Investigating the daily need satisfaction and work engagement of nurses: A diary study

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Mini-dissertation accepted in partial fulfilment of the requirements for the degree Master of Commerce in Industrial Psychology at the North-West University

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Graduation: October 2019

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COMMENTS

The reader is reminded of the following:

- The editorial style of this manuscript follows the guidelines of the South African Journal of Industrial Psychology (SAJIP).

- The referencing in this mini-dissertation follows the format prescribed by the Publication Manual (6th edition) of the American Psychological Association (APA). These practices are in line with the policy of the Programme in Industrial Psychology of the North-West University (Potchefstroom) to use the APA style of referencing in all scientific documents.

- The mini-dissertation is presented in the form of a research article.

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude and appreciation to those who have made this research study possible:

- My Heavenly Father for this opportunity, the career path He chose and granted me. Thank you for the people He chose to be part of this proses, for without them I could have done none of this.

- My parents for your unconditional love and support over the years. Thank you for believing in me and always giving me the emotional support and wisdom that I needed. I will forever be grateful.

- To my best friend and greatest support, my husband EP Horn. Thank you for your patience, support and motivation. Thank you for always being around when I was busy working, all the treats and encouragement when it was much needed. I look forward to take on any challenges in the future with you.

- My supervisor, Prof. Leon de Beer, for your enthusiasm, professionalism, direction, patience, great humour and encouragement throughout the process. I will remember the day we sat in your office, brainstorming and trying to pick a research topic. We decided that we are ready for a challenge - and it was, but you made it worthwhile, thank you.

- To all my family members and friends which played important roles during the process. Thank you for the support, showing interest and all the love.

DECLARATION

I, **Jo-Mari Liebenberg**, hereby declare that 'Investigating the daily need satisfaction and work engagement of nurses: A diary study' is my own work and that the views and opinions expressed in this work are those of the author and relevant literature references as cited in the manuscript.

I further declare that the content of this research will not be submitted for any other qualification at any other tertiary institution.

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28 March 2017

Ms J Liebenberg
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Dear Ms Liebenberg

ETHICAL CLEARANCE

This letter serves to confirm that the research project of Jo-Mari Liebenberg, with the title *"Investigating the daily need satisfaction and work engagement of nurses: A diary study"* has undergone ethical review. The proposal was presented at a Faculty Research Meeting and accepted. The Faculty Research Meeting assigned the project number **EMSMHW16/07/21-01/01**. This acceptance deems the proposed research as being of minimal risk, granted that all requirements of anonymity, confidentiality and informed consent are met. This letter should form part or your dissertation manuscript submitted for examination purposes.

Yours sincerely

Prof PW Buys
Director: WorkWell Research Unit

CC: Dr LT de Beer

Original details: (11930497) C:\Users\11930497\Documents\2. BESTUUR\2.2.2.20_FEMS-WorkWell_Voorleggingsvergaderings\2016\Mensehulpbronbestuur\2016-07-21\Liebenberg, J 21578354_Ethical clearance.docm
28 March 2017

File reference: 2.2.2.20

DECLARATION OF LANGUAGE EDITING

16 May 2019

I, **Ms Cecilia van der Walt**, hereby declare that I took care of the editing of the **dissertation** of **Ms Jo-Mari Liebenberg** titled *Investigating the Daily Need Satisfaction and Work Engagement of Nurses: a Diary Study.*

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SUMMARY

Title: Investigating the daily need satisfaction and work engagement of nurses: A diary study

Keyword: Daily need satisfaction, self-determination theory, work engagement, emotional demands, diary study, multilevel analysis

The constructs of this study respectively have gained increasing attention from research in the past. However, research gaps still exist when considering how these constructs have an impact on one another within different sectors and occupations. More specifically, within the health-care sector, the research gap with regard to how daily need satisfaction has an impact on daily work engagement of night-shift nurses working seven consecutive days within the public health-care sector, calls for investigation.

The general objective of this study was to determine the impact of daily need satisfaction on work engagement, as well as to explore which factors of general job demands, general job resources and general work engagement impact significant daily variable variations.

A quantitative, 'shortitudinal' research design with a multilevel research approach was implemented. Data was collected by means of convenience sampling among nurses working night-shift seven consecutive workdays in a public hospital ($n = 33$). The sample of nurses had to complete a general questionnaire on the first day of data collection. Thereafter they had to complete daily paper-based questionnaires once a day after having worked night-shift. Multilevel analysis was used for testing the hypotheses whereby repeated measures gave an indication of variance both within participants over days and among participants. The intra-class correlation coefficient (ICC) was used to compare within and between person variance.

