

Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

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Dissertation submitted in fulfilment of the requirements for the degree *Master of Arts* in *Research Psychology* at the North-West University

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ILLNESS PERCEPTION IN ADOLESCENTS WITH CONTROLLED AND UNCONTROLLED DIABETES

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Dedication

Jean Swanepoel

My dear friend, I know your battle with diabetes is a tough one, and you are confronted by different challenges daily. Always remember that we are here and will always support you, no matter what. I dedicate this current research to you! You inspired me to think outside of the box.

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Declaration statement

I, Nicolaas Prinsloo, declare that *Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review*, a current research study was submitted in partial fulfilment of the requirements for the degree *Master of Arts in Research 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 current research have been acknowledged and referenced according to the American Psychological Association's Publication manual (6th edition). Exception may be made depending on the requirements of the specific journal. No single or comprehensive unit of this current research has been plagiarised from another author or institution and it remains the intellectual property of the corresponding author, namely myself. The current research received a Turn-it-in report within accepted norms.

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



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Nicolaas Prinsloo

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Summary

Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

Type 1 diabetes mellitus (T1DM) is regarded as one of the most common endocrinological disorders found in adolescents. Several studies have reported an annual increase in the incidence of diabetes mellitus amongst children; however the prevalence rate for diabetes mellitus amongst adolescents in South Africa is unknown. T1DM can develop at any developmental stage of life. However, the peak onset for T1DM has been identified as being during puberty. In puberty, insulin resistance occurs, leaving adolescents particularly vulnerable. When adolescents are diagnosed with T1DM, they face the challenge of successfully integrating diabetes mellitus management into their lives, while concurrently struggling with the physiological and psychological changes that occur during this developmental phase. The strict treatment regime and the variety of distinct tasks that are required to manage diabetes effectively can increase emotional, social and physical stress. As less than one third of adolescents adhere to their treatment, it is important to identify psychosocial variables within adolescence.

The aim of the current research was to conduct a rapid review, and to summarise the research findings on how illness perception of adolescents who successfully manage their T1DM differs from those who do not. The current research title refers to controlled and uncontrolled diabetes mellitus, whereas other research refers to it as metabolic control. A rapid review with a pragmatic approach was conducted in which a comprehensive and stepwise keyword search was done, using Boolean operators to combine keywords and the inclusion criteria. Quality assessment was done on the identified publications; in which three publications, published between 2016 and 2017, were used for the final inclusion.

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Initially, the current research found 11 unique publications, of which 6 publications met the following inclusion criteria; (1) published and peer reviewed article, specific to the research question; (2) studies that focused on illness perception amongst adolescents with type 1 diabetes; (3) studies that focused on illness perception amongst adolescents with controlled and uncontrolled management of their condition; (4) reviewed studies; (5) only ethically approved published and reviewed articles were be used; (6) studies done in English or in Afrikaans. After all duplicates were removed, a total of 3 studies were included that met the inclusion criteria. Of the 3 publications used, 1 publication found that illness perception does have an impact on metabolic control and that poor metabolic control tends to lead to more negative illness perception when compared to adolescents with good metabolic control; 1 publication pointed out that there is in fact a correlation between illness perception and metabolic control, but that this correlation could only be found in female adolescents. 1 publication pointed out that there is no correlation at all, however this might be due to the fact that this correlation could only be seen in girls and not in boys.

The current research concluded that there is limited information available on how illness perception of adolescents diagnosed with T1DM may vary according to metabolic control levels. More research should be done in order to determine if adolescents who successfully manage their T1DM differ from those who do not, in terms of illness perception and whether or not gender plays a role.

KEYWORDS: Adolescents, illness perception, metabolic control, type 1 diabetes mellitus, controlled diabetes management, uncontrolled diabetes management

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Opsomming

Siekte-persepsie van Adollesente met Beheerde en Onbeheerde diabetes: ‘n “rapid review”

Tipe-1 diabetes mellitus word beskou as een van die mees algemene endokrinologiese siektes wat in adollesente aangetref word. Verskeie studies het reeds bepaal dat daar jaarliks ‘n toename in diabetes mellitus by kinders plaasvind, maar die koers waarteen dit by adollesente in Suid Afrika voorkom is nie bekend nie. Tipe-1 diabetes mellitus kan op enige stadium van ‘n individueel se lewe ontwikkel, maar daar is ‘n hoër kans vir ontwikkeling tydens, of naby pubertiteit aangesien insulien weerstandigheid veral tydens pubertiteit voorkom. Wanneer adollesente gediagnoseer word met tipe-1 diabetes mellitus, moet hulle nie slegs sukkel met die fisiologiese en psigologiese veranderings in hul liggame, wat kenmerkend is van hierdie ontwikkelingsfase nie, maar hulle moet ook aanpas by die uitdagings om die diabetes mellitus suksesvol in hul lewens te integreer. Die streng behandelings bestuurs-plan, asook die verskeidenheid van take wat vereis word om die diabetes effektief te bestuur, kan emosionele, sosiale en fisiese stres verhoog. Aangesien minder as ‘n derde van adollesente hul diabetes mellitus suksesvol bestuur, is dit belangrik om veranderlikes te identifiseer wanneer dit by adollesente kom.

Die doel van die huidige navorsing was om ‘n “rapid review” uit te voer en in terme van siekte-persepsie te bepaal hoe sekere adollesente dit reg kry om hulle tipe-1 diabetes mellitus suksesvol te bestuur, terwyl ander adollesente nie suksesvol daarmee is nie. Alhoewel die navorsings titel verwys na beheerde en onbeheerde diabetes mellitus, word dit in ander navorsing gespesifiseer as diabetes bestuur. ‘n “Rapid review” is uitgevoer met ‘n pragmatiese benadering, waar ‘n soektog na sleutelwoorde stapsgewys gedoen is. Boolean operateurs is gebruik om die

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sleutelwoorde met die insluitende kriteria te kombineer. 'n Kwaliteit inhouds-analise is gedoen waarin drie publikasies geïdentifiseer is. Hierdie publikasies was gedurende 2016 en 2017 gepubliseer.

Die huidige navorsings het oorspronklik elf unieke publikasies gevind, waarvan ses aan die insluitings kriteria voldoen het. Die insluitings kriteria was soos volg: (1) gepubliseerde en eweknie hersiene artikels, wat spesifiek gefokus is op die navorsings vraag; (2) studies wat fokus op siekte-persepsie onder adolessente met tipe-1 diabetes mellitus; (3) studies wat fokus op siekte-persepsie onder adolessente met beheerde en onbeheerde bestuur van hulle siekte toestand; (4) hersiene studies; (5) slegs studies wat eties goedgekeur is; (6) Afrikaanse en Engelse studies. Nadat al die duplikate verwyder is, was daar 3 gepubliseerde studies oor wat kon gebruik word in die huidige navorsing. Uit die drie publikasies wat gebruik was, het een publikasie gevind dat siekte-persepsie 'n impak het op siekte-bestuur. Die tweede publikasie het gevind dat daar 'n korrelasie is tussen siekte-persepsies en siekte-bestuur, maar dat die korrelasie slegs onder meisies voorkom. Die derde publikasie het uitgewys dat daar geen korrelasie is tussen siekte-persepsie en diabetes bestuur nie.

Die huidige navorsings het uitgewys dat daar slegs beperkte navorsing beskikbaar is oor hoe siekte-persepsie en siekte-bestuur in adolessente met tipe-1 diabetes mellitus verskil. Die studie het bevind dat meer navorsing gedoen moet word om te bepaal of siekte-persepsie in adolessente met tipe 1 diabetes mellitus 'n impak het op hulle siekte-bestuur, en of ander veranderlikes soos geslag, ras of kultuur ook 'n rol speel.

SLEUTELWOORDE: Adolessente, siekte-persepsie, diabetes-bestuur, tipe 1 diabetes mellitus, beheerde diabetes-bestuur, onbeheerde diabetes-bestuur

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Preface

- The current research was written in article format in accordance with rules A.4.4.2 of the North-West University.
- The article in Section 2 of the current research, titled: *Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review* will be submitted for possible publication in the *Health SA Gesondheid – Journal of Interdisciplinary Health Sciences*.
- The editorial and referencing style of Section 1 and 3 of the current research is in strict accordance with the guidelines defined and described 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 the current research, also specify the division of the article structure into subdivision numbered sections, which contradicts APA editorial and referencing styles set forth in the Publication Manual (6th Edition) of the APA. In order to comply with the author guidelines of the *Health SA Gesondheid – Journal of Interdisciplinary Health Sciences*, described in section 2.1 of the current research, Section 2 of the current research was written according to the APA editorial and referencing style set forth in the Publication Manual (6th Edition) of the APA. However the numbering of the article's subdivision was different.
- The page numbering of the current research is successive, starting from the introduction.
- Professor E van Rensburg and Dr E Deacon, the co-authors of the article: *Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review* in section 2 of the current research, granted their consent for the submission of the above mentioned article for

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examination purposes in partial fulfilment of the requirements of a MA degree in Research Psychology.

- The language editing was done by Bernice McNeil.
- The numbering of the tables is restarted in Section 2 of the current research.
- For publication purposes the referencing in the current research is restarted in every section.
- The current research received a Turn-it-in report within accepted norms.

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Letter of permission

Permission is hereby granted for the submission by the first author, N. Prinsloo, of the following mini-dissertation for examination purposes, towards partial fulfilment of the requirements for the degree Master of Arts in Research Psychology at the Potchefstroom campus of the North-West University:

Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

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 mini-dissertation.

.....

Professor E van Rensburg

Supervisor

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Proof of language editing

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To whom it may concern

This letter serves to confirm that in **October 2017** I did the
proofreading and the language editing for the Rapid Review and the Journal Article of
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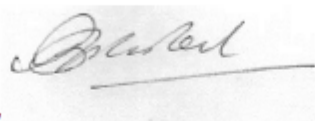
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This document is being submitted in fulfilment of the requirements for the degree
MASTER OF ARTS in RESEARCH PSYCHOLOGY

**At the POTCHEFSTROOM CAMPUS
Of the NORTH-WEST UNIVERSITY.**

I have proofread and edited those sections of the work required by the author. I have not been asked to edit the List of References or Appendices. This editing principally involves proofreading, language, style, punctuation and grammar editing; and also checking the text for clarity of meaning, sequence of thought and expression and tenses. I have noted any inconsistencies in thought, style or logic, and any ambiguities or repetitions of words and phrases, and have corrected those errors which creep into all writing. I have written the corrections on the hard copy and have returned the document to the author, who is responsible for inserting these. Please note that this confirmation refers only to editing of work done up to the date of this letter and does not include any changes which the author or the supervisor may make later.



