *Patient Preference and Adherence*, *10*, 1443–1451. <http://doi.org/10.2147/PPA.S111696>

Jones, P. M., & Persaud, S. J. (2010). Islet function and insulin secretion. In R. I. G. Holt, C. S. Cockram, A. Flyvbjerg, & B. J. Goldstein (Eds.), *Textbook of diabetes* (4th ed.) (pp. 87–103). West Sussex, UK: Wiley-Blackwell.

Josifova, T., & Henrich, P. B. (2013). Diabetic retinopathy: The need for predictive, preventive and personalised approach to management. In M. S. Mozaffari (Ed.), *New strategies to advance pre/diabetes care: Integrative approach by PPPM* (pp. 211–232). Berlin, DE: Springer Science & Business Media.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Kakleas, K., Kandyla, B., Karayianni, C., & Karavanaki, K. (2009). Psychosocial problems in adolescents with type 1 diabetes mellitus. *Diabetes & Metabolism*, 35(5), 339–350.
doi:10.1016/j.diabet.2009.05.002
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semistructured interview guide. *Journal of Advanced Nursing*, 72(12), 2954–2965.
doi:10.1111/jan.13031
- Kapellen, T. M., Gausche, R., Dost, A., Wiegand, S., Flechtner-Mors, M., Keller., ...Holl, R. W. (2014). Children and adolescents with type 1 diabetes in Germany are more overweight than healthy controls: Results comparing DPV database and CrescNet database. *Journal of Pediatric Endocrinology Metabolism*, 27(3-4), 209–214.
<https://doi.org/10.1515/jpem-2013-0381>.
- Karlsson, A. (2008). Teenagers with type 1 diabetes—a phenomenological study of the transition towards autonomy in self-management. *International Journal of Nursing Studies*, 45(4), 562–570. doi:10.1016.
- Kaur, K. K., Gautam, A., & Singh, M. (2016). An update on etiopathogenesis and management of type 1 diabetes Mellitus. *Journal of Endocrinology*, 1(2), 1–23.
Retrieved from <https://medwinpublishers.com/OAJE/OAJE16000107.pdf>
- Kay, J. S., Juth, V., Silver, R. C., & Sender, L. S. (2017). Support and conflict in relationships and psychological health in adolescents and young adults with cancer. *Journal of Health Psychology*, 1-16. doi:10.1177/1359105316676629.
- Kershner, A. K., Daniels, S. R., Imperatore, G., Palla, S. L., Petitti, D. B., Pettitt, D. J., ... Rodriguez, B. L. (2006). Lipid abnormalities are prevalent in youth with type 1 and

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- type 2 diabetes: the SEARCH for diabetes in youth study. *The Journal of Pediatrics*, 149, 314–319. doi:10.1016/j.jpeds.2006.04.065
- Khyndeit E., Rao, P. A., Narayanan, P., & Mayya, S. (2016). Social support influencing diabetes self-management behaviours: A cross-sectional study in Udupi Taluk. *Indian Journal of Health Science and Biomed Research*, 9(2), 153–157. doi:10.4103/2349-5006.191255
- Kivela, R., Silvennoinen, M., Touvra, A. M., Lehti, T. M., Kainulainen, H., & Vihko, V. (2006). Effects of experimental type 1 diabetes and exercise training on angiogenic gene expression. and capillarization in skeletal muscle. *The FASEB Journal*, 20(9), 1570–1572. doi:10.1096/fj.05-4780fje
- Konduru, S. S. T., Karthik, A. R., Muddada, S., Shaik, S., & Vakkapatla, L. S. (2017). Assessment of Diabetes Related Knowledge, Attitude and Practice among Diabetics and Non-diabetics using Self Prepared Questionnaire for Awareness of Health Promotion. *Indian Journal of Pharmacy Practice*, 10(1), 32–38. doi:10.5530/ijopp.10.1.8
- Kota, S. K., Meher, L. K., Jammula, S., Kota, S. K., & Modi, K. D. (2012). Clinical profile of coexisting conditions in type 1 diabetes mellitus patients. *Diabetes & Metabolic Syndrome: Clinical Research and Reviews*, 6(2), 70–76. doi:10.1016/j.dsx.2012.08.006
- Lakhtakia, R. (2013). The History of Diabetes Mellitus. *Sultan Qaboos University Medical Journal*, 13(3), 368–370. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3749019/>
- Lancaster, B., Pfeffer, B., McElligott, M., Ferguson, A., Miller, M., Wallace, D., & Lane, J. (2010). Assessing treatment barriers in young adults with Type 1 diabetes. *Diabetes*

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Research and Clinical Practice, 90(3), 243–249.

<https://doi.org/10.1016/j.diabres.2010.07.003>

- Landel-Graham, J., Yount, S. E., & Rudnicki, S. R. (2003). Diabetes Mellitus. In I. B. Weiner, & D. K. Freedheim (Eds.), *Handbook of psychology: Health psychology* (Vol. 9) (pp. 191–217). New Jersey, NJ: John Wiley & Sons, Inc.
- Lee, P., Greenfield, J. R., & Campbell, L. V. (2009). Managing young people with type 1 diabetes in a ‘rave’ new world: Metabolic complications of substance abuse in type 1 diabetes. *Diabetes Medicine*, 26(4), 328–333. doi:10.1111/j.1464-5491.2009.02678.x
- Levitt, H. M., Motulsky, S. L., Wertz, F. J., Morrow, S. L., & Ponterotto, J. G. (2017). Recommendations for designing and reviewing qualitative research in psychology: Promoting methodological integrity. *Qualitative Psychology*, 4(1), 2–22. doi:2326-3601/17.
- Lin, E. H., Von Korff, M., Alonso, J., Angermeyer, M. C., Anthony, J., Bromet, E., ... Williams, D. (2008). Mental disorders among persons with diabetes – results from the World Mental Health Surveys. *Journal of Psychosomatic Research*, 65(6), 571–580. doi:10.1016/j.jpsychores.2008.06.007
- Lipscomb, M. (2016). *Social theory and nursing*. New York, NY: Routledge.
- Llorente, M. D., & Urrutia, V. (2006). Diabetes, psychiatric disorders, and the metabolic effects of antipsychotic medications. *Clinical Diabetes*, 24(1), 18–24. doi:10.2337/diaclin.24.1.18
- Losantos, M., Montoya, T., Exeni, S., Santa Cruz, M., & Loots, G. (2016). Applying social constructionist epistemology to research in psychology. *International Journal of Collaborative Practice*, 6(1), 29–42. Retrieved from https://ijcp.files.wordpress.com/2016/04/losantos_montoya_exeni_santacruz_loots_english_6.pdf