The results revealed that the daily basic need satisfaction of autonomy and relatedness did not significantly predict variance in daily work engagement. However, daily need satisfaction of competence significantly predicted variance in daily work engagement. General emotional load explained significant variability in daily need satisfaction of competence. Lastly, general role clarity had a negative impact on the daily variability in work engagement.

Recommendations were made to be applied in practice, as well as for future research.

OPSOMMING

Opskrif: Ondersoek na die daaglikse behoeftebevrediging en begeestering van verpleërs – 'n dagboek-studie

Sleutelwoorde: Daaglikse behoeftebevrediging, selfbeskikkingsteorie, begeestering, emosionele eise, dagboek-studie, veelvlakkige analise

Die konstrukte van hierdie studie het onderskeidelik in die verlede toenemend aandag van navorsing ontvang. Navorsingsleemtes kom egter steeds voor, in ag genome die impak wat hierdie konstrukte op mekaar inwerk binne verskillende sektore en beroepe. Meer spesifiek, binne die gesondheidsektor, word die navorsingsleemte met betrekking tot die wyse waarop daaglikse behoeftebevrediging 'n uitwerking op daaglikse begeestering van nagskof-verpleërs wat sewe opeenvolgende dae in die openbaregesondheid-sektor werksaam is, onder die loep geneem.

Die algemene doel van hierdie studie was om die uitwerking van daaglikse behoeftebevrediging op begeestering te bepaal, asook om ondersoek in te stel na watter faktore van algemene werkseise, algemene werkshulpmiddele en algemene werkbetrokkenheid op betekenisvolle daaglikse wisselende veranderlikes inwerk.

'n Kwantitatiewe, "kortitudinale" navorsingsontwerp met 'n meervlakkige navorsingsbenadering is toegepas. Data is ingesamel aan die hand van gerieflikheidsteekproefneming onder verpleërs wat sewe opeenvolgende werksdae nagskof in 'n openbare hospitaal gewerk het (*n* = 33). Die steekproef verpleërs moes 'n algemene vraelys op die eerste dag van data-insameling invul. Daarna moes hulle daaglikse papiergebaseerde vraelyste eenmaal per dag nadat hulle 'n nagskof gewerk het, invul. Meervlakkige analise is aangewens vir die toets van die hipoteses deur middel waarvan herhaalde metings 'n aanduiding gegee het van variansie – beide in deelnemers oor dae heen en tussen deelnemers. Die intraklas korrelasiekoëffisiënt (IKK) is aangewend om in- en tussenpersoon-variansie te vergelyk.

Die resultate het aan die lig gebring dat die daaglikse basiese behoeftebevrediging van outonomie en betrokkenheid nie variansie in daaglikse begeestering voorspel het nie. Daaglikse behoeftebevrediging van bevoegdheid het variansie in daaglikse begeestering voorspel.

Algemene emosionele belading het veranderlikheid in daaglikse behoeftebevrediging van bevoegdheid betekenisvol verklaar, Algemene emosionele lading het betekenisvolle veranderlikheid in daaglikse behoeftebevrediging van bevoegdheid verklaar. Laastens het algemene rolsekerheid 'n negatiewe uitwerking op die daaglikse veranderlikheid in begeestering.

Aanbevelings is gemaak vir toepassing in die praktyk, en ook vir toekomstige navorsing.

CHAPTER 1

INTRODUCTION

Introduction

Globally, healthcare organisations are challenged to provide quality healthcare as a universal human need (Rowe & Moodley, 2013; Klopper, Coetzee, Pretorius, & Bester, 2012). South Africa is no different; evidence shows that South African healthcare organisations face complex challenges, especially within nursing care (Joyner, Shefer, & Smit, 2014). According to Jooste and Jasper (2012), South Africa is faced with a shortage of nurses that results in an imbalance between the supply and demand of nursing resources. In March 2010, South Africa was faced with a shortage of 109 075 nurses and in 2013, 44 780 nurses (Maphosa, 2016). Nursing plays a crucial role in public and primary healthcare and nurses therefore have a direct impact on people's health (Wong, Liu, Wang, Anderson, Seib, & Mosasiotis, 2015). It is therefore important for the motivation of nurses to be sustained and enhanced by investigating the work engagement of nurses in order for healthcare organisations to provide reliable and sustainable services to society.