October 2017

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Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

SECTION 1: INTRODUCTION AND RATIONALE

1.1 Introduction

The current research was conducted within the context of the first phase of the ethically approved overarching umbrella research project, in which the overarching study explored psycho-social variables in adjusting to diabetes mellitus management in adolescents and young adults (NWU-HS-2015-0111). The current research did a rapid review in order to determine how illness perception of adolescents who successfully manage type 1 diabetes mellitus (T1DM) differs from those who do not.

In the first section of this current research, the introduction and rationale of the study are provided. Firstly, the problem statement and orientation of the study will be discussed. After the problem statement and orientation have been discussed, an in-depth literature analysis will follow, in which significant findings on diabetes mellitus are outlined. The desired outcome would be to gain a comprehensive understanding of diabetes mellitus, with a specific focus on T1DM, its origin, aetiology, epidemiology, diagnostic criteria, complications and management. Illness perception in adolescents with a specific focus on T1DM is also explored. In addition the section will also provide the aim and the structure of the research.

1.2 Problem statement and orientation

Diabetes mellitus is a complex chronic illness that affects people in all stages of life (Hörsten, Norberg & Lundman, 2002). It can best be defined as a chronic illness that is characterised by chronic hyperglycaemia that follows from defects in insulin action or secretion, or both (Craig, Hattersley & Donaghue, 2009; Craig et al., 2014). Insulin is a hormone that is produced by the pancreas (Mukeshimana & Nkosi, 2013), which allows the cells in the muscles, liver and fat to absorb glucose from the bloodstream (Mukeshimana & Nkosi, 2013). Glucose

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serves as an energy source to these cells, and can affect other metabolic processes such as the breakdown of protein and fat. In a healthy individual, insulin is released and produced by a constricted regulated process, allowing the human body to balance its metabolic needs. However, in diabetes mellitus, the human body does not secrete enough insulin, or no longer secretes it effectively (Craig et al., 2014).

The incidence rate for diabetes mellitus in childhood is increasing in many countries (Patterson et al., 2014). It is estimated that 79000 children worldwide are being diagnosed with T1DM annually (Patterson et al., 2014). Diabetes mellitus is becoming more common and is often diagnosed in children between the ages of 10 to 14 years old (Davidson, 2014). The risk of developing T1DM in childhood is higher than almost all other chronic illnesses, with T1DM affecting about one in every 400 children and adolescents (Carpentier, Mullins, Chaney & Wagner, 2006; Mulder, 2016). Overall it is expected that these figures will double by 2025 (Davidson, 2014). In the United Kingdom diabetes mellitus is one of the most common chronic health conditions in those people under the age of 17 years old, in which T1DM, is affecting more than 23000 young people (Davidson, 2014). According to the International Diabetes Federation (IDF) (2015) it is estimated that in Africa 46000 children under the age of 15 years old are living with T1DM. Currently, there is limited data available with regards to the prevalence rate of diabetes mellitus in South Africa. T1DM international statistical indicators are scarce for adolescence, and statistics provided by the IDF are predominantly region specific. Within a South African context, the prevalence rate for T1DM among adolescents is currently unknown (Dhada, Blackbeard & Adam, 2014).

Liles and Juhnke (2008) stated that currently there is no cure available for T1DM; in fact T1DM is a life-long chronic illness that needs to be managed effectively by the diagnosed

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individual, in order to increase his/her health. However, in order to manage diabetes mellitus effectively, the diagnosed individual should take his/her medication either orally, or by means of insulin injections, do regular blood glucose testing, exercise regularly and have a diet that restricts certain food (Silverstein et al., 2005). In order to measure whether an individual diagnosed with diabetes mellitus is adhering to his/her treatment, a measurement is used to calculate the glycosylated haemoglobin (HbA1c) objectively. This measurement measures the average plasma glucose levels over approximately three months. When individuals are adhering to their treatment and managing their diabetes mellitus effectively, the HbA1c result should be below 7.5% (IDF, 2015). Unfortunately, less than one third of people living with diabetes mellitus manage their diabetes mellitus effectively, meaning that they do not maintain a life-long HbA1c of 7.5% or lower, putting themselves at risk of the development of diabetes mellitus related complications (Babler & Strickland, 2015; IDF, 2015).

When adolescents are diagnosed with diabetes mellitus, they face the challenge of successfully integrating diabetes mellitus management into their lives, while simultaneously struggling with the psychological and physiological changes that occur during this developmental phase (Graue, Wentzel-Larsen, Bru, Hanestad & Sovik, 2004). The strict treatment regime and variety of distinct tasks that are required to manage the illness effectively, can increase an adolescent's experience of emotional, physical and social distress (Cheung, Young Cureton & Canham, 2006; Coffen, 2009; Yi-Frazier, Hilliard, Cochrane & Hood, 2012). However, not all young people's treatment regiments deteriorate as some young people accept the responsibility to adhere to the treatment requirements (Scholes et al., 2012). Given the fact that less than one third of adolescents adhere to their treatment, it is important to identify psychosocial variables within this developmental group (Bryden et al., 2001). By better understanding these psychosocial variables, guidelines aimed at promoting adherence within

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adolescents, and thus promoting diabetes mellitus management can, be identified (Griva, Myers & Newman, 2000).

1.2.1 Diabetes mellitus as a syndrome

Diabetes mellitus is one of the most common endocrine disorders of all time (Klandorf & Stark, 2017). The origin of the name of this disorder, derived from the Greek word diabetes, meaning “running through” or “siphon”, a reference describing the large amount of urine that usually accompanies the disorder (Klandorf & Stark, 2017; Tripathy, 2012). The term “mellitus” is of Latin origin, and it means “honey”. The term “mellitus” was later added to “diabetes” by physicians when they made the diagnosis of diabetes mellitus in order to describe the sweet taste of the patient’s urine (Klandorf & Stark, 2017; Tripathy, 2012). Diabetes mellitus consists of a group of metabolic diseases which are characterised by hyperglycaemia resulting from a defect in insulin action, insulin secretion or both (American Diabetes Association, 2014b; Craig, Hattersley & Donaghue, 2009; Klandorf & Stark, 2017; Triparty, 2012). However, chronic hyperglycaemia of diabetes mellitus is linked with long-term dysfunction, damage and failure of different organs, especially the heart, kidneys, nerves, eyes and blood vessels (American Diabetes Association, 2014b). In diabetes mellitus several pathogenic processes are involved, which include abnormalities that result in resistance to insulin action and autoimmune destruction of the pancreatic beta cells subsequent to insulin deficiency (American Diabetes Association, 2014b; Craig et al., 2014; Jones & Persaud, 2010). Deficient insulin action is caused by inadequate secretion and/or pathological functioning of insulin at one or more points in the complex pathway of hormone action (American Diabetes Association, 2014b; Craig et al., 2014). In patients diagnosed with diabetes mellitus, it is not uncommon for insulin secretion and deficits in insulin action to coexist (American Diabetes Association, 2014b). However, the cause of

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insulin secretion and/or pathological functioning is important because it classifies diabetes mellitus into broad etiopathogenetic categories (American Diabetes Association, 2014b; Craig et al., 2014). Symptoms of diabetes mellitus are related to hyperglycaemia, ketoacidosis and glycosuria (American Diabetes Association, 2014b; Craig et al., 2014; Klandorf & Stark, 2017). Marked symptoms of hyperglycaemia include blurred vision and weight loss, sometimes with polyphagia, polyuria and polydipsia (American Diabetes Association, 2014b; Mulder, 2016). In chronic hyperglycaemia, impairment of growth and susceptibility to certain infections have also been noticed (American Diabetes Association, 2014b). Long-term complications in diabetes mellitus include: nephropathy leading to kidney failure (renal failure); potential loss of vision; peripheral neuropathy, with risk of foot ulcers, Charcot joints and amputations; and autonomic neuropathy that causes sexual dysfunction, cardiovascular symptoms, genitourinary and gastrointestinal (American Diabetes Association, 2014b). People diagnosed with diabetes mellitus also have an increased risk or incidence rate of developing atherosclerotic, cardiovascular and cerebrovascular disease (American Diabetes Association, 2014b).

According to the American Diabetes Association (2014b), most diabetes mellitus cases fall into two broad etiopathogenetic categories called type 1 and type 2 diabetes mellitus. T1DM is characterised by hyperglycaemia resulting from absolute deficiency of insulin secretion (American Diabetes Association, 2014b; Craig et al., 2009; Scholes et al., 2012). Individuals who are at an increased risk of developing T1DM, can often be identified by genetic markers and by serological evidence of an autoimmune pathologic process occurring in the pancreatic islets (American Diabetes Association, 2014b). Type 2 diabetes mellitus is characterised by a combination of inadequate compensatory insulin secretory response and resistance to insulin (Craig et al., 2014), both which then cause the blood glucose levels to rise, leading to symptoms such as lethargy, frequent urination, hunger and excessive thirst (American Diabetes

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Association, 2014b; Craig et al., 2014; Mukeshimana & Nkosi, 2013). However, it is also important to know that other forms of diabetes mellitus are secondary to, genetic syndromes, genetic defects, autoimmune pathologic processes occurring in the pancreatic islets and inadequate compensatory insulin secretory response and resistance to insulin (Turner & Wass, 2009). Another form of T1DM is Gestational diabetes mellitus which usually occurs around week 24 of pregnancy, in which women who had never previously had diabetes mellitus, are now presenting high glucose levels (American Diabetes Association, 2014a; IDF, 2015). However, the current research will only focus on T1DM.