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Luszczynska, A., Mohamed, N. E., & Schwarzer, R. (2005). Self-efficacy and social support predict benefit finding 12 months after cancer surgery: The mediating role of coping strategies. *Psychology, Health & Medicine, 10*(4), 365–375.
doi:10.1080/13548500500093738
- Luthra, A., & Misra, A. (2008). Erectile dysfunction in diabetic males: Plausible mechanisms and management strategies. *Diabetes & Metabolic Syndrome: Clinical Research and Reviews, 2*(1), 81–86. doi:10.1016/j.dsx.2007.11.005
- MacDonald, K., Lowe, J. M., Barker, D., Mensch, M., & Attia, J. (2008). Effect of popular takeaway foods on blood glucose levels in type 1 diabetes mellitus patients on intensive insulin therapy. *International Journal of Clinical Practice, 63*(2), 189–194.
doi:10.1111/j.1742-1241.2008.01970.x.
- Malik, J. A., & Koot, H. M. (2011). Assessing diabetes support in adolescents: Factor structure of the Modified Diabetes Social Support Questionnaire (M-DSSQFamily). *Pediatrics Diabetes, 12*, 258–265. doi:10.1111/j.1399-5448.2010.00691.x
- Margeirsdottir, H. D., Larsen, J. R., Brunborg, C., Overby, N. C., & Dahl-Jorgensen, K. (2008). High prevalence of cardiovascular risk factors in children and adolescents with type 1 diabetes: a population-based study. *Diabetologia, 51*(4), 554–561.
doi:10.1007/s00125-007-0921-8
- Marsh, K., Barclay, A., Colagiuri, S. & Brand-Miller, J. (2011). Glycemic index and glycemic load of carbohydrates in the diabetes diet. *Current Diabetes Reports, 11*(2), 120–127. doi:10.1007/s11892-010-0173-8.
- Mascarenhas, L. P. G., Decimo, J. P., Lima, V. A., Kraemer, G. C., Lacerda, K. R. C., & Nesi-França, S. (2016). Physical exercise in type 1 diabetes: Recommendations and care. *Motriz Rio Claro, 22*(4), 223–230. <http://dx.doi.org/10.1590/S1980>.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Masoudi Alavi, N., Ghofranipour, F., Ahmadi, F., Babae, G., Rajab, A., & Emami, A.

(2012). Explanatory model of diabetes management; an experience from Iran. *Nurse Midwifery Studies*, 1(2), 100–106. doi:10.5812/nms.8675

Matthews, D. M. (2007). What is diabetes? In J. R. S McDowell, D. M. Matthews, & F. J.

Brown (Eds.), *Diabetes: A handbook for the primary healthcare team* (pp. 1–20).

Philadelphia, PA: Elsevier Limited.

Mazze, R. S., Strock, E. S., Bergenstal, R. M., Criego, A., Cuddihy, R., Langer, O., ...

Powers, M. A. (2012). *Staged diabetes management* (3rd ed.). West Sussex, UK: John Wiley & Sons.

McAuley, S. A., Horsburgh, J. C., Ward, G. M., Gerche, A. L., Gooley, J. L., Jenkins, A. J.,

...O'Neal, D. N. (2016). Insulin pump basal adjustment for exercise in type 1

diabetes: A randomised crossover study. *Diabetologia*, 59(8), 1636–1644.

doi:10.1007/s00125-016-3981-9.

McCarthy, G. M., Rodríguez Ramírez, E. R., & Robinson, B. J. (2017). Design experiments.

Identifying areas for intervention and designing medical technology for adolescents and young adults with type 1 diabetes. *The Design Journal*, 20(1), 2044–2056.

doi:10.1080/14606925.2017.1352723

McIntosh, M., & Morse, J. M. (2015). Situating and constructing diversity in semistructured

interviews. *Global Qualitative Nursing Research*, 1–12.

doi:10.1177/2333393615597674

McKnight, J. A., Wild, S. H., Lamb, M. J., Cooper, M. N., Jones, T. W., Davis, E. A.,

...Miller, K. M. (2015). Glycaemic control of Type 1 diabetes in clinical practice

early in the 21st century: an international comparison. *Diabetic Medicine*, 32(8),

1036–1050. doi:10.1111/dme.12676

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Mehta, S. N., Volkening, L. K., Anderson, B. J., Nansel, T., Weissberg-Benchell, J., Wysocki, T., & Laffel, L. M. (2008). Dietary behaviours predict glycemic control in youth with type 1 diabetes. *Diabetes Care*, *31*(7), 1318–1320. doi:10.2337/dc07-2435
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oakes, CA: SAGE Publications.
- Misra, A., Wasir, J. S., & Vikram, N. K. (2012). An approach to management of diabetes mellitus. In B. B. Tripathy (Ed.), *RSSDI Textbook of diabetes mellitus* (2nd ed.) (pp. 447–454). New Delhi, ND: Jaypee Brothers Medical Publishers (P) Ltd.
- Monaghan, M., Helgeson, V., & Wiebe, D. (2015). Type 1 diabetes in young adulthood. *Current Diabetes Reviews*, *11*(4), 239–250. doi:10.2174/1573399811666150421114957
- Moore, S. M., Hackworth, N. J., Hamilton, V. E., Northam, E. P., & Cameron, F. J. (2013). Adolescents with Type 1 Diabetes: parental perceptions of child health and family functioning and their relationship to adolescent metabolic control. *Health and Quality of Life Outcomes*, *11*(50). <http://doi.org/10.1186/1477-7525-11-50>
- Nakhla, M., Daneman, D., To, T., Paradis, G., & Guttmann, A. (2009). Transition to adult care for youths with diabetes mellitus: Findings from a universal health care system. *Journal of Pediatrics*, *124*(6), 1134–1141. doi:10.1542/peds.2009-0041
- Nardacci, E. A., Bode, B. W., & Hirsch, I. B. (2010). Individualizing care for the many: the evolving role of professional continuous glucose monitoring systems in clinical practice. *Diabetes Education*, *36*(1), 4S-19S. <https://doi.org/10.1177/0145721710362798>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

National Diabetes Education Program (NDEP). (2014). *Overview of Diabetes in Children and Adolescents*. Retrieved from www.YourDiabetesInfo.org/schools.

National Institute for Health and Care Excellence (NICE). (2016). *Diabetes in children and young people* (Quality standard). Retrieved from <https://www.nice.org.uk/>

National Institute for Health and Care Excellence (NICE). (2015). *Diabetes (type 1 and type 2) in children and young people: Diagnosis and management* (Guideline 18).

Retrieved from <https://tinyurl.com/zhwhj35>.

Noble, J. A., Valdes, A. M., Cook, M., Klitz, W., Thomson, G., & Erlich, H. A. (1996). The role of HLA class II genes in insulin-dependent diabetes mellitus: molecular analysis of 180 Caucasian, multiplex families. *American Journal of Human Genetics*, 59(5), 1134–1148. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1914851/>

O'Hara, M. C., Hynes, L., O'Donnell, M., Nery, N., Byrne, M., Heller, S. R., ... the Irish Type 1 Diabetes Young Adult Study Group. (2017). A systematic review of interventions to improve outcomes for young adults with Type 1 diabetes. *Diabetic Medicine*, 34(6), 753–769. doi:10.1111/dme.13276.

Oram, R. A., Patel, K., Hill, A., Shields, B., McDonald, T. J., Jones, A., ... Weedon, M. N. (2016). A type 1 diabetes genetic risk score can aid discrimination between type 1 and type 2 diabetes in young adults. *Diabetes Care*, 39(3), 337–344. doi:10.2337/dc15-1111.