1.1 Problem statement

Khamisa, Oldenburg, Peltzer, and Ilic (2015) explain that nursing is considered a provision that requires the delivery of moral, empathetic, culturally sensitive and proficient care in working environments with limited resources but also increasing responsibilities. Aiken, Clarke, Sloane, Lake, & Cheney (2008) relate to the above mentioned and state that nurses worldwide often work in difficult circumstances which include patient-related problems, heavy workloads, staff shortages, poor working conditions, lack of resources and equipment to work effectively. Ozkara San (2015) argues that these difficult circumstances can have a daily impact on nurses' emotional well-being and their ability to provide quality care.

Furthermore, nursing is an occupation with high emotional demands (Shacklock, Brunetto, Teo, & Farr-Wharton, 2014). Donoso, Demerouti, Hernández, Moreno-Jiménez, and Cobo (2015), state that nurses are constantly confronted with emotional demands such as: paying attention to, interpreting and understanding the patient's feelings/needs, and having to deal with patients' families daily. The emotional demands nurses face can therefore critically influence the daily work experiences of nurses in terms of their energy level and motivation at work.

Bakker (2014) advances that when employees have access to many resources such as supervisor and colleague support, it enables them to cope well with their daily job demands in terms of emotional load. Therefore the satisfaction of nurses' psychological needs depends on the environmental support in which they operate (e.g. social support) and the behaviours in which they engage (e.g. energy and dedication to work; work engagement) (Bakker, 2011; Kasser, 2009; Leroy, Anseel, Gardner, & Sels, 2012). According to Chen et al. (2015), people are familiar with the word 'need' in terms of desires or likings, however in the context of this study 'need' refers to what is necessary for daily engagement and optimal functioning at work. Van den Broeck, Vansteenkiste, De Witte, and Lens (2010) mention that it can be useful to focus on basic psychological need satisfaction, a sub-theory based in the self-determination theory (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009), so as to gain insight into employees' daily functioning.

The self-determination theory has been under development for four decades, a macro-theory of human motivation, emotion and personality (Vansteenkiste, Niemiec, & Soenens, 2010). The basic psychological needs theory is one of the six mini-theories of the self-determination theory (Chen et al., 2015) formulated by Edward Deci and Richard Ryan (Quested & Duda, 2009) who argue that humans possess certain psychological needs that are essential for ongoing psychological growth, integrity and well-being (Reis, Sheldon, Gable, & Ryan, 2000). For humans to survive, experience psychological growth and function optimally certain psychological needs need to be satisfied (Kasser, 2009). The self-determination theory posits the fulfilment of three basic psychological needs, namely the needs for autonomy, competence and relatedness (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009).

Autonomy refers to the need for having the freedom to make one's own decisions, and choosing one's own behaviour accordingly with one's personal values and interests rather than feeling controlled by internal and external forces (Quested & Duda, 2009; Kasser, 2009; Church, Katigbak, Locke, Zhang, Shen, De Jesús Vargas-Flores, & Mastor, 2013). If this need is satisfied, the individual experiences a sense of psychological freedom in his or her actions (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009). The second need, the *need for competence*, refers to an individual's need to feel capable of achieving one's desired outcomes, feeling competent and effective in one's actions (Patrick, Knee, Canevello, & Lonsbary, 2007). The satisfaction of this need leads to operating effectively, experiencing personal success and having a sense of control over outcomes (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009).

The *need for relatedness* refers to the need for belonging, intimacy, and connectedness to others (Church et al., 2013) feeling understood by others and having meaningful interpersonal relationships with others (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009).

Church et al. (2013) state that the satisfaction of all three needs is a basic requirement for all humans' well-being. Furthermore, there is no fixed order in which the three needs should be satisfied since all needs are important for humans to flourish (Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010). Milyavskaya, Gingras, Mageau, Koestner, Gagnon, Fang, and Boiché (2009) maintain that the self-determination theory is not concerned about the amount of a certain need, but with the degree to which each need is satisfied. Therefore greater fulfilment of autonomy, competence and relatedness lead to greater and better outcomes for individuals, such as work engagement.

Work engagement is a state of vigour, dedication and absorption that influences and predicts organisational outcomes in terms of job performance (Bakker, 2014). Schreurs, Van Emmerik, Guenter, and Van den Broeck (2014) refer to vigour as the willingness of an individual to put one's effort into one's work with high levels of energy; dedication is referred to as being involved in one's work while experiencing a sense of enthusiasm; and absorption refers to being occupied with one's work to the extent of finding it difficult to remove oneself from the task. It is important for organisations to determine whether employees are engaged in their work, willing to go the extra mile and work toward the goals of co-workers and the organisation (Christian, Garza, & Slaughter, 2011). Work engagement of nurses is important to consider due to the continuing shortage of nurses, the political pressures to reduce healthcare costs and the medical error rates (Bjarnadottir, 2011).