T1DM can be caused by a variety of unknown genetic, environmental and cellular mediated autoimmune destruction of the pancreatic beta cells (American Diabetes Association, 2014b). In T1DM, the rate of beta-cell destruction is quite inconstant, being rapid in some individuals, especially in infants and children, and slow in other especially adults. Autoimmune destruction of beta-cells incorporates numerous genetic predispositions and environmental factors, but these are still poorly defined (American Diabetes Association, 2014b; Paterson et al., 2014). Researchers are still trying to determine the underlying reason for T1DM and the risk factors predisposing to it. In research done by the American Diabetes Association (2015), they have identified that influences such as certain viruses and heredity can cause T1DM. According to Ali (2011) and Beaser (2010), T1DM can be triggered by a certain type of viral infection during pregnancy, childhood and early adulthood. Ali (2011), further stated that the virus may trigger changes in the immune system that create antibodies that are capable of attacking beta-cells. With regards to genetics, if a parent or grandparent has T1DM, a person's risk increases (Ali, 2011). Environmental influences such as certain viruses, substances, dietary and stressful life events are also associated with developing T1DM (Ali, 2011; Ochola & Venkatesh, 2009). Nevertheless, environmental triggers for T1DM which cause pancreatic beta-cell destruction

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remain largely unknown, but the process usually begins months, or even years before any clinical symptoms manifest (Craig et al., 2014).

A diagnosis of T1DM, was previously based on any blood glucose of 11.01 mmol/L at any given interval, regardless of food consumption and fasting (American Diabetes Association, 2014b; Craig et al., 2014; Silverstein et al., 2005). T1DM was previously tested by taking the plasma glucose level, if the level was higher than 7 mmol/L for longer than eight hours, it was an indication of possible T1DM (American Diabetes Association, 2014b; IDF, 2015). However, the ADA revised the policy for T1DM, and integrated glycated haemoglobin also known as HbA1c (Craig et al., 2014). The HbA1c was developed in order to measure the average blood glucose of the preceding three months. If diabetes mellitus is managed successfully/effectively, the HbA1c levels should be below 7.5% (IDF, 2015; Liles & Juhnke, 2008). Even though the test measures the average blood glucose levels, a definite diagnosis should not be made based on a single examination of the blood glucose levels. Instead the blood glucose levels should be examined continuously (IDF, 2011).

An individual who has been diagnosed with T1DM, can suffer from a variety of physiological complications (Sosenko, 2012). There are several physiological complications that are potential consequences of diabetes mellitus such as athlete's foot, brain abscess, primary pituitary abscess, dental abscess, sleep hyperhidrosis, candidiasis and blood pressure are being investigated (Ali, 2011). Being diagnosed with T1DM and type 2 diabetes mellitus can cause chronic and acute complications (Tripathi & Srivastava, 2006). Acute complications include ketoacidosis (DKA) and non-ketotic hyper-osmolar state (NKHS). DKA is seen primarily in individuals with T1DM (Tripathi & Srivastava, 2006). DKA, is caused by insulin deficiency and is combined with counter-regulatory hormone excess (Tripathi & Srivastava, 2006). DKA can be

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best characterised by the decreased ration of insulin to glucagon that promotes gluconeogenesis, glucogenolysis and ketone body formation in the liver (Tripathi & Srivastava, 2006). Ketosis is the result of the free fatty acid that is released from the adipocytes due to increased lipolysis (Tripathi & Srivastava, 2006). DKA, is usually caused by insufficient exogenous insulin uptake, trauma or stress, a virus, a surgical procedure or an infection (Ochola & Venkatesh, 2009). In DKA, it is common for the person to be nauseas and to vomit (Tripathi & Srivastava, 2006).

Chronic complications of diabetes mellitus affect many organ systems and are responsible for the majority of mortality and morbidity (Tripathi & Srivastava, 2006). Chronic complications can also be divided into nonvascular and vascular complications. However, in vascular complications, it is further subdivided into macrovascular complications, which consist of coronary artery disease, peripheral vascular disease and, cerebrovascular and microvascular complications, which consist of retinopathy, neuropathy and nephropathy (Tripathi & Srivastava, 2006). Nonvascular complications include problems such as sexual dysfunction, gastroparesis and skin changes (Tripathi & Srivastava, 2006). Diabetes mellitus is the most common cause of a variety of debilitating neuropathies, adult blindness and cerebral and cardiac disorders (Tripathi & Srivastava, 2006).

1.2.2 Diabetes mellitus management

The best management for T1DM begins with laying down the foundation of care (Maahs, West, Lawrence & Mayer-Davis, 2010). Various therapeutic options are available for a person diagnosed with T1DM. These include multiple injections of rapid acting insulin daily, combined with daily basal insulin as well as the continuous subcutaneous insulin infusion through an insulin pump (Maahs et al., 2010). According to the American Diabetes Association (2016), people diagnosed with diabetes mellitus should get medical care from a collaborative and

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integrated team. This team usually consists out of mental health care professionals, endocrinologists, podiatrists, dentists, pharmacists, exercise specialists, dietitians, nurses, physician assistants, nurse practitioners and physicians (American Diabetes Association, 2016). Nevertheless, even though all of these guidelines are provided to people diagnosed with T1DM, they need to take personal responsibility for the regulation of their blood glucose levels (Silverstein et al., 2005). In order for them regulate their blood glucose levels, they will need to adhere to a multicomponent and complicated treatment regime by taking daily insulin injections, testing their blood glucose level on a regular basis, and eating certain foods and snacks during the day as well as monitoring their exercise level (Silverstein et al., 2005).

Maahs et al. (2010), pointed out that glycaemic control is the foundation of diabetes mellitus care. In order for diagnosed individuals to manage their diabetes mellitus effectively, a glycated haemoglobin level and/or an average blood glucose level that is below 7.5% or 58mmol/L of blood. If the haemoglobin and/or average blood glucose level is below 7.5% or 58mmol/L of blood, this can then be viewed and referred to as being well-controlled T1DM (IDF, 2011).

1.2.3 Diabetes mellitus in adolescence

Adolescence is a transitional developmental phase between childhood and adulthood, which includes both psychological and biological changes associated with puberty (Leonard, Garwick & Adwan, 2005; Mulder, 2016). Friedman, Connelly, Miller and Williams (1998) stated that adolescence is a prolonged period of transition which allows time for adolescents to move from dependence on their parents to greater independence, in order to meet their own needs. During puberty, adolescents are particularly vulnerable because of the normal insulin resistance that occurs during puberty (Harjutsalo, Sjöberg & Tuomilehto, 2008; Mulder, 2016;

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Wysocki & Greco, 2006), as well as the normative psychological crises and conflicts that are related with this developmental phase (Leonard et al., 2005). With regards to T1DM, it can develop or be diagnosed at any developmental stage of life.

The diagnosis of a life-threatening chronic disease such as diabetes mellitus can be a highly stressful and challenging event for adolescents (Malik & Koot, 2012). Luyckx et al. (2008) and Scholes et al. (2012) pointed out that adolescence is a challenging developmental stage, and this stage can be made more challenging with the diagnosis of a long-term illness such as T1DM. During adolescence, physiological changes occur and demanding management may contribute to remaining dependants and restrict their freedom (Scholes et al., 2012). This might lead to poor metabolic control and other related diabetes mellitus challenges (Scholes et al., 2012). Diabetes mellitus related challenges for adolescents can include creating personal meaning for the condition, managing to transition to self-management and dealing with social situations (Chiang et al., 2014). Luyckx et al. (2008) pointed out that when adolescents are diagnosed with diabetes mellitus, it might prevent or even delay them from addressing certain developmental tasks such as identity development. Adolescents diagnosed with diabetes mellitus also have a higher risk of developing psychological problems such as: adjustment difficulties, suicidal ideation, depression, social withdrawal, anxiety and lower levels of self-esteem (Williams, Sharpe & Mulan, 2013). These psychological problems can interfere with the management of diabetes and can consequently affect metabolic control (Williams et al., 2013).

Living with T1DM and being concurrently challenged with multifaceted developmental changes can be an exceptionally challenging for adolescents (Comeaux & Jaser, 2010; Griva et al., 2000; Jonker, 2017; Williams et al., 2013). Adolescents diagnosed with diabetes mellitus, tend to face several challenges related to integrating diabetes mellitus management successfully

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into their lives, while they are confronted with these psychological and physiological changes that are occurring during adolescence (Graue et al., 2004; Mulder, 2016). Diabetes mellitus management and the treatment regimen both require a variety of distinct tasks. Combining these tasks with adolescence, can cause social, physical and emotional distress (Cheung et al., 2006; Coffen, 2009; Yi-Frazier, Hilliard, Cochrane & Hood, 2012). Even though adolescents diagnosed with T1DM can live a reasonably normal life, they are vulnerable to develop diabetes related illnesses such as, ophthalmic, renal, neurological and vascular health complications that are secondary to poor diabetes management (Skinner, John & Hampson, 2000).

Unfortunately, research has indicated that less than one third of adolescents adhere to their treatment (Bryden et al., 2001; Mulder, 2016). This indicates that it is important to make the psycho-social variables known, as this will enable researchers to develop guidelines specifically aimed at promoting adherence within adolescence (Bryden et al., 2001; Griva et al., 2000).

1.2.4 Illness perception

According to Hurt et al. (2014), illness perception refers to a condition-specific belief that shapes ones experiences, knowledge and personal characteristics. Illness perception is increasingly being used to explain how individuals adjust when diagnosed with a chronic illness (Hurt, Burn, Hindle, Samuel, Wilson & Brown, 2014; Jonker, 2017). Hurt et al. (2014) stated that individuals hold a different range of beliefs regarding their illness and those which ultimately influence their physical and mental well-being as well as their coping strategies. In a research study done by Hagger and Orbell (2003), they demonstrated that in a number of conditions that there is a robust linear relationship between illness perception and a range of mental and physical health outcomes. For example, when an individual holds a strong illness

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identity, perceiving an illness as having severe consequences, and believing that the illness has a chronic timeline it may lead to negative mental and physical health outcomes (Hagger & Orbell, 2003; Hurt et al., 2014; Jonker, 2017). In contrast, when an individual strongly believes that an illness can be cured and controlled, it correlates with positive mental and physical health outcomes (Hurt et al., 2014). However, Weinman and Petrie (1997) pointed out that illness perception can be best defined as a structured cognitive image which individuals entertain regarding their illness. These cognitive beliefs serves as a foundation to explain symptoms (Leventhal et al., 1997) and can vary widely from patient to patient (Griva et al., 2000; Petrie, Jago & Devcich, 2007; Weinman & Petrie, 1997).