Osan, K., Punch, J. D., Watson, M., Chan, Y. X., Barrie, P., Fegan, P. G., & Yeap, B. B. (2016). Associations of demographic and behavioural factors with glycaemic control in young adults with type 1 diabetes mellitus. *Internal Medicine Journal*, 46(3), 332–338. doi:10.1111/imj.12991.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Overby, N. C., Flaaten, V., Veierod, M. B., Bergstad, I., Margeirsdottir, H. D., Dahl-Jorgensen, K., & Andersen, L. F. (2007). Children and adolescents with type 1 diabetes eat a more atherosclerosis-prone diet than healthy control subjects. *Diabetologia*, *50*(2), 307–316. <https://doi.org/10.1007/s00125-006-0540-9>
- Packer, M. J. (2018). *The science of qualitative research* (2nd ed.). United Kingdom, UK: Cambridge University Press.
- Palinkas, L. A., Horwits, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2013). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, *42*(5), 533–544. doi:10.1007/s10488-013-0528-y.
- Palladino, D. K., & Helgeson, V. S. (2012). Friends or foes? A review of peer influence on self-care and glycemic control in adolescents with type 1 diabetes. *Journal of Pediatric Psychology*, *37*(5), 591–603. <http://doi.org/10.1093/jpepsy/jss009>
- Parillo, M., Annuzzi, G., Rivellese, A. A., Bozzetto, L., Alessandrini, R., Riccardi, G., & Capaldo, B. (2011). Effects of meals with different glycaemic index on postprandial blood glucose response in patients with Type 1 diabetes treated with continuous subcutaneous insulin infusion. *Diabetic Medicine*, *28*(2), 227–229. doi:10.1111/j.1464-5491.2010.03176.
- Park, M. J., Scott, J. T., Adams, S. H., Brindis, C. D., & Irwin, C. E. (2014). Adolescent and young adult health in the United States in the past decade: Little improvement and young adults remain worse off than adolescents. *Journal of Adolescent Health*, *55*(1), 3–16. doi:10.1016/j.jadohealth.2014.04.003.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Patton, S. R. (2011). Adherence to Diet in Youth with Type 1 Diabetes. *Journal of the American Dietetic Association*, *111*(4), 550–555.
<http://doi.org/10.1016/j.jada.2011.01.016>
- Patton, S. R., & Clements, M. A. (2012). Continuous glucose monitoring versus self-monitoring of blood glucose in children with type 1 diabetes – Are there pros and cons for both? *US Endocrinology*, *8*(1), 27–29.
- Patton, S. R., Dolan, L. M., & Powers, S. W. (2007). Dietary adherence and associated glycemic control in families of young children with type 1 diabetes. *Journal of the American Dietetic Association*, *107*(1), 46–52. doi:10.1016/j.jada.2006.10.012
- Paun, A., & Danska, J. S. (2016). Modulation of type 1 and type 2 diabetes risk by the intestinal microbiome. *Journal of Pediatric Diabetes*, *12*(7), 469–477.
doi:10.1111/pedi.12424
- Percy, W. H., Kostere, K., & Kostere, S. (2015). Generic qualitative research in psychology. *The Qualitative Report*, *20*(2), 76–85. Retrieved from
<http://nsuworks.nova.edu/tqr/vol20/iss2/7>
- Peters, A., Laffel, L., & the American Diabetes Association Transitions Working Group. (2011). Diabetes Care for emerging adults: Recommendations for transition from pediatric to adult diabetes care systems. *Diabetes Care*, *34*(11), 2477–2485.
<http://dx.doi.org/10.2337/dc11-1723>
- Peters, L. W., Nawijn, L., & Van Kesteren, N. (2014). How adolescents with diabetes experience social support from friends: two qualitative studies. *Scientifica*, *89*.
<http://dx.doi.org/10.1155/2014/415849/>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Phillips, A. (2016). Supporting patients with type 1 diabetes. *British Journal of Nursing*, 25(6), 330–334. <https://dx.doi.org/10.12968/bjon.2016.25.6.330>
- Pinhas-Hamiel, O., Levek-Motola, N., Kaidar, K., Boyko, V., Tisch, E., Mazor-Aronovitch K., ... Frumkin, B. R. (2015). Prevalence of overweight, obesity and metabolic syndrome components in children, adolescents and young adults with type 1 diabetes mellitus. *Diabetes Metabolism Research and Reviews*, 31(1), 76–84. doi:10.1002/dmrr.2565
- Porcellati, F., Bolli, G. B., & Fanelli, C. G. (2013). Pharmacokinetics and pharmacodynamics of basal insulins. *Diabetes Technology & Therapeutics*, 13(1), 15–24. doi:10.1089/dia.2011.0038
- Pyatak, E. (2011). Participation in occupation and diabetes self-management in emerging adulthood. *The American Journal of Occupational Therapy*, 65(4), 462–469.
- Pyatak, E. A., Sequeira, P. A., Vigen, C. L. P., Weigensberg, M. J., Wood, J. R., Montoya, ... & Peters, A. L. (2017). Clinical and psychosocial outcomes of a structured transition program among young adults with type 1 diabetes. *Journal of Adolescent Health*, 60(2), 212–218. doi:10.1016/j.jadohealth.2016.09.004
- Pyatak, E. A., Sequeira, P. A., Whittemore, R., Vigen, C. P., Peters, A. L., & Weigensberg, M. J. (2014). Challenges contributing to disrupted transition from paediatric to adult diabetes care in young adults with type 1 diabetes. *Diabetes Medicine*, 31(12), 1615–1624.
- Qin, J., Fu, S., Speake, C., Greenbaum, C. J., & Odegard, J. M. (2016). NETosis-associated serum biomarkers are reduced in type 1 diabetes in association with neutrophil count. *Clinical & Experimental Immunology*, 184(3), 318–322. doi:10.1111/cei.12783
- Ramalho, A. C., & Soares, S. (2008). The role of exercise in the treatment of type 1 diabetes. *Brazilian Archives of Endocrinology and Metabolism*, 52(2), 260–267.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Ramkisson, S., Pillay, B., & Sibanda, W. (2017). Social support and coping in adults with type 2 diabetes. *African Journal of Primary Health Care & Family Medicine*, 9(1), a1405. doi:10.4102/phcfm.v9i1.1405.
- Rasmussen, B., Ward, G., Jenkins, A., King, S. J., & Dunning, T. (2011). Young adults' management of type 1 diabetes during life transitions. *Journal of Clinical Nursing*, 20(13–14), 1981–1992. doi:10.1111/j.1365-2702.2010.03657.x.
- Rewers, M., & Ludvigsson, J. (2016). Environmental risk factors for type 1 diabetes. *Lancet*, 387(10035), 2340–2348. doi:10.1016/S0140-6736(16)30507-4
- Reynolds, K., Liese, A. D., Anderson, A. M., Dabelea, D., Standiford, D., Daniels, S. R., ... Lawrence, J. M. (2011). Prevalence of tobacco use and association between cardiometabolic risk factors and cigarette smoking in youth with type 1 or type 2 diabetes mellitus. *The Journal of Pediatrics*, 158(4), 594–601.
<http://doi.org/10.1016/j.jpeds.2010.10.011>
- Ritchie, J., Lewis, J., Elam, G., Tennant, R., & Rahim, N. (2013). Designing and selecting samples. In J. Ritchie, J. Lewis, C. McNaughton Nicholls, & R. Ormston (Eds.), *Qualitative research practice: A guide for social science students researchers* (2nd ed.) (pp. 234–246). Los Angeles, LA: SAGE Publications Incorporated
- Roberts, F. R., Hupple, C., Norowski, E., Walsh, N. C., Przewozniak, N., & Aryee K. E., ... Yang, C. (2017). Possible type 1 diabetes risk prediction: Using ultrasound imaging to assess pancreas inflammation in the inducible autoimmune diabetes BBDR model. *Plos One*, 12(6): 0178641. <https://doi.org/10.1371/journal.pone.0178641>
- Robertson, K., Riddell, M. C., Guinhouya, B. C., Adolfsson, P., & Hanas, R. (2014). Exercise in children and adolescents with diabetes. *Pediatric Diabetes*, 15(20), 203–223. doi:10.1111/pedi.12176