The fulfilment of psychological needs may differ from moment to moment within the day or may differ from day to day between the days, having an impact on individuals' daily well-being. Although Reis, Sheldon, Gable, and Ryan (2000) focused on how individuals' well-being differ from day to day, the current study is concerned with the extent to which nurses' engagement varies from day to day according to the degree to which the three basic psychological needs from the SDT – autonomy, competence and relatedness – are satisfied in daily work activity. Recent research by Trépanier, Fernet, and Austin (2015) focused on nurses and investigated the role of basic psychological need satisfaction in relation to workplace bullying and employee functioning in terms of burnout, work engagement and turnover

intention. They found that the satisfaction of employees' basic psychological needs foster work engagement. However, Trépanier and colleagues (2015) only measured the vigour component of work engagement as the work engagement construct and did not consider the dedication or absorption aspects as per the definition.

A recent study by Shuck, Zigarmi, and Owen (2015) concluded that the three basic psychological needs remain critical in understanding the influential factors for behaviour at work – within the context of work engagement. Although work engagement has become a well-known construct and a central issue for 21st century practitioners and scientists (Bjarnadottir, 2011), the linkages between self-determination theory and engagement remain under-developed and under-explored (Shuck, Zigarmi, & Owen, 2015).

For purposes of this study, SDT is applied in the work context, and the focus is on work-related autonomy, relatedness (colleague and supervisor support) and competence (professional competence). Schreurs, Van Emmerik, Van den Broeck, and Guenter (2014) define autonomy as being an individual's desire to develop, to grow in the workplace by having the freedom to act independently. In the context of nursing, autonomy refers to having power to make decisions in a relationship with the patient, to have authority of total patient care and to have freedom to make judgements and choices and take actions (Skår, 2010). Even if nursing tasks need to be executed according to set guidelines, nurses should have the freedom to choose between alternative actions in order to experience work autonomy that promotes work engagement (Skår, 2016; Vera, Martínez, Lorente, & Chambel, 2016).

According to Vera, Martínez, Lorente, and Chambel (2016), nurses' work engagement results from job autonomy and social support (supervisor and colleagues). Relatedness refers to individuals' perceptions of warm and emotional connections with different social partners (King, 2015), in this context their co-workers. Walker and Campbell (2013) found that nurses who perceive that they have the necessary social skills to effectively interact with colleagues, supervisors and patients feel more engaged with their work. Although nurses confirm that maintaining quality professional relationships with patients and others is vital in their work, these workplace relationships are currently still far from ideal (Pullon, 2008; Shacklock, Brunetto, Teo, & Farr-Wharton, 2013). Furthermore, nursing competence refers to the personal characteristics, values, attitudes, knowledge and skills nurses need to function optimally within

their role (Takase & Teraoka, 2011). Bjarnadottir (2011) states that colleague and supervisor support assist nurses in developing the necessary competence in order to adapt to challenging situations and to perform tasks in a satisfactory manner; thus maintaining work engagement. Hence it is important to determine the degree of satisfaction in terms of competence, relatedness and autonomy among nurses as these variables function as strong predictors of work engagement (King, 2015).

Analysing the daily work engagement of nurses may provide organisations with more insight regarding changes from day to day (Bakker, 2014). Previous diary studies that have been conducted during the past decade have shown that variation in the levels of work engagement of employees differs from day to day and from task to task due to the changes in daily job- and personal resources (Bakker, 2014). However, the current study will focus on the daily variance in the levels of daily work engagement among nurses in terms of their daily psychological need satisfaction. Sonnentag (2011) agrees that it is important to consider daily changes in work engagement in order to understand the dynamic aspects thereof.

This is the first research study to investigate daily basic psychological need satisfaction and daily work engagement among nurses within the South African, or any other, context. The remainder of this chapter presents the research questions/objective, expected contribution of the study, research hypotheses, research design, chapter division and timeframe.

1.2 Research questions

- How is daily need satisfaction, self-determination theory, work engagement, emotional demands, diary study and multilevel analysis conceptualised in the literature?
- What amount of variance can be explained on a within- and between level based on daily need satisfaction and work engagement?
- What is the impact of daily need satisfaction on daily work engagement?
- What is impact of general job demands, general job resources and general work engagement on significant daily variable variations?
- What recommendations can be made for future research and practice?

1.3 Expected contribution of the study

1.3.1 Contribution to the individual

In order for employees to function optimally it is necessary to have a better understanding of how the satisfaction of the three basic needs influence their work engagement daily. This study will contribute to understanding how the satisfaction of employees' needs influences their work engagement, which in turn could lead to optimal functioning and more productivity.