When someone is diagnosed with an illness, it frequently causes a range of problems which can vary greatly from person to person, even if they are diagnosed with the same condition (Jonker, 2017; Weinman, Petrie, Moss-Morris & Horne, 1996). Research has shown that, in order for patients to make sense of their illness and respond to these problems, they create their own representation or model of their illness (Weinman et al., 1996). Thus, when looking at illness perception it can be regarded as organised cognitive beliefs or representations that patients have about their illness (Jonker, 2017; Petrie et al., 2007). Illness perception creates a framework for patients to make sense of their diagnosis, symptoms and influence treatment effectiveness and possible complications relating to the condition (Broadbent, Petrie, Main & Weinman, 2005; Jonker, 2017; Weinman et al., 1996). Illness perception in patients is found to be a very important determinant of behaviour and can be associated with several important outcomes such as functional recovery and treatment adherence. Petrie et al. (2007) suggested that there is a consistent pattern in which patients structure their perceptions of illness. This is known as the common sense model. Illness perception usually holds an *identity component*, a *causal component*, *timeline component*, *consequences component* and the *cure component*. The *identity*

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component consists of the different beliefs the patient associates with the name of the illness and the range of symptoms (Griva et al., 2000; Petrie et al., 2007). The *causal component*, consist of the patient's ideas about the likely cause or causes of the illness (Weinman et al., 1996). *The time component* indicates patients' perception of the likely duration of their health problems, and these have been categorised as acute, chronic or cyclical (Broadbent et al., 2005; Griva et al., 2000; Weinman et al., 1996). The *consequences component* reflects the patients' beliefs about the severity of the illness and the possible impact it will have on their psychological, physiological and social functioning (Weinman et al., 1996). The last component is the *cure component*. This consists of the extent to which patients believe that their illness is amenable to control or cure (Broadbent et al., 2005; Weinman et al., 1996). Illness perception is constantly being updated as patients gain new knowledge about an illness or when they experience a new illness (Jansen et al., 2013). According to Broadbent et al. (2005), research over the past 30 years has shown the importance of illness perception to patient behaviour. Changing a patient's illness perception has been shown to improve recovery following myocardial infarction, and other illnesses such as diabetes mellitus and AIDS (Broadbent et al., 2005). However, according to Scholes et al. (2012), there is limited information available on how the perceptions of adolescents with T1DM vary according to metabolic control levels, limiting the ability of practitioners to support adolescents.

In a recent study done by Goh et al. (2016) it was found that “adolescents with poorer metabolic control tend to have poorer self-care behaviours and hold more negative illness perception when compared with those with good metabolic control” (p. 9-10). Thus, if glycaemic control is not managed adequately, it can potentially increase seizures, cardiac and arrhythmias as well as hypoglycaemia (Barnard et al., 2014).

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1.3 Research paradigm: Pragmatism

Pragmatism can be defined as a philosophical approach or paradigm that encourages people “to seek out the processes and do things that work best to help them achieve desirable ends” (Ozmon & Craver, 2008, p. 119). The origin of pragmatism can be traced back all the way to the classical period, where Academic Sceptics rejected the idea that an absolute truth could be achieved (Smith, 2015). In the 1970s Charles Pierce first used the term pragmatism. The term pragmatism, a Greek word meaning work. Pragmatism is a philosophy of personal experience (Smith, 2015). According to Morgan (2014), pragmatism can be simply defined as, “what works”. Pragmatism is therefore outcome-orientated and is interested in determining the meaning of things (Shanon-Baker, 2016). In pragmatism, the philosophy is based on the belief that theories can be both generalisable and contextual by analysing them for “transferability” to another situation (Shanon-Baker, 2016). Pragmatic researchers are also able to maintain both objectivity on their data collection and data analysis, as well as subjectivity in their own reflections. However, more often pragmatism has been referred to as an approach rather than a paradigm (Morgan, 2007).

The current research is using this approach, because the researcher is trying to determine how illness perception of adolescents who successfully manage T1DM differ from those who do not. The current research is interested in both quantitative and qualitative research, and irrespectively of the approach, method and paradigm they used, the research wants to determine if illness perception has an impact on metabolic control in adolescents diagnosed with T1DM and this is why the current research is done from a pragmatic approach.

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1.4 Contextualisation of this study

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

1.5 Research question

The research question is: How does illness perception of adolescents who successfully manage T1DM differ from those who do not?

1.6 Aim

The aim of the proposed research study is:

- *to identify and summarise key research papers on how illness perception of adolescents who successfully manage T1DM differs from those who do not.*

1.7 Research Methodology and Design

A rapid review will be done so as to ensure that the best available literature is gathered in order to answer the research question of how adolescents who successfully manage type 1 diabetes mellitus differ from those who do not manage their diabetes mellitus in terms of illness perception. According to Grant and Booth (2009), a rapid review is a method of providing an assessment of what is already known about a practice issue or a policy, by using a systematic review approach to search for readily available research.

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The aim of a rapid review is to be explicit in method and rigorous and thus systematic. However, it makes concessions to the depth of the process by restricting particular aspects of the systematic review approach (Grant & Booth, 2009). The methodology of a rapid review identifies several legitimate techniques in which it shortens the timescales. This includes carefully focusing on the research question, using a less sophisticated and broader search strategy, and conducting a review of reviews (Grant & Booth, 2009). By doing this, the researcher will be able to focus on only extracting the key variables and this allows for simple quality appraisal (Harker & Kleijnen, 2012). However, the guidelines that one needs to follow for a rapid review will contribute to answering the research question effectively, competently and rapidly (Harker & Kleijnen, 2012).

In order to identify the available literature, the current research followed five distinct and standardised phases, namely:

- Phase 1: The search for keywords;
- Phase 2: Critical appraisal of compliance with inclusion and exclusion criteria;
- Phase 3: Critical appraisal of quality of selected studies;
- Phase 4: Data extraction; and
- Phase 5: Data analysis.

Phase 1: The Search Strategy

The researcher will search for the keywords as provided below, in the databases, by selecting advance search and entering the first level keyword, as well as the second and third level keywords in the required places. This process will be done twice. Firstly the researcher will search for all titles consisting of the keywords. The process will then be repeated by searching for all abstracts using the keywords. The inclusion and exclusion criteria will be filtered through the Boolean. By referring to Boolean, the researcher will be using a combination of keywords

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and use the three main Boolean operators such as AND, OR and NOT, in order to produce a more accurate and relevant result. The Boolean operators like AND, OR and NOT will combine the inclusion criteria and the specified keywords.

Level 1 keywords (in titles and abstracts) *“illness perception”*

AND

Level 2 keywords (in titles and abstracts) *“adolescen”* OR *“teenage”* OR *“pubescent”* OR *“youth”* OR *“youthful”* OR *“young”* OR *“youngster”* OR *“young person”* OR *“juvenile”* OR *“teen”*

AND

Level 3 keywords (in titles and abstracts) *“diabetes”* OR *“diabetes mellitus”* OR *“type 1 diabetes”*

Readily available literature will be sought and extracted from the North-West University’s database. All literature will be studied and synthesised in the execution of the current research. The proposed design is a formal scientific process in which all attempts will be made to prevent and minimise bias (Grant & Booth, 2009; Hemingway & Brereton, 2009). Specific keywords will be used in order to find relevant literature from the electronic database. All relevant literature will be included (Umscheid, 2013).

The North-West University has access to a variety of electronic databases. This provide easy access to various sources and readily available literature. The databases include: Africa-Wide Information, Applied Science and Technology, CINAHL with Full Text, Environment Complete, Expanded Academic ASAP, Google Scholar, JSTOR, MasterFILE Premier,

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MEDLINE, PsycINFO, SciELO, ScienceDirect, SocINDEX with Full Text and SPORTDiscuss with Full Text. All results will be based upon the empirical evidence of previous research, and will at all times be a fair reflection of the best readily available literature.

The current research will search all readily available literature on the electronic databases of the North-West University, in order to find studies relating to the current research question. An expert at the North-West University of Potchefstroom's library was consulted in order to assist the researcher with finding all the relevant literature available.

Phase 2: Critical appraisal of compliance with inclusion and exclusion criteria

After searching for the relevant studies and literature available, the selected studies will be subjected to a methodological critical appraisal approach. The approach will be done in the following way:

- The researcher will independently examine and review the titles and the abstracts of all the selected studies. The researcher will independently decide on which studies should be included and excluded, based on the inclusion and exclusion criteria in mind. The criteria for the current research will use the National Institute for Health and Care Excellence (NICE) and Quality Criteria Checklists (QCC: ADA, 2008) for all qualitative studies and the Critical Appraisal Skills Programme instrument (Critical Appraisal Skills Programme, 2006) for quantitative studies.
- After this process has been completed, the researcher and study leader will meet in order to establish consensus on which studies should be included and which excluded. If no consensus can be reached by the researcher and the study leader, a third reviewer, with experience with rapid reviews, will be consulted to assist and resolve the disagreement

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and to help to ensure that the selection is done according to the inclusion criteria in an objective manner.

Inclusion criteria

The current research will use the following criteria to include studies for this rapid review:

- The first of these is published and peer reviewed articles, specific to the research question of the review (This is to ensure that the researcher do not deviate from the research question. The researcher has a specific aim in mind, and focusing only on studies that have been peer reviewed and published, will enable the researcher to minimise any risk of including studies that are not published or recognised);
- Secondly there are the studies that focused on illness perception among adolescents diagnosed with type 1 diabetes mellitus (The current research focus is only on adolescents and not on other developmental phases).
- Thirdly there are the studies that focused on illness perception and metabolic control (controlled and uncontrolled management) in adolescents with T1DM (This is to ensure the researcher stays within the aim of the current research and does not deviate from the research question).
- Studies that has been reviewed.
- Finally there are the studies done in English and in Afrikaans.

Exclusion criteria

The current research will use the following criteria to exclude studies for this rapid review:

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- any information that is not empirical, the study will only focus on using empirical studies;
- studies that do not focus on illness perception in diabetes mellitus;
- studies that do not focus on adolescents;
- studies that focus on type 2 diabetes mellitus;
- studies that do not focus on type 1 diabetes mellitus in adolescents;
- studies that do not focus on management in type 1 diabetes mellitus;
- studies that is both not published and peer reviewed literature, specific to the research question of the review;
- conference proceedings.