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Robins, R. W., Fraley, D. R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality*, 69(4), 617–640. doi:10.1111/1467-6494.694157
- Rogers, V. A., Vassilev, I., Sanders, C., Kirk, S., Chew-Graham, C., Kennedy, A., ... Richardson, G. (2011). Social networks, work and network-based resources for the management of long-term conditions: a framework and study protocol for developing self-care support. *Implementation Science*, 6, 56. doi:10.1186/1748-5908-6-56.
- Rollo, A., Salardi, S., Ciavarella, A., Forlani, G., Scipione, M., Maltoni, G., ... Zucchin, S. (2014). Transition from pediatric to adult care. Eight years after the transition from pediatric to adult diabetes care: metabolic control, complications and associated diseases. *Journal of Endocrinological Investigation*, 37(7), 653–659.
- Rosenberg, T., & Shields, G. C. (2009). The role of parent-adolescent attachment in glycemic control of adolescents with type 1 diabetes: A pilot study. *Family Systems Health*, 27(3), 237–248. <http://dx.doi.org/10.1037/a0017117>
- Rostami, S., Parsa-Yekta, Z., Ghezjeljeh, T. N., & Vanaki, Z. (2014). Supporting adolescents with type 1 diabetes mellitus: A qualitative study. *Nursing and Health Sciences*, 16, 84–90. doi:10.1111/nhs.12070
- Rydén, A., Sörstadius, E., Bergenheim, K., Romanovschi, A., Thorén, F., Witt, E. A., ... Sternhufvud, C. (2016). The humanistic burden of type 1 diabetes mellitus in Europe: Examining health outcomes and the role of complications. *PloS ONE*, 11(11), e0164977. <https://doi.org/10.1371/journal.pone.0164977>
- Saeed, T., Mansor, N. N. A., Naz, F., Fatima, K., & Ishaq, S. H. (2012). Perceived social support: Impact on quality of life in diabetics. *International Journal of Academic Research*, 4(3), 89-95.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Seshiah, V. (2009). Preface. In V. Seshiah (Ed.), *Microvascular complications of diabetes*, (p. v). Philadelphia, PA: Elsevier Health Sciences.
- Shetty, V. B., Fournier, P. A., Davey, R. J., Retterath, A. J., Paramalingam, N., Roby, H. C., ... Jones, T. W. (2016). Effect of exercise intensity on glucose requirements to maintain euglycemia during exercise in type 1 diabetes. *The Journal of Clinical Endocrinology & Metabolism*, *101*(3), 972–980. <https://doi.org/10.1210/jc.2015-4026>
- Silverstein, J., Klingensmith, G., Copeland, K., Plotnick, L., Kaufman, F., Laffel, L., ... Clark, N. (2005). Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care*, *28*(1), 186-212. <https://doi.org/10.2337/diacare.28.1.186>
- Sivanandy, P., Sagar, R., & Molugulu, N. (2017). Assessment of knowledge of diabetes mellitus in the urban areas of Klang District, Malaysia. *Pharmacy*, *5* (1),11. [doi:10.3390/pharmacy5010011](https://doi.org/10.3390/pharmacy5010011)
- Simmons, K. M., & Michels, A. W. (2015). Type 1 diabetes: A predictable disease. *World Journal of Diabetes*, *6*(3), 380–390.
- Song, Y., Nam, S., Park, S., Shin, I. S., & Ku, B. J. (2017). The impact of social support on self-care of patients with type diabetes: What is the effect of diabetes type? Systematic review and meta-analysis. *The Diabetes Educator*, *43*(4), 396–412. [doi:10.1177/0145721717712457](https://doi.org/10.1177/0145721717712457)
- Sosenko, J. M. (2012). Diabetes. In D. M. Becker, & L. B. Gardner (Eds.), *Prevention in clinical practice* (pp. 165–177). New York, NY: Springer.
- Sparud-Lundin, C., & Hallstrom, I. (2015). Parents' experiences of two different approaches to diabetes care in children newly diagnosed with type 1 diabetes. *Qualitative Health Research*, *26*(10), 1331–1340. <https://doi.org/10.1177/1049732315575317>

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Speight, J. (2013). Managing diabetes and preventing complications: What makes the difference? *Medical Journal of Australia*, *198*(1), 16–17. doi:10.5694/mja12.11489
- Spencer, J., Cooper, H., & Milton, B. (2013). Type 1 diabetes in young people: The impact of social environments on self-management issues from young people's and parents' perspectives. *Diabetes Care for Children and Young People*, *2*(2), 48-57.
- Spiegel, G., Bortov, A., Bishop, F. K., Owens, D., Klingensmith, G. J., Mayer-Davis, E. J., & Maahs, D. M. (2012). Randomized nutrition education intervention to improve carbohydrate counting in adolescents with type 1 diabetes study: Is more intensive education needed? *Journal of the Academy of Nutrition and Dietetics*, *112*(11), 1736–1746. doi:10.1016/j.jand.2012.06.001
- Stewart, D. L. (2010). Researcher as instrument: Understanding “shifting” findings in constructivist research. *Journal of Student Affairs Research and Practice*, *47*(3), 291–306.
- Strom, J. L., & Egede, L. E. (2012). The impact of social support on outcomes in adult patients with type 2 diabetes: A systematic review. *Current Diabetes Reports*, *12*(6), 769–781. doi:10.1007/s11892-012-0317-0
- Symons, J., Crawford, R., Isaac, D., & Thompson, S. (2015). The whole day revolves around it: Families' experiences of living with a child with type 1 diabetes – A descriptive study. *Neonatal, Paediatric and Child Health Nursing*, *18*(1), 7–11. Retrieved from <http://www.cambridgepublishing.com.au/publications/neonatal,-paediatric-childhealth-nursing/about-the-journal.aspx>
- Tipton, M. C. (2008). Susruta of India, an unrecognized contributor to the history of exercise physiology. *Journal of Applied Physiology*, *104*(6), 1553–1556. doi:10.1152/jappphysiol.00925.2007

SOCIAL SUPPORT AND DIABETES MANAGEMENT

- Tongco, D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research and Applications*, 5, 147–158. doi:<http://hdl.handle.net/10125/227>
- Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837–851. doi:10.1177/1077800410383121.
- Tuckett, A. G. (2005). Applying thematic analysis theory to practice: A researcher’s experience. *Contemporary Nurse*, 19(1–2), 75–87. doi:10.5172/conu.19.1-2.75
- Turner, H. E., & Wass, J. A. H. (2009). Diabetes. In H. E. Turner, & J. A. H. Wass (Eds.), *Oxford handbook of endocrinology and diabetes* (2nd ed.) (pp. 724–822). Oxford, NY: Oxford University Press.
- Vaccaro, J. A., Exebio, J. C., Zarini, G. G., & Huffman, F. G. (2014). The role of family/friend social support in diabetes self-management for minorities with type 2 diabetes. *Journal of Nutrition and Health*, 2(1), 1–9.
- Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 6(5), 100–110. doi:10.5430/jnep.v6n5p100.
- Wadwa, R. P., Fiallo-Scharer, R., Vanderwel, B., Messer, L. H., Cobry, E., & Chase, H. P. (2009). Continuous glucose monitoring in youth with type 1 diabetes. *Diabetes Technologies and Therapies*, 11(1), S83-S91.
- Weber, M. (2017). *Methodology of social sciences*. New York, NY: Routledge.
- Weick, K. E. (2007). The generative properties of richness. *Academy of Management Journal*, 50(1), 14–19.
- Weir, G. C., & Bonner-Weir, S. (2017). Glucose driven changes in beta cell identity are important for function and possibly autoimmune vulnerability during the progression

SOCIAL SUPPORT AND DIABETES MANAGEMENT

of type 1 diabetes. *Frontiers in Genetics*, 8, 2.