1.3.2 Contribution to the organisation

By analysing the impact of daily need satisfaction on work engagement in nurses may provide healthcare organisations with explanations for variance in performance and results from day to day. This study would help organisations to better understand how nurses' engagement varies from day to day according to the degree to which the three basic needs – autonomy, competence and relatedness – are satisfied in daily activity.

1.3.3 Contribution to Industrial Psychology literature

At present little consensus prevails regarding whether or not daily need satisfaction truly impacts work engagement of nurses on a daily basis. A variety of literature exists on daily need satisfaction, SDT and work engagement. However, the link between daily need satisfaction in terms of the SDT and work engagement on a daily basis of nurses is underdeveloped. This study will therefore add to the literature aimed at shedding more light on this subject, specifically also within the South African context.

1.4 Research objectives

The research objectives are divided into a general objective and specific objectives.

1.4.1 General objective

The study seeks to determine the impact of daily need satisfaction on work engagement in nurses based on a diary study.

1.4.2 Specific objectives

- To determine how self-determination theory, basic need satisfaction, work engagement and job demand-resources are conceptualised in the literature.
- To determine the impact of daily need satisfaction on daily work engagement.
- To explore the impact of general job demands, general job resources and general work engagement on significant daily variable variations.
- To make recommendations for future research and practice.

1.5 Research hypotheses

Hypothesis 1: Daily basic need satisfaction, in the form of autonomy, significantly predicts variation in daily work engagement.

Hypothesis 2: Daily basic need satisfaction, in the form of competence, significantly predicts variation in daily work engagement.

Hypothesis 3: Daily basic need satisfaction, in the form of relatedness, significantly predicts variation in daily work engagement.

1.6 Research design

1.6.1 Research approach

A quantitative diary study approach was used in this study. This implies that participants were requested to fill in short questionnaires during seven consecutive workdays (shifts). The questionnaires were filled out at the end of each shift. First, the participants completed a one-time questionnaire to determine their general level of job demands and job resources. The diary study approach assisted in capturing the short-term dynamics of experiences in the work context by addressing questions concerning when employees feel engaged (Bakker, 2014).

1.6.2 Research method

Two phases were implemented, namely a literature review and an empirical study. The results were presented in the form of a research article.

1.6.3 Literature review

A thorough literature review regarding the impact of daily need satisfaction on work engagement was conducted. Various sources were used to gather information. Several research engines were, namely Google Scholar, EbscoHost (Academic search premier, business source premier, E-Journals, CINAHL with full text, EconLit, ERIC, PsychARTICLES, PscyhINFO) and LexisNexis. As part of this search the following journals were used: *South African Journal of Industrial Psychology, Stress and Health, Burnout Research, Work and Stress, Journal of Occupational Health Psychology, The International Journal of Human Resource Management, International Journal of Stress Management, Journal of Occupational and Organisational Psychology, Journal of Organisational Behaviour, Organizational Psychology and Organizational Behaviour, Journal of Applied Psychology, Journal of Personality Assessment, Journal of Psychosomatic Research Journal of Social Issues, Journal of Occupational and Environmental Hygiene, Psychology & Health, Journal of Health Psychology.*

1.6.4 Research participants

Convenience sampling was done to gather data amongst at least 30 nurses in a healthcare organisation on seven occasions (30 nurses x 7 occasions = 210; $N = 210$). The seven occasions were based on the seven-day shift cycle of the nurses; the first occasion being day one of the shift and the seventh occasion the seventh day of the shift. The sample group included individuals who vary in terms of age, ethnicity, marital status and gender. All participants were 18 years of age and proficient in English in order to complete the questionnaire.

1.6.5 Measuring instruments

The measuring instruments were divided into two categories: i) A general format which included more questions and which was implemented in one survey before the start of the study to ascertain baseline information and ii) A shorter survey to ascertain the day-level information for the study.

General work engagement was measured with the 9-item Utrecht Work Engagement Scale (Van Beek, Taris, & Schaufeli, 2011). The 9-item Utrecht Work Engagement Scale consists of three subscales, namely Vigor, Dedication and Absorption. This version includes three items

for each engagement dimension (Bakker, Tims, & Derks, 2012). Examples of the items include: 'At my work, I feel bursting with energy' (vigour); 'I am enthusiastic about my job' (dedication); 'I get carried away when I am working' (absorption). All items were scored on a scale ranging from (0) 'never' to (6) 'always'. The Cronbach's alpha coefficients varied between 0.85 and 0.92 (Schaufeli, Bakker, & Salanova, 2006).