Phase 3: Critical appraisal of quality of selected studies

The researcher, study leader and the third independent reviewer, if necessary, will then review the selected studies according to standardised criteria. This process will allow the researcher and other reviewers to evaluate whether the studies selected have a sound scientific base.

Phase 4: Data extraction

After identifying the studies that met the inclusion criteria, the studies will be extracted onto an Excel data sheet. The Excel sheet will be drafted in a comprehensive manner, in order to ensure that all the relevant data will be collected (Bettany-Saltikov, 2010). The suitable studies that have been agreed upon by the researcher and the study leader will be extracted to the Excel spreadsheet. This will include: author(s), title of study, aim, sample size and article main finding. The data will then be screened and analysed in order to answer the research question namely:

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How does illness perception of adolescents who successfully manage T1DM differ from those who do not?

Phase 5: Data analysis

Content Analysis

Each study that has been selected by the reviewers will be read and analysed. Content analysis will be used to synthesise the finding across the group of studies selected by the reviewers. Maree (2016) stated that content analysis is “a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding” (p. 111). All relevant studies that have been selected by the reviewers will interpret the finding of the studies with regards to, how illness perception of adolescents, who successfully manage T1DM, differs from those who do not. The analysis for the current research will be inductive, thus allowing the themes to flow from the data, rather than using preconceived categories. However, if no qualitative research is found in the literature search, content analysis will not be used.

Meta-Analysis – for Quantitative Studies

A meta-analysis can be best defined as “a technique that statistically combines the results of quantitative studies to provide a more precise effect of the results” (Grant & Booth, 2009, p.98). Even though many systematic reviews report their results without statistically combining data in this way, it is essential for a good systematic review to do a meta-analysis of the literature. In order to ensure that a meta-analysis is valid, it requires all included studies to be sufficiently similar (Drisko & Grady, 2012; Grant & Booth, 2009). This includes the fact that the characteristics of the population being studied and the comparison being made are similar (Grant & Booth, 2009).

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Kovalchik (2013) pointed out that a meta-analysis may not be appropriate if too few studies are available. Conversely, in another study done by Israel and Richter (2011), they also indicated that, when results vary or/and heterogeneity is possible, a meta-analysis may not be appropriate. The above is also supported by Drisko and Grady (2012). According to Drisko and Grady (2012), they emphasise that a meta-analysis may not be appropriate in a situation where only one or two studies are found on a topic. When the researcher and study leader need to do a meta-analysis, the above-mentioned will be taken into consideration.

Rigour

By doing a rapid review, it will enable the researcher to assess evidence quickly and accurately. One of the main strengths of a rapid review is that it aims to be rigorous and explicit in method and thus systematic (Featherstone et al., 2015; Grant & Booth, 2009; Tricco et al., 2015). However, a rapid review makes concessions to the depth and breadth of the process by limiting certain aspects of the systematic review process. Therefore, a rapid review identifies several valid techniques that are used in order to shorten the timescale (Grant & Booth, 2009; Tricco et al., 2015).

One of the main weaknesses of a rapid review is that it runs the risk of being biased. For any review this is true, but this is emphasised in a rapid review, when measures are fast-tracked. Minimising the amount of time it takes to search for literature may result in publication bias (Featherstone et al., 2015; Grant & Booth, 2009). Another concern is that, when limiting quality assessment, it may cause a disproportionate emphasis on poorer quality research (Grant & Booth, 2009).

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Trustworthiness

In order to ensure that a study is rigorous, a researcher should seek to achieve the following: “to create an account of method and data which can stand independently so that another trained researcher could analyse the same data in the same way and come to essentially the same conclusion” (Mays & Pope, 1995, p.110).

Ethical Considerations

The current research will at all times acknowledge the work of others, and all findings and conclusions of the proposed research will be conducted in an ethical manner at all times. The appropriate reference and citation method will also be used consistently in order to reference the authors who will be cited in the text. Plagiarism is a serious offence and an ethical violation. All means necessary will be adapted in order to prevent any plagiarism from occurring, whether intentionally or unintentionally (Park, 2003). When, ideas, words, findings and results are used from other studies, the original authors will be acknowledged at all times (Park, 2003). A rapid review reports findings from other studies and special care will be taken in the current research to ensure that all authors being cited will be acknowledged at all times. All data gathered for the current research will be recorded accurately and no information or ideas will be falsified. All information gathered will be reviewed independently by at least two reviewers to prevent the final synthesis from being skewed as far as possible. The overarching umbrella research project, in which the overarching study explored psycho-social variables in adjusting to diabetes mellitus management in adolescents and young adults (NWU-HS-2015-0111), will use participants, questionnaires and interviews. However, the current research will do a rapid review. This means that there will be no participant involvement and no questionnaires or interviews will be conducted. The current research, Illness perception in adolescents with controlled and

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uncontrolled diabetes: a rapid review, obtained ethical approval as well (NWU-HS-2015-0111), see Addendum 1.

1.8 Outline of Study

Section 1 of the mini dissertation includes a general introduction to diabetes mellitus, in which it covers T1DM, its origin, aetiology, epidemiology, diagnostic criteria, complications and management of it. It also includes the research paradigm of the study, as well as the methodology used to conduct this study.

In section 2 of the mini dissertation, the researcher clearly outlines the guidelines of the *Health SA Gesondheid - Journal of Interdisciplinary Health Science*, and also includes the proposed manuscript, titled: *Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review*.

In section 3 of the mini-dissertation, a critical reflection is completed by the researcher, and a complete reference list is included.

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SECTION 2: ARTICLE

Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

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

Description

Health SA Gesondheid – Journal of Interdisciplinary Health Sciences, is an open access, peer-reviewed interdisciplinary and inter-professional scholarly journal that aims to promote communication, collaboration and teamwork between professions and disciplines with the health sciences to address problems that cross and affect disciplinary boundaries.

Health SA Gesondheid – Journal of Interdisciplinary Health Sciences publishes original articles on issues related to public health, including implications for practical applications and service delivery that are of concern and relevance to Africa and other developing countries. It facilitates the gathering and critical testing of insights and viewpoints on knowledge from different disciplines involved in health service delivery.

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- improvement of health safety and service delivery
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- evaluation and assessment of health care needs

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Introduction

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results. The introduction should include the following:

- Research problem statement
- Purpose (aims) and objectives
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Note to the reader

The article in Section II of this current research, titled: *'Illness Perception in Adolescents with Controlled and Uncontrolled Type 1 Diabetes Mellitus: A Rapid Review'* is written in accordance with the author guidelines of the *Health SA Gesondheid Journal of Interdisciplinary Health Sciences* (please refer to pp. 41-65 of this current research). **Even though these guidelines stipulate adherence to the editorial and referencing style described in the Publication Manual (6th edition) of the American Psychological Association, numbering of the subsections of the article is required (please refer to p. 48 of this current research).** 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. 58 of this current research). The article in Section II of this current research, titled: *'Illness Perception in Adolescents with Controlled and Uncontrolled Type 1 Diabetes Mellitus: A Rapid Review'* has a total word count of exactly 4069 words and a total of 149 words within the abstract. There are also 40 references in the text and the reference list.

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Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

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2.2 MANUSCRIPT

Abstract

Adhering to a challenging diabetes mellitus regimen and maintaining plasma-glucose levels at a near normal range is extremely important. The aim of the research was to identify and summarise key research papers on how illness perception of adolescents who successfully manage type 1 diabetes mellitus (T1DM) differs from those who do not. A rapid review was done through a comprehensive and stepwise keyword search using Boolean operators to combine keywords and inclusion criteria. Quality assessment was done, and three articles were included in the study. From the publications that were reviewed, one publication found that illness perception does impact metabolic control, and one publication found that there is a correlation between illness perception and metabolic control but only in adolescent females. Another publication found that there is no correlation. There is limited information available on how illness perception of adolescents diagnosed with T1DM varies according to metabolic control levels.

Keywords: Adolescents, illness perception, metabolic control, type 1 diabetes mellitus, controlled diabetes management, uncontrolled diabetes management

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Illness perception in adolescents with controlled and uncontrolled diabetes: a rapid review

1. Introduction

The incidence rate for diabetes mellitus is increasing all over the world (Paterson et al., 2014). It is estimated that 79000 children worldwide are being diagnosed with Type 1 Diabetes Mellitus (TD1M) yearly (Paterson et al., 2014). According to the International Diabetes Federation (IDF), there is an annual global increase of approximately 86 000 new childhood TD1M cases annually (IDF, 2015). According to research done by Davidson (2014), diabetes mellitus is becoming more common and is often diagnosed in children between the ages of 10 to 14 years old. Overall, it is anticipated that these figures will double by 2025 (Davidson, 2014).

1.1. Problem Statement

There is currently no cure available for TD1M. In fact TD1M is a life-long chronic disease that needs to be managed effectively by the diagnosed individual, in order to increase his/her health outcomes (Liles & Juhnke, 2008). An individual diagnosed with diabetes mellitus, has to take medication either orally or by means of injections, do regular blood glucose testing, exercise regularly and must have a diet that excludes certain foods (Silverstein et al., 2005). To determine if an individual is adhering to the above prescribed treatment and diet, a measurement was developed in order to objectively assess the glycosylated haemoglobin (Hb1Ac) over a period of three months. The HbA1c results should be below 7.5% (IDF, 2015). However, less than one third of people living with diabetes mellitus manage their diabetes mellitus effectively, this putting themselves at risk of developing associated complications (Babler & Strickland, 2015; Bryden et al., 2001).

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Goh et al. (2016), found that “adolescents with poorer metabolic control tend to have poorer self-care behaviours and hold more negative illness perception when compared with those with good metabolic control” (p. 9-10). Therefore, if glycaemic control is not managed effectively, it can potentially lead to promoting cardiac arrhythmias and seizures as well as hypoglycaemia (Barnard et al., 2014).