<http://doi.org/10.3389/fgene.2017.00002>

Weiss, H. B., Kreider, H., Lopez, M. E., & Chatman, C. M. (2005). *Preparing educators to involve families: From theory to practice*. Thousand Oaks, CA: Sage Publications.

Wennick, A., Lundqvist, & A., Hallstrom, I. (2009). Everyday experiences of families three years after diagnosis of type 1 diabetes in children: a research paper. *Journal of Pediatric Nursing*, 24(3), 222–230. <https://doi.org/10.1016/j.pedn.2008.02.028>

Whiting, L. S. (2008). Semi-structured interviews: Guidance for novice researchers. *Nursing Standard*. 22(23), 35–40.

Wiebe, D. J., Helgeson, V., & Berg, C. A. (2016). The social context of managing diabetes across the life span. *American Psychological Association*, 71(7), 526–538. doi:0003-066X/16/\$12.00 <http://dx.doi.org/10.1037/a0040355>

Wiley, J., Westbrook, M., Long, J., Greenfield, J. R., Day, R. O., & Braithwaite, J. (2014). Diabetes education: The experiences of young adults with type 1 diabetes. *Diabetes Therapy*, 5(1), 299–321. <http://doi.org/10.1007/s13300-014-0056-0>

Wilson, V. (2016). Research Methods: Interviews. *Evidence Based Library and Information Practice*, 11(1), 47–49. <http://dx.doi.org/10.18438/B8404H>

Witt, S. (2016). Glu: An online type 1 diabetes information community. *SLIS Student Research Journal*, 6(1). Retrieved from <http://scholarworks.sjsu.edu/slissrj/vol6/iss1/3>

Wolpert, H. A., & Anderson, B. J. (2001). Young adults with diabetes: Need for a new treatment paradigm. *Diabetes Care*, 24, 1513–1514.
<http://dx.doi.org/10.2337/diacare.24.9.1513>

World Health Organization (2016). *Global report on diabetes*. France: WHO Press.

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Wysocki, T., & Greco, P. (2006). Social support and diabetes management in childhood and adolescence: influence of parents and friends. *Current Diabetes Reports*, 6(2), 117–122.

Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education*, 48(2), 311–325.

Yin, R.K. (2015). *Qualitative research from start to finish* (2nd ed.). New York, NY: The Guilford Press.

Young-Hyman, D., De Groot, M., Hill-Briggs, F., Gonzalez, J. S., Hood, K., & Peyrot, M. (2016). Psychosocial care for people with diabetes: A position statement of the American Diabetes Association. *Diabetes Care*, 39(12), 2126–2140.
doi:10.2337/dc16-2053

Ziegler, R., Heidtmann, B., Hilgard, D., Hofer, S., Rosenbauer, J., & Holl, R. (2011). Frequency of SMBG correlates with HbA1c and acute complications in children and adolescents with type 1 diabetes. *Pediatric Diabetes*, 12(1), 11–17.
doi:10.1111/j.1399-5448.2010.00650.x

ADDENDUM A

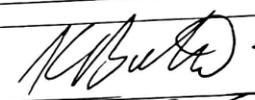
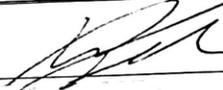
Proposal approval letter issued by scientific committee

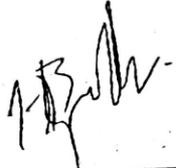


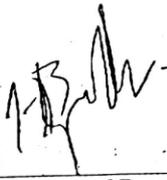
**Recommendation of the Research Proposal Committee to the Research Ethics Committee
Research Using Human Participants**

Scientific Committee	Name	Elné Visagie	Discipline	Psychology
	Research Entity	Compres	Contact Person	Elien Seokolo
	Faculty	Health Sciences	E-mail	23352000@nwu.ac.za
	Title of the study:	Young adults' experience of social support in effective diabetes management		
Researchers involved in the study:	Elné Visagie – primary researcher Prof Esmé van Rensburg – Research Supervisor Dr E Deacon – Research Co-supervisor			
Executive summary of the research:	Diabetes has risen to be one of the most challenging health problems of the 21st century and has proven to have a distinguished negative effect on overall health and health-associated qualities of life (Amod et al., 2012). Diabetes, in all its forms, imposes unacceptably high human, social, economic and health costs on all countries (IDF, 2013). In South Africa limited data regarding diabetes prevalence exist, however the available information propose that two thirds of individuals' glycaeted haemoglobin (HbA1c) levels are above 7%; the recommended target (Amod et al., 2012). Saeed et al., (2012) affirmed that diabetes overload the individual's personal resources, resulting in poorer quality of life. Accordingly, young adults find it difficult managing their diabetes during these transition periods and moderately higher levels of illness and mortality are experienced (Balfe et al., 2014; Peters, Laffle and ADA Transistions, 2011). Therefore exploring aids, such as an individual with diabetes' social support network, can prove to be vital.			
Potential risk level for human participants:	No risk	<input type="checkbox"/>	Motivate: The ethically approved comprehensive research study has received ethical clearance from the Humanities and Health Research Ethics Committee (HHREC)of the Faculty of Humanities of the North-West University on 11/08/2015 (NWU-HS-2015-0111) (please refer to addendum A). The estimated ethical risk level of the current study is regarded as high, as the participants of the proposed and ethically approved comprehensive research project fits into a physically and possibly psychologically susceptible category. Their vulnerability stems from their type 1 diabetes diagnosis. Due to the high estimated ethical risk level of the proposed study, the ethically approved comprehensive research study team has made provision if the sensitivity of the topic increases the stress levels of the participants. Hence, the research team of the ethically approved study has set arrangements in place to acquire written consent of each participant. Moreover, throughout the proposed study and ethically approved comprehensive study, ethical principles will be upheld to ensure that all participants' rights are advocated; participation	
	Minimal risk	<input type="checkbox"/>		
	Medium risk	<input type="checkbox"/>		
	High risk	<input checked="" type="checkbox"/>		

SOCIAL SUPPORT AND DIABETES MANAGEMENT

		remains voluntary throughout the process; a participant can withdraw at any time and that all data received is treated justly and with confidentiality.
Potential risk level for children and incapacitated adults:	No risk	<input type="checkbox"/>
	No more than minimal risk of harm	<input type="checkbox"/>
	Greater than minimal risk with the prospect of direct benefit	<input type="checkbox"/>
	Greater than minimal risk with no direct benefit	<input type="checkbox"/>
Recommendation for the ethics committee	Expedited review	<input type="checkbox"/>
	Full review	<input type="checkbox"/>
	Exempted from review	<input type="checkbox"/>
Any additional comments	Motivate: The current study forms part of an ethically approved comprehensive research project (NWU-HS-2015-0111) (please refer to addendum A), and will be conducted within the first phase the ethically approved comprehensive research project (see section 1 of this proposal). The purpose of the comprehensive research project, which has already been ethically approved, is to explore the psycho-social variables in adjusting to diabetes management in adolescents and young adults from a qualitative phenomenological perspective	
Committee members present during the review	Members present	Signatures
	Prof K Botha	
	Dr W de Klerk	
	Mariette van der Merwe	M. van der Merwe
	Issie Jacobs	Issie Jacobs
	Click here to enter name.	
	Click here to enter name.	
Date of review	Click here to enter a date.	