General need satisfaction was measured using the Work-Related Basic Need Satisfaction scale (WBNS) (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). The instrument measured satisfaction of employees' basic needs, namely the need for autonomy (e.g. 'I feel free to do my job the way I think it could best be done'; 6 items), the need for competence (e.g. 'I really master my tasks at my job'; 4 items), and the need for relatedness (e.g. 'At work, I can talk with people about things that really matter to me'; 6 items). The WBNS in total consisted of 16 items with a five-point Likert scale which ranges from 'totally disagree' (1) to 'totally agree' (5). The Cronbach's alpha coefficients were found to be 0.81, 0.85 and 0.82 on average for the three basic needs; autonomy, competence and relatedness (Van den Broeck et al., 2010).

General job demands and general job resources was measured with scales from the Job Demands-Resources Scale (JDRS) developed by Jackson and Rothmann (2005). Items were measured on a four-point scale ranging from 1 (Never) to 4 (Always). The JDRS comprised 40 items concerning pace and amount of work, mental load, emotional load, variety in work, opportunities to learn, independence in work, relationships with colleagues, relationship with immediate supervisor, ambiguities about work, information, communications, participation, contact possibilities, uncertainty about the future, remuneration, and career possibilities. The scales of the JDRS were reliable with α's > 0.70.

Daily need satisfaction was measured with an end-of-workday questionnaire by means of nine adapted items from the Work-Related Basic Need Satisfaction scale (WBNS) (Van den Broeck et al., 2010). The three basic needs for autonomy, relatedness and competence were measured by three items each. The wording of the items was slightly be changed to make them applicable for day-to-day measurement, for example: 'Today I felt free to express my ideas and opinions in this job' (need for autonomy); 'Today, I felt competent in my job' (need for competence) and 'Today, I felt part of a group at work' (need for relatedness). A five-point Likert scale which ranges from 'Strongly disagree' (1) to 'Strongly agree' (5) was used. The Cronbach's

alpha coefficients were found to be 0.81, 0.85 and 0.82 on average for the three basic needs, autonomy, competence and relatedness (Van den Broeck et al., 2010).

Daily work engagement was measured with the 9-item UWES. The items for each dimension included: for example, 'Today at my work, I felt bursting with energy' (vigour); 'Today my job inspired me' (dedication) and 'Today I felt happy when I worked intensely' (absorption). Again, the wording of the items will be changed in order to make them more applicable for purpose of day-to-day measurement. An overall work engagement factor score for each of the 7 days was computed. All items were scored on a scale ranging from (1) 'Strongly disagree' to (5) 'Strongly agree'. The Cronbach's range from 0.85 and 0.90 (Schaufeli et al., 2006).

1.6.6 Research procedure

Prior to data collection, approval for the research project and ethical authorisation was sought from the scientific research committee and ethics in commerce research committee of North-West University's Faculty of Economic and Management Sciences. Next, the researcher obtained permission from a healthcare organisation management before initiating the data collection process. The aim was to include participants who vary in terms of age, ethnicity, marital status and gender, 18 years of age and proficient in English. Participants (nurses) working seven-day work shifts were identified and met with in person to be informed about the overall goal of the study. It was also explained to the participants that participation was voluntary and that agreements regarding confidentiality would be conformed to at all times. A covering letter was distributed to participants to explain the goal and the importance of the study. The letter contained a list of contact persons in case participants had any questions. The data collection process started with the completion of the general measuring instruments of general engagement and general basic need satisfaction. The completion of the general instruments only took place once. Thereafter, participants received the short questionnaire of daily engagement and need satisfaction in hard copy (by hand) to complete at the end of each work day (shift) for seven consecutive days. The reason for this was that shifts were divided into seven-day rotations. The general questionnaire took approximately 10-15 minutes to complete, whereas the daily questionnaire took around 5 minutes to complete. The general questionnaires were delivered and retrieved in sealed envelopes. The procedure was made known to all parties. Participants had to answer the questions with regard to how they experienced the workday by selecting from predetermined answer options. Informed consent

and permission to use data for research purposes were obtained from the participants before the start of the research project; participation was voluntary and participants could withdraw from the study at any moment without any negative consequences. Participants received a number once they submitted their informed consent to the researcher. The number had to be written on the daily questionnaires for data capturing purposes. The researcher collected the questionnaires each day personally. Thereafter the data were captured in a spreadsheet and statistical analyses followed upon completion thereof.