Scholes et al. (2012) and Goh et al. (2016), identified that there have been studies that focused on illness perception in diabetes mellitus. However, limited research was found on whether there is a difference in illness perception among adolescents with controlled and uncontrolled diabetes mellitus. In the current research, the researchers refers to metabolic control as controlled and uncontrolled. Controlled is when the HbA1c levels are below 7.5% (IDF, 2015), uncontrolled is when the HbA1c levels are above 7.5% (IDF, 2015).

1.2. Type 1 diabetes mellitus (T1DM)

T1DM is characterised by hyperglycaemia that results from absolute deficiency of insulin secretion, which leads to permanent dependence on exogenous insulin administration (Chaing, Kirkman, Laffel & Peters, 2014; Craig et al., 2014; Paterson et al., 2014; Scholes et al., 2012). Without insulin secretion, the body is unable to produce glucose effectively (La Greca & Mackey, 2009). Even though there are various stages of prediabetes (American Diabetes Association, 2014; Craig et al., 2014; Klandorf & Stark, 2017; La Greca & Mackey, 2009), the clinical onset of diabetes is typically manifested by hyperglycaemia and is usually associated with several symptoms such as excessive thirst, weight loss, fatigue and frequent urination (American Diabetes Association, 2014; Chaing et al., 2014; Craig et al., 2014).

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1.3. Adolescents with diabetes mellitus

Adolescence is a transitional developmental phase between childhood and adulthood, which includes both psychological and biological changes that are associated with puberty (Leonard, Garwick & Adwan, 2005). Mazze et al. (2012), stated that the peak onset for T1DM is during puberty. During puberty adolescents are more vulnerable to the development of diabetes, as well as the psychological crises and conflicts that are associated with this developmental phase (Craig et al., 2014; Leonard et al., 2005). Diagnosing an adolescent with a life-threatening chronic disease such as diabetes mellitus can become a highly stressful and challenging event (Malik & Koot, 2012). Diabetes mellitus related challenges for adolescents can include dealing with social situations, navigating the transition to self-management, creating personal meaning, preventing or even delaying them from addressing certain developmental tasks such as identity development and increasing their risk of developing psychological issues such as suicidal ideation, adjustment difficulties, depression, anxiety, lower levels of self-esteem and social withdrawal (Chiang et al., 2014; Luyckx et al., 2008; Williams, Sharpe & Mulan, 2013).

Living with T1DM and being simultaneously confronted with multifaceted developmental changes can be exceptionally challenging for adolescents (Comeaux & Jaser, 2010; Griva, Myers & Newman, 2000). Therefore, the strict treatment regimen and a variety of distinct tasks that are required to be done can increase adolescents' experience of physical, social and emotional distress (Cheung, Young Cureton & Canham, 2006; Coffen, 2009; Yi-Frazier, Hilliard, Cochrane & Hood, 2012). Adolescents diagnosed with diabetes mellitus are confronted with the necessity of successfully integrating diabetes mellitus management into their lives, while at the same time struggling with the psychological and physiological changes that occur during adolescents (Graue, Wentzel-Larsen, Bru, Hanestad & Sovik, 2004). However, not all adolescents' treatment regimens

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deteriorate, as some adolescents accept their responsibility to adhere for adhering to their treatment requirement (Scholes et al., 2012).

1.4. Illness perception

Illness perception has been increasingly used to explain how individuals adjust when they are diagnosed with a chronic illness (Hurt et al., 2014; Petrie et al., 1997). Hurt et al. (2014) pointed out that individuals have a range of different beliefs regarding their illness and this ultimately influences their mental and physical well-being as well as their coping strategies. Hagger and Orbell (2003) demonstrated in their study that various conditions have a robust linear relationship between illness perception and a range of physical and mental health outcomes. For example, when an individual has a strong illness identity and believes that the illness has a chronic timeline and perceives that an illness has severe consequences, it may cause or lead to negative physical and mental health outcomes (Hagger & Orbell, 2003; Hurt et al., 2014). However, if an individual strongly believes that an illness can be cured and managed, it correlates with a positive mental and physical health outcome. A patient's illness perception is found to be a very important determinant of behaviour and can also be associated with several important outcomes such as treatment adherence and functional recovery. According to Petrie et al. (2007) there is a regular pattern in which patients structure their perceptions of an illness. Illness perception usually consist of several components that are found in the Common Sense Model. These components include *identity component*, *causal component*, *time line component*, *consequences component* and *cure component* (Petrie et al., 2007). The *identity component*, consists of different beliefs associated with the name of the illness and the range of the symptoms (Griva et al., 2000; Petrie et al., 2007). The *causal component*, indicates the perception the patient most likely has on the cause or causes of the illness (Weinman, Petrie, Moss-Morris & Horne,

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1996). The *time component*, indicates the patient's perception the possible duration of their health problems, and these have been categorised as acute, chronic and cyclical (Broadbent, Petrie, Main & Weinman, 2005; Griva et al., 2000). The *consequences component* reflects the patient's beliefs on how severe the illness is and what possible impact the illness will have on their physiological, psychological and social functioning (Weinman et al., 1996). The final component of illness perception is the *cure component*, this consist of the degree to which a patient believes that their illness is amenable to control or cure (Broadbent et al., 2005; Weinman et al., 1996). Illness perception is also constantly being updated as a patient gain new knowledge about an illness or even when they experience a new illness (Jansen et al., 2013).

1.5. Aim of the Study

The aim of the research was to identify and summarise key research papers on how illness perception of adolescents who successfully manage type 1 diabetes mellitus (T1DM) differs from those who do not

2. Material and methods

The current research took the form of a rapid review of the literature. A rapid review can be best defined as a method of providing an assessment of what is already known about a policy or issue, by using a systematic review approach to search for readily available research (Grant & Booth, 2009). A rapid review was done in order to provide recommendations for future studies to be conducted with the aim if understanding the relationship between illness perception and diabetes mellitus management among adolescents.

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2.1. Search method

Readily accessible literature was searched for and extracted from the North-West University's databases. The North-West University has access to a range of electronic databases, which therefore gives easy access to various sources and readily available literature. These databases include: Africa-Wide Information, Applied Science and Technology, CINAHL with Full Text, Environment Complete, Expanded Academic ASAP, Google Scholar, JSTOR, MasterFILE Premier, MEDLINE, PsycINFO, SciELO, ScienceDirect, SocINDEX with Full Text and SPORTDiscuss with Full Text. The abstract and titles were searched using the following keywords: illness perception, adolescents (adolescen, teenage, pubescent, youth, youthful, young, youngster, young person, juvenile, teen) and diabetes (diabetes, diabetes mellitus, type 1 diabetes). The searches were linked with Boolean terms as ("illness perception") AND ("adolescen" OR "teenage" OR "pubescent" OR "youth" OR "youthful" OR "young" OR "youngster" OR "young person" OR "juvenile" OR "teen") AND ("diabetes" OR "diabetes mellitus" OR "type 1 diabetes").

2.2. Inclusion criteria

The inclusion criteria for the current research were as follows: (1) published and peer reviewed articles, specific to the research question of the review; (2) studies that focused on illness perception among adolescents diagnosed with type 1 diabetes mellitus; (3) studies that focused on illness perception among adolescents with controlled and uncontrolled management of their condition; (4) reviewed studies; (5) only ethically approved published and reviewed articles was used and; (6) studies done in English or in Afrikaans.

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2.3. Exclusion criteria

The exclusion criteria for the current research were as follow: (1) any information that is not empirical, the study only focused on using empirical studies; (2) studies that do not focus on illness perception in diabetes mellitus; (3) studies that do not focus on adolescents; (4) studies that focus on type 2 diabetes mellitus; (5) studies that do not focus on type 1 diabetes mellitus in adolescents; (6) studies that do not focus on management in type 1 diabetes mellitus; (7) studies that have not been published and peer reviewed literature, specific to the research question of the review; (8) conference proceedings and; (9) Published and reviewed articles that has not obtained ethical approval.

2.4. Sampling method

The selected studies were subjected to a methodological critical appraisal approach. The approach was done in the following way: Both the author and the co-authors examined and reviewed the titles and the abstracts of all the selected studies. Both the author and the co-authors decided independently on what studies should be included and excluded.

2.5. Analysis

The authors wanted to use content analysis in order to analyse all the qualitative studies, and meta-analysis in order to analyse all the quantitative studies found in the search. However, no qualitative studies were found in the literature search, meaning no content analysis was done. For the quantitative studies found in the literature search, only three studies were included. These studies were selected, as shown in Figure 1.

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A meta-analysis could not be done due to the small range of literature being available. Kovalchik (2013) pointed out that a meta-analysis may not be appropriate if the studies that were available are too few. This is also supported by Israel and Richter (2011). When results vary or/and heterogeneity is possible, a meta-analysis may not be appropriate. According to Drisko and Grady (2012), a meta-analysis may not be appropriate in a situation where only one or two studies are available.

The authors discussed the included studies, and looked for any similarities and/or discrepancies in their findings in order to formulate an analysis. The authors compared the following across the included articles: definitions of illness perception, diabetes and adolescents. The age range of adolescents, what measurements were used to measure illness perception, did they use HbA1c and ultimately what was the findings and conclusions.

2.6. Ethical principles

The current research inquiry was conducted within the context of the ethically approved overarching umbrella research project, in which the overarching study explored psycho-social variables in adjusting to diabetes mellitus management in adolescents and young adults (NWU-HS-2015-0111). Ethical approval was obtained for the current research under NWU-HS-2015-0111. All studies used for the review were also ethically approved. The current research has minimal/no risk involved, and no participants were involved. The current research acknowledged the work of others at all times, and the appropriate citation and reference method was used at all times in order to prevent any intentional and/or unintentional plagiarism.

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3. *Results and Findings*

The initial search returned 11 unique publications, of which only six met the inclusion criteria 1–3 and were assessed (Fig. 1). After systematically excluding publications that did not meet the other inclusion criteria three studies remained. Both the author and co-authors agreed that the publications met the inclusion criteria. The publications dated from 2016-2017. The publications used for the current research appeared in three unique journals, being published in the *Journal of Psychology and Medicine* (n=1), the *Journal of Diabetes Research* (n=1) and the *Journal of Health Psychology and Behavioral Medicine* (n=1). The research process can be visually represented as shown below in Figure 1.