 Signature of Chairperson
 Date: 2016/07/07


 Signature of Research Director
 Date: 2016/07/07

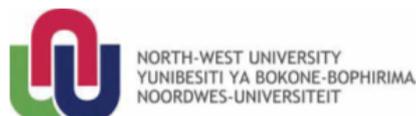
Decision of the Ethics Committee:

Expedited review	<input type="checkbox"/>	Motivate: Click here to enter text.
Full review	<input type="checkbox"/>	
Exempted from review	<input type="checkbox"/>	

SOCIAL SUPPORT AND DIABETES MANAGEMENT

ADDENDUM B

Ethical approval of the overarching larger study



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: (018) 299-4900
Faks: (018) 299-4910
Web: <http://www.nwu.ac.za>

Institutional Research Ethics Regulatory Committee

Tel +27 18 299 4849
Email Ethics@nwu.ac.za

ETHICS APPROVAL CERTIFICATE OF PROJECT

Based on approval by **Humanities and Health Research Ethics Committee (HHREC)**, the North-West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) hereby approves your project as indicated below. This implies that the NWU-IRERC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the project may be initiated, using the ethics number below.

Project title: Psycho-social variables in adjusting to diabetes management in adolescents and young adults																																														
Project Leader: E Deacon																																														
Ethics number:	<table border="1"><tr><td>N</td><td>W</td><td>U</td><td>-</td><td>HS</td><td>-</td><td>2</td><td>0</td><td>1</td><td>5</td><td>-</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td colspan="3">Institution</td><td colspan="5">Project Number</td><td colspan="2">Year</td><td colspan="5">Status</td></tr><tr><td colspan="15">Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation</td></tr></table>	N	W	U	-	HS	-	2	0	1	5	-	0	1	1	1	Institution			Project Number					Year		Status					Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation														
N	W	U	-	HS	-	2	0	1	5	-	0	1	1	1																																
Institution			Project Number					Year		Status																																				
Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation																																														
Approval date: 2015-08-11	Expiry date: 2018-08-10	Category: N/A																																												

Special conditions of the approval (if any): None

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following:

- The project leader (principle investigator) must report in the prescribed format to the NWU-IRERC:
 - annually (or as otherwise requested) on the progress of the project,
 - without any delay in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.
- The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the project, the project leader must apply for approval of these changes at the NWU-IRERC. Would there be deviated from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.
- The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date, a new application must be made to the NWU-IRERC and new approval received before or on the expiry date.
- In the interest of ethical responsibility the NWU-IRERC retains the right to:
 - request access to any information or data at any time during the course or after completion of the project;
 - withdraw or postpone approval if:
 - any unethical principles or practices of the project are revealed or suspected,
 - it becomes apparent that any relevant information was withheld from the NWU-IRERC or that information has been false or misrepresented,
 - the required annual report and reporting of adverse events was not done timely and accurately,
 - new institutional rules, national legislation or international conventions deem it necessary.

The IRERC would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the IRERC for any further enquiries or requests for assistance.

Yours sincerely

Linda du Plessis

Digitally signed by Linda du Plessis
DN: cn=Linda du Plessis, o=NWU,
ou=Vaal Triangle Campus,
email=Linda.duplessis@nwu.ac.za,
c=ZA
Date: 2015.08.11 14:25:23 +02'00'

Prof Linda du Plessis

Chair NWU Institutional Research Ethics Regulatory Committee (IRERC)

ADDENDUM C

Ethical Approval certificate of current study



Private Bag X6001, Potchefstroom,
South Africa, 2520

Tel: (018) 299-4900
Faks: (018) 299-4910
Web: <http://www.nwu.ac.za>

Institutional Research Ethics Regulatory Committee
Tel: +27 18 299 4849
Email : Ethics@nwu.ac.za

ETHICS APPROVAL CERTIFICATE OF PROJECT

Based on approval by the Humanities and Health Research Ethics Committee (HHREC) on 30/11/2016, the North-West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) hereby approves your project as indicated below. This implies that the NWU-IRERC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the project may be initiated, using the ethics number below.

Project title: Young adults' experience of social support in effective diabetes management.	
Project Leader/Supervisor: Dr E Deacon	
Student: Me E Visagie	
Ethics number:	N W U - HS - 2 0 1 6 - 0 0 8 5
	<small>Institution Project Number Year Status</small>
	<small>Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation</small>
Application Type: N/A	
Commencement date: 2016-11-30	Expiry date: 2019-11-30
Risk:	Medium

Special conditions of the approval (if applicable):

- Translation of the Informed consent document to the languages applicable to the study participants should be submitted to the HHREC (if applicable).
- Any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the HHREC. Ethics approval is required BEFORE approval can be obtained from these authorities.

General conditions:
While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following:

- The project leader (principle investigator) must report in the prescribed format to the NWU-IRERC via HHREC:
 - annually (or as otherwise requested) on the progress of the project, and upon completion of the project
 - without any delay in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.
 - Annually a number of projects may be randomly selected for an external audit.
- The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the project, the project leader must apply for approval of these changes at the HHREC. Would there be deviation from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.
- The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date, a new application must be made to the NWU-IRERC via HHREC and new approval received before or on the expiry date.
- In the interest of ethical responsibility the NWU-IRERC and HHREC retains the right to:
 - request access to any information or data at any time during the course or after completion of the project;
 - to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process.
 - withdraw or postpone approval if:
 - any unethical principles or practices of the project are revealed or suspected,
 - it becomes apparent that any relevant information was withheld from the HHREC or that information has been false or misrepresented,
 - the required annual report and reporting of adverse events was not done timely and accurately,
 - new institutional rules, national legislation or international conventions deem it necessary.
- HHREC can be contacted for further information via Daleen.Claasens@nwu.ac.za or 018 210 3441

The IRERC would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the IRERC or HHREC for any further enquiries or requests for assistance.