1.6.7 Statistical analysis

Mplus 8.2 was used to investigate the research questions (Muthén & Muthén, 2018). Specifically, multilevel modelling was implemented as the data was structured in such a manner, i.e. on a within- (within employees) and between-level (between employees). Multilevel models do not provide standard fit indices (e.g. CFI and TLI) but present an intra-class coefficient value that provides researchers with the proportion of variance in the dependent variable that occurs between groups, rather than within the groups (Bickel, 2007). Thus the intra-class correlation coefficient indicated whether nesting of the data made a difference in the variation of scores. Random coefficient regression and multilevel regression were applied for further investigation (Bickel, 2007), i.e. investigating (varying) intercepts and slopes. See Chapter 2 for an expansion on the statistical analysis.

1.6.8 Ethical considerations

This entire study was conducted in an ethically correct manner (De Vos, Strydom, Fouché, & Delport, 2011). After having obtained ethical clearance from the ethics committee, informed consent was obtained from each participant. The researcher had the responsibility to give complete explanations of the nature of the study in order to prevent deceiving, misinforming, misleading or doing any harm to the participants (De Vos et al., 2011). Prior to data collection, the participants were notified that the information given will only be used for research purposes and kept confidential at all times. The participants received sufficient time to consider their potential engagement in the proposed research project. As mentioned previously, the questionnaires were provided in envelopes, collected and distributed by the researcher at the end of each work shift. This approach provided an extra layer of security. It is important to

note that all actions were based on ethical decision-making in an appropriate manner so as to address any ethical issues that may have occurred.

1.7 Chapter division

The chapters in this mini-dissertation is presented as follows:

Chapter 1: Introduction.

Chapter 2: Research article.

Chapter 3: Conclusions, limitations and recommendations.

1.8 Chapter summary

Chapter 1 presented the problem statement, objectives of the research and the research hypotheses. This was followed by an explanation of the measuring instruments, the research methods and a brief overview of the chapters which are to follow.

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CHAPTER 2
RESEARCH ARTICLE

Investigating the daily need satisfaction and work engagement of nurses: A diary study

Abstract

Orientation: The current challenges faced by the health-care systems in South Africa, especially within the public sector, provide the context for this study of investigating the daily basic needs satisfaction and work engagement of night-shift nurses in a public health-care context.

Research purpose: To investigate the variation in nurses' work engagement from day to day (7-day consecutive night shifts) in accordance with the satisfaction of their three basic psychological needs as indicated by the SDT – autonomy, competence and relatedness – within a public health-care context.

Motivation for the study: Work engagement in the nursing practice is of upmost importance, especially when considering key challenges within health-care systems. Research exists that examines the relations between basic need satisfaction and work engagement. However, the research gap with regard to how daily need satisfaction impacts daily work engagement of night-shift nurses working seven consecutive days within the public health-care sector, has become a concern.

Research design, approach and method: A quantitative, 'shortitudinal' design with a multilevel research approach was followed. Data was collected based on a daily diary survey method. A convenience sample of nurses working night-shift in a public hospital had to complete daily paper-based questionnaires once a day, after having worked night-shift for seven consecutive workdays ($N = 33$). Multilevel analysis was used for testing the hypotheses by means of which repeated measures gave an indication of variance both within participants over days and between participants. The intra-class correlation coefficient (ICC) was used to compare within and between person variance.

Main findings: The results from the modelling of the effects of three daily basic need satisfaction variables on daily work engagement revealed that daily need satisfaction of autonomy and relatedness did not significantly predict variance in daily work engagement. The daily need satisfaction of competence significantly predicted variance in daily work engagement. General emotional load explained significant variability in daily need satisfaction of competence. Lastly, general role clarity had a negative impact on the daily variability in work engagement.

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Practical/Managerial implications: It is important for health-care organisations to consider how the satisfaction of nurses' basic needs for autonomy, competence and relatedness influences their work engagement, which in turn could lead to optimal functioning and more productivity. This study provides health-care organisations with explanations for variance in performance and creates awareness of implementation of effective interventions to address the outcomes.

Contribution/Value-add: This study provides a better understanding of how nurses' engagement varies from day to day in accordance with the degree to which the three basic needs – autonomy, competence and relatedness – are satisfied in daily activity.

Introduction

Health and health-care services in South Africa have been shaped by powerful historical and social forces, leading to progressive policies being formulated in the first years of its democracy (Coetzee, Klopper, Ellis, & Aiken, 2013). During this period the public health system was transformed into an integrated, comprehensive national health system (National Planning Commission, 2013). However, the implementation and health-care outcomes fell short of expectations and South Africa, as most global health-care systems, are still challenged to provide quality care to the population (Klopper, Coetzee, Pretorius, & Bester, 2012). South Africa faces the challenge of finding a balance between developed and underdeveloped health systems to provide quality health-care for all (Coetzee, Klopper, Ellis, & Aiken, 2013). High-quality health-care is considered to be the ultimate goal in health-care systems around the world (Cho, Lee, Kim, Kim, Lee, Park, & Sung, 2016). According to Mahlathi and Jabu (2015) the delivery of health-care services to the population of South Africa is greatly dependent on the sufficiency of the health-care workforce, in terms of the capacity, the quality of the workforce skills, how the workforce is managed and whether they are situated in the private or public sector.