<Insert Figure 1 Approximately here>

Goh et al. (2016) investigated the associations of self-care, illness perception and in psychological distress with metabolic control in Singaporean adolescents with T1DM. They had a total of 41 participants between the ages of 14-20 years old, who completed measures of self-care, illness perception and psychological distress. Goh et al. (2016) used HbA1c levels in order to explore the dose-effect relationship and also classify good versus poor metabolic control, which the current research refers to as controlled and uncontrolled. In their research they found that 65.9% of their participants had poor metabolic control. Goh et al. (2016) explained their findings in the following way: according to their Pearson Product-Moment correlations and Spearman rank-order correlations between HbA1c and self-care, illness perception and psychological distress, higher levels of HbA1c were associated with lower self-care, lower beliefs in treatment control, lower coherence and higher levels of psychological distress. According to their dichotomised analyses, adolescents with poor metabolic control reported lower levels of adherence to general diet, foot care and lower perceptions of treatment control, compared with

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good metabolic control (Goh et al., 2016). In their discussion they point out that adolescents with poor metabolic control tend to have more negative illness perceptions when compared to adolescents with have good metabolic control (Goh et al., 2016). They postulate that with a bigger sample a stronger relationship might emerge.

Wisting et al. (2016), investigated the associations between HbA1c, psychosocial factors and eating disorder psychopathology in adolescent males and females diagnosed with T1DM. They found that there were significant gender differences, and that no variables contributed significantly to the variance in adolescent males. However, the overall model including coping strategies, illness perception and eating disorder psychopathology explained 30% of the variance among the HbA1c among females. They did a backward elimination strategy, and found that, the illness perception *personal control* was significantly associated with HbA1c, and thus explained 23% of the variance (Wisting et al., 2016). However, Wisting et al. (2016) found that the association between illness perception and HbA1c was apparent when they examined the correlation matrix (Wisting et al., 2016). With regards to the Brief Illness Perception Questionnaire that they used, the subscales consequences, coherence, personal control and concern, were associated with HbA1c in females, but not in males (Wisting et al., 2016). The more negative perceptions the participants had of their diabetes, the higher levels of HbA1c that were indicated. However, this was noted in adolescent females and no correlation could be found in adolescent males. (Wisting et al., 2016). Wisting et al. (2016) pointed out that “the association between illness perception and HbA1c suggest the importance of attention to patients’ views and perceptions of their diabetes in clinical settings, especially among females” (p 5).

Terrasson et al. (2017), found that there were differences between parents’ illness perception and the perceptions recognised by their children. Their multiple linear analysis partly supports

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their hypothesis about the impact of illness perception on adolescents' quality of life. Terrasson et al. (2017) pointed out that they did not find a correlation between illness perception and HbA1c. However, according to Terrasson et al. (2017), the reason for no correlation might be the fact that illness perceptions impact metabolic control in adolescent females and not in adolescent males as stated in Wisting et al (2016). Studies included into the rapid review can be seen in Table 1.

<Insert Table 1 Approximately here>

4. Discussion

This rapid review appraised illness perception of adolescents with controlled and uncontrolled T1DM. While there is limited information available on how illness perception impacts metabolic control, three studies were identified through the search. The authors could not do a meta-analysis due to the small number of publications found. A content analysis could not be done as well, as there were no qualitative publications available.

As pointed out by Goh et al. (2016), adolescents with poor metabolic control tend to have more negative illness perception when compared to adolescents who have good metabolic control. Goh et al. (2016) also indicated that if a bigger sample has been used a stronger relationship might have emerged. Wisting et al. (2016), concluded that illness perception seems to be important contributor to metabolic control, however this was only seen in adolescent female patients with T1DM and not in adolescent males. Terrasson et al. (2017), indicated that they did not find any correlation between illness perception and HbA1c levels. Nevertheless, they referred to Wisting et al. (2016), in which they stated that the reason they did not find a

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correlation might have been because illness perception impacts metabolic control in females with T1DM and not males.

All of the above studies have concluded something different. Goh et al. (2016) found that there is a correlation. Wisting et al. (2016), find a correlation but, only in females, and Terrasson et al. (2017), found that there is no correlation at all. At this stage there is no consensus found in the studies collected through the rapid review. This highlights a big concern, because according to Petrie et al. (2007) and Broadbent et al. (2005), illness perception is very important to patient behaviour and improving a patient's illness perception has shown to improve recovery.

The researchers looked at several other factors within the studies that were used to determine why there is no agreement concerning the impact of illness perception in adolescents with T1DM. The researchers compared definitions of illness perception, looked at the samples used in all studies, looked at what else the studies measure and how it as measured or was it focusing only on illness perception? How did they measure illness perception? What age range did they use in order to define adolescents?

In all of the studies their definitions of illness perception are the same. They all defined illness perception as an individual's perception or beliefs about his/her illness and that illness perception is central to patient behaviour in a variety of illnesses (Goh et al., 2016; Terrasson et al., 2017; Wisting et al., 2016). With regards to measuring illness perception in the studies, Goh et al. (2016) used The Brief Illness Perception Questionnaire (BIPQ), whereas as Wisting et al. (2016), that found that there is a correlation between illness perception and metabolic control only in females with TD1M, used the BIPQ and Illness Perception Questionnaire-Revised (IPQ-R). Terrasson et al. (2017), found no correlation at all used the IPQ-R. Terrasson et al. (2017), indicated that they used the French version of the IPQ-R on all of their participants. Whether the

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measurements used caused the difference in correlations is unknown, however, it does identify another gap with regards to illness perception in adolescents with T1DM.

All of the studies used for the review had different samples. The only similarity with their samples was that their age range for adolescents was more or less the same. The age range was between 11 and 20 years of age. Goh et al. (2016), focused on Singaporean adolescents in which the sample consisted of 24 Chinese, nine Malay, four Indian and two other ethnicities. They had a total of 41 adolescents that ranged between the ages of 14-20 years old. Wisting et al. (2016), had a total of 105 Norwegian adolescents who ranged between the ages of 12-20 years old. Their sample consisted of 44 females and 61 males, but there was no significant difference between the two gender groups. Terrasson et al. (2017) had a total of 41 adolescents aged between 11-18 years of age, and also had 47 parents included in the study. All of their participants were French. Whether the sample caused the difference between the correlation of illness perception and metabolic control is unknown, yet, again another gap is pointed out, in asking the question: does culture, language, ethnicity or gender impact the correlation between illness perception and metabolic control?

With regards to what the studies in the review measured, all of them combined their studies with other variables and did not focus only on illness perception and the impact it has on metabolic control. Goh et al. (2016) measured the associations of self-care, illness perception and psychological distress, Wisting et al. (2016) investigated the associations between HbA1c and coping strategies, eating disorder psychopathology, illness perception and beliefs concerning insulin; Terrasson et al. (2017), were interested in the associations between quality of life in adolescents with T1DM and also at parents' illness perception as evaluated by adolescents.

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There is limited information available on how illness perception of adolescents who successfully manage T1DM differs from those who do not. It wouldn't be wise to generalise at all at this stage to say that illness perception does have an impact on adolescents with T1DM with regards to metabolic control. Goh et al. (2016) support the correlation between illness perception and metabolic control, Terrasson et al. (2017) found no correlations while Wisting et al. (2016) found that it does have an impact, however only in female adolescents. More research will need to be done in order to find out whether adolescents who successfully manage their T1DM differ from those who do not in terms of illness perception.

5. Conclusion

In conclusion, the current research contributes to the growing body of knowledge, in that there is limited information available on how illness perception of adolescents who successfully manage T1DM differs from those who do not. The current research could not point out the correlation between illness perception and T1DM in adolescents. However, the research made a contribution in identifying gaps and shortage of research about how adolescents who successfully manage T1DM differ from those who do not in terms of illness perception. There is at present limited information available on how illness perception of adolescents with T1DM varies according to metabolic control levels, thus inhibiting treatment. Finally, more research should be done in order to determine where adolescents who successfully manage their T1DM differ from those who do not in terms of illness perception and determine if gender plays a role.

5.1. Recommendations for Future Research

The study contributed by revealing several gaps with regards to how illness perception of adolescents who successfully manage T1DM differs from those who do not. Future research

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needs to focus on; (1) doing more research to determining whether there is a correlation between illness perception and metabolic control in adolescents with T1DM as pointed out in the discussion; (2) whether the different measures used to assess illness perception are accurate and whether only one standard measurement should be used instead of having multiple opinions; (3) whether culture, language, ethnicity or gender has an impact on the correlation between illness perception and metabolic control.

5.2. Limitation of study

One of the main limitations with regards to the current research is that there is limited research available with regards to how adolescents who successfully manage TD1M differ from those who do not in terms of illness perception. The current research could not determine if adolescents who successfully manage TD1M differ from those who do not in terms of illness perception. This is mainly due to insufficient research done. Another limitation would be that a formal data analytic approach was not used due to the amount of research that was gathered. However, the researchers were able to identify several gaps within the field, and could make several recommendations.