Yours sincerely

Linda du Plessis
Digitally signed by Linda du Plessis, DN: cn=Linda du Plessis, o=NWU, ou=Vaal Triangle Campus, email=Linda.duPlessis@nwu.ac.za, c=ZA
Date: 2019.12.13 17:38:34 +0200

Prof Linda du Plessis
Chair NWU Institutional Research Ethics Regulatory Committee (IRERC)

ADDENDUM D

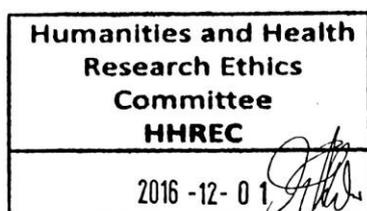
Participant information leaflet and consent for young adults



NORTH-WEST UNIVERSITY
YUNIBESITHI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

PO Box 1174, Vanderbijlpark
South Africa, 1900

Web: <http://www.nwu.ac.za>



1 December 2016

**PARTICIPANT INFORMATION LEAFLET AND CONSENT
FORM FOR YOUNG ADULTS**

TITLE OF THE LARGER RESEARCH PROJECT: Psycho-social variables in adjusting to diabetes management in adolescents and young adults (NWU-HS-2015-0111)

TITLE OF THE RESEARCH PROJECT: Young adults' experience of social support in effective diabetes management (NWU-HS-2016-0085)

RESEARCHER: Ms E. Visagie

ADDRESS: North-West University, Vaal Triangle Campus, Hendrick van Eck Blvd

CONTACT NUMBER: (016) 910 3414

You are being invited to take part in a research project exploring diabetes management in adolescents and young adults. Within the larger project (*Psycho-social variables in adjusting to diabetes management in adolescents and young adults (NWU-HS-2015-0111)*), a number of sub-studies are conducted, including this sub-study titled *Young adults' experience of social support in effective diabetes management (NWU-HS-2016-0085)*.

Please read through the document on your own time and indicate whether you would like to participate in the proposed research study. Remember that participating in this project is entirely up to you and therefore you may say that you do not want to be part of this project. If you say no, this will not affect you negatively in any way whatsoever. You are also free to

SOCIAL SUPPORT AND DIABETES MANAGEMENT

end your participation in our research project at any time, even if you have already told us that you wanted to be a part of our project.

The larger study (NWU-HIS-2015-0111), as well as this sub-study (NWU-HS-2016-0085) have been approved by the **Humanities and Health Research Ethics Committee (HHREC) of the Faculty of Humanities of the North-West University** and will be conducted in accordance with the ethical guidelines and principles of the international Declaration of Helsinki and the ethical guidelines of the National Health Research Ethics Council. It might be necessary for the research ethics committee members (the people who are granting us permission to do this project) or relevant authorities to inspect the research records to make sure that we (the researchers) do our research according to certain important ethical rules.

What is this research study all about?

- *This study will be conducted with the permission of the CDE in Houghton and Parktown. The project will consist of an interview which will require of you to talk to a researcher. The researchers have been trained to use the method mentioned.*
- *The researchers are not at present certain how many participants will be involved in the interviews, but they predict that approximately eight to fifteen participants will be interviewed.*
- *This objective of this research project is to better understand young adults' experience of social support in effective diabetes management. In order to achieve these objectives, as well the objectives of the larger study, the following questions will be asked: Can you tell me about your experience in terms of managing your diabetes? How did your life change after being diagnosed with diabetes? How do you manage your diabetes? How does your understanding of diabetes influence how you manage it? How does managing diabetes impact your daily life? How does support from family and friends influence how you manage your diabetes? How do you make sense of living with diabetes?*

Why have we invited you to be a part of this research project?

- *You have told us that you would be interested in taking part in the project. Your doctor sent us the information leaflet, which you have completed at your previous visit at the CDE, or you have forwarded your e-mail address indicating that you are interested in taking part in the research. You have already received a phone call in which you told us that you will be interested in being part of this project, followed by an e-mail with this form attached. Also note that we have obtained permission from the CDE to conduct this research.*
- *The reasons why you were selected to take part in this research project are: you are willing to do an interview with us in English or Afrikaans, you are between ages 18 and 25, were diagnosed with type 1 diabetes more than 12 months ago, you are a patient at the CDE, and have an HbA1C of 8% or less over the last 12 months.*
- *You will be excluded if you suffer from any other long-term illness or are currently seeing a psychologist for therapy.*

What will your responsibilities be?

- *We would expect you to do an interview with us. The interview will be more or less 45 minutes long. This will take place in a suitable venue at the CDE, before or after your*

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).

2



SOCIAL SUPPORT AND DIABETES MANAGEMENT

regular appointment with either the diabetes educator or doctor, depending on your preference.

- *We would also like to include your HbA1C results in this study as this will give us a good idea of how you manage your diabetes. We will, however, not be doing the blood test ourselves, but will get the results from your medical record at the CDE. This will only happen once you have given us permission, in writing, to do so.*
- *You will also be invited to take part in an intervention at a later stage. Currently we do not have more information on the kind of activities and your responsibilities in the intervention phase. A separate assent form will be compiled and discussed with you before the intervention starts. This intervention will be completely voluntary, and you are free not to take part in the intervention, should you decide so.*

Will you benefit from taking part in this research?

- *The direct benefits for you as a participant will probably be the following:*
 - *While you think about the questions we ask you in the interviews, you may better understand diabetes management, which may positively influence how you manage your diabetes and experience your life.*
 - *After your interview with the researcher you will receive an information leaflet on diabetes management which could further help to assist you to managing your diabetes well.*
 - *As part of thanking you for taking part in this study, we will give you a certificate. As this token of appreciation is only meant for those living with diabetes taking part in the study, you may start feeling that you belong to a special group and that your opinions are important.*
 - *The next phase of this project involves the development of interventions to improve diabetes management and you will be invited to take part in these interventions and possibly improve your diabetes management.*
 - *The immediate therapeutic benefit for you will be that you will receive a individualized visual presentation of the themes in your interview, specifically focusing on the strengths showed in the interview. You will have the option to receive the feedback in person, or telephonically. This feedback session will also be used to check if the researcher understood your comments correctly, and as such will also be audio-recorded.*
- *The indirect benefit will probably be:*
 - *The research community, both medical and behavioural sciences, could benefit from a better understanding of the influences of diabetes management, as well as effective interventions that could possibly improve the management of diabetes.*
 - *The cost of not managing diabetes well could be reduced, resulting in savings for individuals (less hospitalisation, medical expenses, less time off from school), and the community at large (more healthy members that can contribute to improving society).*



3

SOCIAL SUPPORT AND DIABETES MANAGEMENT

Are any risks involved in your taking part in this research and how will these be managed?

➤ The risks in this study, and how these will be managed, are summarised in the table below:

<i>Probable/possible risks/discomforts</i>	<i>Strategies to minimize risk/discomfort</i>
Because you will spend about 45 minutes participating in an interview, it is possible that you will become tired.	The researcher doing the interview with you will give you a 15-minute break with a low carb snack and bottled water) about half way through the interview.
Because the researchers will ask you questions about your diabetes management, you will need to think about how you manage your diabetes, and this may make you feel uncomfortable/sad.	Upon completion of the interview, we will ask you if you experienced any feelings of emotional discomfort or distress while taking part in the research. If you indicate that you did feel uncomfortable or distressed secondary to participating in the research project, we will call you the next day to see if you are still feeling the same way. If not, we will thank you for your participation in the research project. If you are still distressed, we will arrange one complimentary session with Rosemary Flynn (a registered clinical psychologist) who can help you work through your feelings of discomfort or distress which you experienced whilst participating in the research project.
We will be using your HbA1C results; this will show us how well you manage your diabetes. We will, however, not be doing these tests ourselves, but get the results from your medical record at the CDE with your permission.	We will not be drawing blood or doing any other tests that need us to hurt you physically. We will ask for your permission, in writing, to get the information from your record at the CDE.
Although we do not expect that the research process will have an impact on your health, having diabetes implies having low and high blood glucose levels unexpectedly and this may happen while you are participating in an interview with the researcher.	If you feel ill at any time during the interview, you need to tell the researcher so that your blood glucose can be tested and corrected.
In this study we will be asking you how well you manage your diabetes, which is also measured by the HbA1C test. Although we will not be talking about this result, you may be worried that we will judge you based on that result, or think less of you based on how well (or	Living with diabetes can be difficult and we will treat every person that is willing to share their experience, with respect. We will not discriminate against any person based on how well (or not) they manage their diabetes. If at any stage you feel uncomfortable talking about your feelings,

4

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).

SOCIAL SUPPORT AND DIABETES MANAGEMENT

not) you manage your diabetes.	please let the researchers know so they can help you identify a psychologist in your region and arrange an appointment for you.
Living with diabetes may cause you to feel that you are different from your friends and that you feel you do not belong in the same group as your friends.	As part of thanking you for taking part in this study, we will give you a certificate. Receiving this may lead to you feeling that you belong to a special group and that your opinions are important.
Living with diabetes, you may be worried that people learn about your diagnosis and start treating you differently.	We will meet with you at the place where you normally receive your treatment (CDE Houghton and Parktown), so you can feel comfortable in a safe place you know.
As we will be meeting with you at the CDE, it might cost you money to get there by car, bus, train or otherwise. You might also have to take time off from school to take part in this study.	In order to minimise transport and other costs, we will schedule the sessions with your normal visits to the CDE. We plan to visit the CDE during the afternoons and during holidays to make it easier for you to attend.
This study is a long-term project (5-10 years). This means that you will be asked to participate (by doing an interview and participating in interventions) several times over the next few years.	You will be asked to take part (either participate in an interview or intervention) not more than once every two years. You also, at any time, have the right to no longer participate.

- *However, the benefits (as noted) outweigh the risks.*

Who will have access to the data?

- *Anonymity (that is, how your results will be linked to your identity) will be managed by providing each participant with a code that will only be used for your information. As this is a long-term project, this code will be used every time you take part in a phase of the project. This code will be given to you once you have given us your permission, in writing. This code will be indicated on the consent form, after which the consent forms will be stored in a separate place, away from the data to ensure that no link can be made between your results and identity.*
- *The treatment of confidentiality (that is, we assure you that we will protect the information we have about you) will differ in the different phases of the project. During the interviews, only you and the researcher will be present. The information gathered will be linked to your individual code. The researchers will also make sure that in recording the data, only your given code will be used, and references to your name or any other identifiable details will be removed. Reporting of findings will be anonymous by only referring to your participant code.*
- *As this is a long-term project, data will be stored for a minimum of 10 years. All documentation will be securely stored in locked rooms and will then be destroyed by*

5

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).

SOCIAL SUPPORT AND DIABETES MANAGEMENT

shredding it. The electronic data (e.g. datasets) will be stored on a password protected computer and will then be destroyed by deleting it from the computer in question.

- *Audio-recorded data will be sent to a person who will type it out word for word and this person will sign a confidentiality letter (i.e., this person will not be allowed to talk to anyone about any aspect of the data). As soon as data has been typed, it will be deleted from the recorders. The typed conversations will be stored on a password-protected computer. All the people that will be working with the data will sign confidentiality letters.*
- *Only the researchers will have access to the raw/obtained data. Although we work closely with the CDE, no member of the CDE, or your medical team will have access to the data. Data will be kept safe and secure by locking hard copies in locked cupboards in the researchers' offices and electronic data will be password protected.*

What will happen to the data?

The data from this study will be reported in the following ways: it will be written up in articles and research reports, and presented at conferences. In all of this reporting, you will not be personally identified. This means that the reporting will not include your name or details that will help others to know that you had participated (e.g., your address or the name of your school).

As this is a long-term study, the data will be re-used by members of this research group working with/at the NWU to determine patterns by doing more analysis on it.

Will you be paid/compensated for taking part in this study and are there any costs involved?

No, you will not be paid for taking part in the study, but a bottle of still water and a low-carb snack will be provided. The researchers aim at conducting the interviews with your scheduled visits to the CDE. This means you do not have to travel additionally for the purpose of participating in the project. Hence there will be no additional costs involved for you.

How will you know about the findings?

- As this is a long-term project, participants will receive (preferably via e-mail) a yearly progress report setting out the main findings thus far, as well as further opportunities for participation. Posters detailing the main findings will also be displayed at the CDE.
- Once we have worked through the word for word typed out document of your interview with us, we will call you and ask you whether we understood you correctly during the interview. By doing this, we want to make sure that we understood you correctly, whilst also giving you the opportunity to then tell us if we misunderstood what you were trying to tell us.

Is there anything else you should know or do?

- You can contact Dr Elmari Deacon at elmari.deacon@nwu.ac.za or (016 910 3414) if you have any further questions or encounter any problems.
- You can contact the chair of the Humanities and Health Research Ethics Committee (Prof Tumi Khumalo) at 016 910 3397 or Tumi.khumalo@nwu.ac.za if you have any

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).

6 

SOCIAL SUPPORT AND DIABETES MANAGEMENT

concerns or complaints that have not been adequately addressed by the researcher. You can also contact the co-chair, (Prof Werner Nell) at 016 910 3427 or Werner.nell@nwu.ac.za. You can leave a message for either Tumi or Werner with Ms Daleen Claasens (016 910 30441).

➤ You will receive a copy of this information and consent form for your own records.

Declaration of young adult

By signing below, Iagree to take part in a research sub-study titled: Young adults' experience of social support in effective diabetes management.

I declare that:

- I have read and understood this information and consent form and it is written in a language in which I am fluent and with which I feel comfortable.
- I have questions to both the person obtaining consent, as well as the researcher (if this is a different person), and all my questions have been adequately answered.
- I understand that taking part in this study is entirely up to me and I have not been pressurised to take part.
- I understand that what my contribution (what I report/say/write/draw/produce visually) could be reproduced publically and/or quoted, but without reference to my personal identity.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has been completed, if the researcher feels it is in my best interests, or if we do not follow the agreed-upon research plan.
- I agree to the CDE giving the researchers access to my medical records and that the HbA1C results, as reported in these medical records, may be used for this project.

Signed at (*place*) on (*date*) 20....

.....
Signature of participant

.....
Signature of witness

- You may contact me again Yes No
- I would like a summary of the findings of this research Yes No

The best way to reach me is:

Name & Surname: _____
Postal Address: _____
Email: _____
Phone Number: _____
Cell Phone Number: _____



This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).

SOCIAL SUPPORT AND DIABETES MANAGEMENT

In case the above details change, please contact the following person who knows me well and who does not live with me and who will help you to contact me:

Name & Surname:

Phone/ Cell Phone Number /Email:

Declaration by person obtaining consent

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and took adequate time answering them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did not use an interpreter.

Signed at (*place*) on (*date*) 20....

.....
Signature of person obtaining consent

.....
Signature of witness

Declaration by researcher

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and spent adequate time answering them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did not use an interpreter.

Signed at (*place*) on (*date*) 20....

.....
Signature of researcher

.....
Signature of witness



8

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).