Declarations

1. This research did not receive any specific grant from agencies in the public, commercial, or not-for-profit-sectors.
2. Conflict of interest: none

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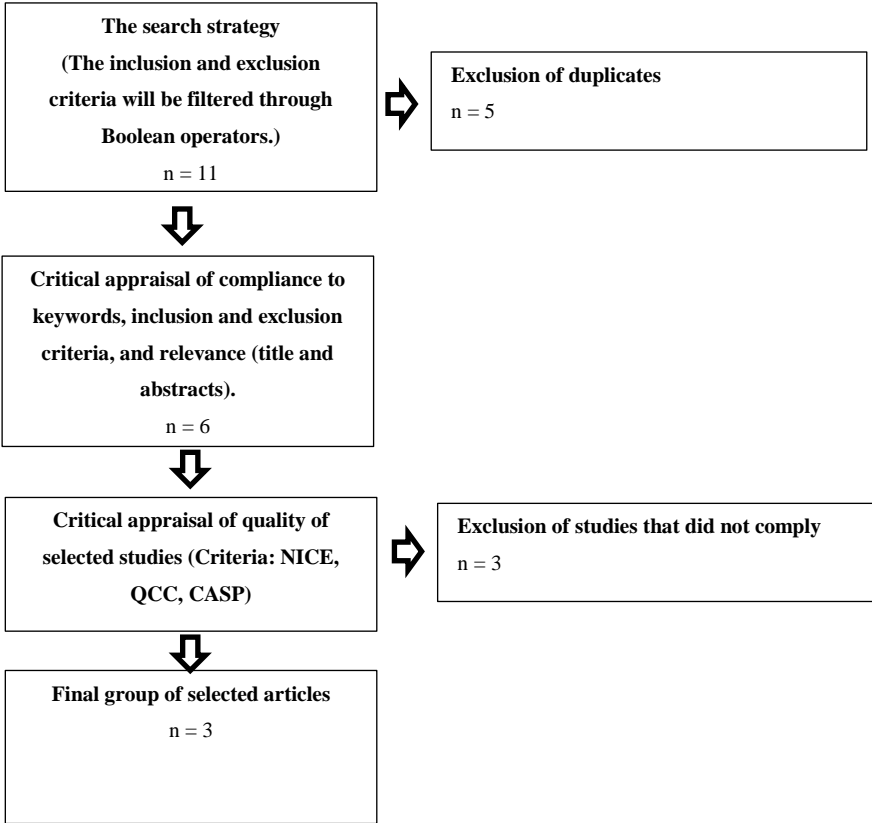


Figure 1 - A visual presentation of the rapid review

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Table 1 – Summary of selected articles

	Authors	Title of Study	Aim	Sample Size	Articles Main Finding
1	Wisting et al., (2016)	Metabolic Control and Illness Perception in Adolescents with Type 1 Diabetes	To explore the associations between metabolic control and eating disorders psychopathology, coping strategies, illness perception, and insulin beliefs' in adolescents with type 1 diabetes	n = 105 (41.9% males with type 1 diabetes between the ages of 12 - 20 years old)	Illness perceptions appear to be important contributors to metabolic control in females, but not in males, with type 2 diabetes.
2	Terrasson, et al., (2017)	Association between quality of life of adolescents with type 1 diabetes and parents' illness perception as evaluated by adolescents	Investigating possible links between the quality of life of adolescent patients with type 1 diabetes and illness perception measured in terms of the adolescents' self-perception, parents' self-perceptions, and the adolescents' evaluations of their parents' perceptions	n = 41 adolescents n = 47 parents	From their multiple linear regression analysis partly supports the researchers' hypothesis about the impact of illness perceptions on adolescents' quality of life, as it shows that part of the variance in quality of life.
3	Goh et al., (2016)	The associations of self-care, illness perception and psychological distress with metabolic control in Singaporean adolescents with Type 1 Diabetes Mellitus	Investigating the associations of self-care, illness perceptions and psychological distress with metabolic control in Singaporean adolescents with Type 1 Diabetes Mellitus	n = 41 adolescents	The results highlight the importance of perceptions of treatment control and dietary self-care in diabetes outcomes for adolescents with T1DM.

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SECTION 3: CRITICAL REFLECTION

3.1 Introduction

The scope of the current research falls within the realm of the social sciences. The current research set out to summarise the best available research on how adolescents who successfully manage type 1 diabetes mellitus (T1DM) differ from those who do not in terms of illness perception. In this section of the current research, a critical reflection was done, that included a short reflection on the process of completing the current research along with the limitations and recommendations for future research

3.2 Research aim and objectives of the study

The aim of the proposed research study was:

- *to identify and summarise key research papers on how illness perception of adolescents who successfully manage type 1 diabetes mellitus differs from those who do not.*

3.3 Conclusion of findings

In conclusion, the current research pointed out that there is limited information available on how illness perception of adolescents who successfully manage T1DM differs from those who do not. As pointed out by Scholes et al. (2012) as well, there is limited information available on how perceptions of adolescents with T1DM vary according to metabolic control, limiting practitioners' ability to support adolescents.

Three studies were included in the current research that met the inclusion criteria. However, none of the studies produced similar findings. One study pointed out that there is no correlation between illness perception and metabolic control in adolescents with T1DM (Terrasson et al.,

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2017). Another pointed out that there is a correlation between metabolic control and illness perception (Goh et al., 2016), while the final article claimed that there is a correlation between illness perceptions and metabolic control, but only in females diagnosed with T1DM (Wisting et al., 2016).

3.4 Limitations of study

The limitations with regards to the current research will be stipulated below.

- One of the main limitations is that there is limited research/information available with regards to how adolescents who successfully manage TD1M differ from those who do not in terms of illness perception. This prevented the researchers from making a conclusion with regards to whether there is a correlation between illness perception and metabolic control in adolescents with T1DM. However, this did not have an impact on the findings of the current research, as the researchers were able to identify several gaps.
- Most of the studies within the review are cross-sectional and another limitation is that there are no longitudinal studies. A longitudinal study would be able to provide more thorough and rich information with regards to the correlation between illness perception and metabolic control in adolescents with TD1M.

3.5 Recommendations

In light of the limitations pointed out above by the researcher, the following recommendations could be made for future research.

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- Future research should focus on doing more research to determine whether there is a correlation between illness perception and metabolic control in adolescents diagnosed with T1DM.
- The findings illustrated that the studies used different measurements to measure illness perception. Two measurements were used: The Illness Perception Questionnaire-Revised (IPQ-R) and the Brief Illness Perception Questionnaire (BIPQ). Future research should focus on whether the different measurements used to measure illness perception are accurate and whether or not one standardised measurement should be used instead of having an option of selecting one.
- The findings also illustrated that all the studies used different sample groups. The only similarity between the groups was that they were all adolescents. Future research should focus on whether culture, language, ethnicity or gender have an impact of the correlation between illness perception and metabolic control.

3.6 Reflection of the researcher

The value of this mini-dissertation was that it enabled the researcher to learn more about how illness perception has an impact on adolescents with regards to metabolic control. The researcher set out to summarise the best available research on how illness perception impacts metabolic control in adolescent diagnosed with T1DM.

One of my friends was diagnosed with T1DM in 2013 and psychologically and physically it had a major impact on him, and still does today. He struggled to follow the strict treatment regimens, faced challenges on a daily basis that he did not always share with us and was in and out of hospital on several occasions. However, we could see that it had a severe impact on his

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life, as he was losing weight rapidly. He complained about the injections, and got frustrated, because he was not allowed to eat certain food, or drink certain beverages any more. This made me wonder; why do certain people accept their diagnosis of any chronic illness and adapt to the strict treatment regimens, and why do certain people struggle to accept their diagnosis and refuse to, or struggle to adapt to the strict treatment regimens? However, conducting this study and reading up about diabetes mellitus, and reading of the effect it has on one's body, and the psychological challenges that exacerbate an already complex disease, was a mind-altering experience, in which I as a researcher was able to broaden my knowledge and understanding of diabetes mellitus.

My aim with the current research was to answer my above-mentioned question. Why can some people adapt and why don't others? It was clear from the findings that there are similar questions being asked recently, especially among adolescents diagnosed with T1DM. Research pointed out that illness perception does have a major role to play in how a diagnosed individual manages a chronic illness. However, there is limited information available about how illness perception does have an impact on metabolic control in adolescents.

Even though there was limited information available on how illness perception of adolescents who successfully manage T1DM differs from those who do not, I do believe that the current research was successful in pointing out several gaps within this specific field. Current research is stating that illness perception is important in managing a chronic illness, yet there is limited research available on how it impacts adolescents.

Reflecting on my experience as a research psychology student, my academic journey has been challenging but yet it broadened my thinking beyond my expectations. In the beginning I was confused and the task at hand looked challenging. I did not know how I was going to

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complete my masters and work at the same time. However, setting firm goals and deadlines helped me accomplished what I needed to do. This was a great learning experience and definitely expanded my knowledge and experience. With regard to the mini-dissertation, I learned a lot from my supervisor and I appreciated that fact that she was able to assist and push me to do better. This was an exciting journey and it definitely empowered me in many ways. I developed and gained more skills as a researcher, I improved my writing and ways of thinking about a topic at hand. I am grateful for the opportunity and I enjoyed the challenges while doing my Master's degree.

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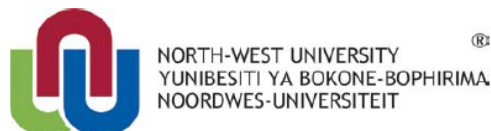
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Addendum A - Ethical approval certificate of overarching larger study and current study



NORTH-WEST UNIVERSITY
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ETHICS APPROVAL CERTIFICATE OF STUDY

Based on approval by the Humanities and Health Research Ethics Committee (HHREC) on 13/04/2017, 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.

Study title: Psycho-social variables in adjusting to diabetes management in adolescents and young adults.																															
Sub-study title: Illness perception in adolescents with controlled and uncontrolled diabetes: A rapid review																															
Study Leader/Supervisor: Dr E Deacon																															
Student: N Prinsloo																															
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="4">Institution</td><td colspan="4">Year</td><td colspan="7">Project Number</td></tr></table>	N	W	U	-	HS	-	2	0	1	5	-	0	1	1	1	Institution				Year				Project Number						
N	W	U	-	HS	-	2	0	1	5	-	0	1	1	1																	
Institution				Year				Project Number																							
Application Type: Sub-study																															
Commencement date: 2017-04-01	Expiry date: 2018-08-10 Risk: Minimal																														

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 study leader (principle investigator) must report in the prescribed format to the NWU-IRERC via HHREC:
 - annually (or as otherwise requested) on the monitoring of the study, and upon completion of the study
 - without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.
- Annually a number of studies may be randomly selected for an external audit.
- The approval applies strictly to the proposal as stipulated in the application form. Would any changes to the proposal be deemed necessary during the course of the study, the study leader must apply for approval of these amendments at the HHREC, prior to implementation. Would there be deviation from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.
- The date of approval indicates the first date that the study may be started.
- 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 study;
 - 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 study 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 amendments, annual (or otherwise stipulated) report and reporting of adverse events or incidents was not done in a timely manner 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 study. Please do not hesitate to contact the IRERC or HHREC for any further enquiries or requests for assistance.

Yours sincerely

Prof LA
Du Plessis

Digitally signed by
Prof LA Du Plessis
Date: 2017.04.20
08:39:52 +02'00'

Prof Linda du Plessis

Chair NWU Institutional Research Ethics Regulatory Committee (IRERC)