The majority of the health-care workforce in South Africa consists of nurses who play a major role in providing primary health-care services (Munyenwende, Rispel, & Chirwa, 2014). Nurses have long been fundamental to health-care (Mayosi, & Benatar, 2014) and have become health-care professionals in their own right (Ten Hoeve, Jansen, & Roodbol, 2014). Khamisa, Oldenburg, Peltzer, and Ilic (2015) maintain that professional nursing care requires a holistic approach of delivering cognitive, physical, emotional, interpersonal work in working environments with limited resources and increasing responsibilities. In South Africa, nursing education and the quality of the nursing workforce's skills is of high standards (Coetzee, Klopper, Ellis, & Aiken, 2013), enabling the workforce to fulfil their expected roles and responsibilities as professionals. However, management of this workforce is of concern as South Africa faces high turnover rates and shortages of professional nurses in the health-care industry (Coetzee, Klopper, Ellis, & Aiken, 2013). High turnover in nursing is therefore an on-going problem and the reasons for nurses' intention to leave are complex (Coetzee, Klopper, Ellis, & Aiken, 2013).

It is well known that there are differences in the available resources relating to the public and private sectors within the South African health-care industry (Coetzee, Klopper, Ellis, & Aiken, 2013). Klopper, Coetzee, Pretorius, and Bester (2012) point out that the private sector forms part of international hospital systems, is highly resourced, serves 16% of private organisations and the population covered by a medical scheme or people who personally pay for medical services. In contrast, the public sector with its insufficient resources is managed by the South African Department of Health which provides free health-care to approximately 84% of the disadvantaged population who lack the ability to pay for health-care services or private medical schemes (Blecher, Kollipara, DeJager, & Zulu, 2011).

Numerous studies, both in the public and private sector, found that nurses were generally *dissatisfied* with the remuneration, workload, resources available, career development opportunities, role uncertainty, poor working conditions and the organizational climate (Klopper, Coetzee, Pretorius, & Bester, 2012). Furthermore, Coetzee et al. (2013) found that public sector hospital nurses report *more* negative outcomes than private sector hospital nurses: 71% of public sector hospital nurses rate their working environment as poor and 59% intend to end their current employment due to job dissatisfaction. This is echoed by Manyisa and Van Aswegen (2017) who found that working conditions in public hospitals in South Africa are less than satisfactory as there are increased patient loads, long working hours, shift work, lack of physical infrastructure and shortage of staff.

Moreover, Pillay (2009) investigated the work satisfaction of professional nurses in South Africa and found that nurses in the public sector were generally more dissatisfied with their remuneration, the workload and the resources available. In the research done by Jardien-Baboo, Van Rooyen, Ricks, and Jordan (2016), nurses working in the South African public sector stated that limited resources served as a barrier to deliver expected patient-centred care. These dynamic differences and negative outcomes between the health-care services create a critical future challenge within the health-care industry (Basu, Andrews, Kishore, Panjabi, & Stuckler, 2012). Van der Doef, Mbazzi, and Verhoeven (2012) reported that efforts should be made to improve working conditions in the public hospitals, especially by maintaining job resources at a high level to help nurses cope with the demands of their job.

All in all, nursing – especially in the public sector – can be demanding and efforts should be made to preserve the motivation and work-related well-being of nurses so that they can

continue performing their important function. Based on the self-determination theory, the impact of varied environmental factors and job characteristics as discussed previously such as: job design, managerial styles and pay contingencies have an impact on nurses' motivation which is greatly mediated by their basic psychological needs (Deci, Olafsen, & Ryan, 2017). If the basic needs for autonomy, competence and relatedness of nurses are supported within their work environment, it enables them to thrive, feel motivated and engaged at work (Albrecht, 2015). Fasoli (2010) accentuates that work engagement is considered an indicator of employee psychological commitment to the job and workplace, which comprises one's energy, involvement and positive efficiency.

Keyko, Cummings, Yonge, and Wong (2016) suggest that considering work engagement in nursing practice is of upmost importance, especially when considering key challenges within health-care systems. Based on their findings, positive outcomes of work engagement are valuable to the performance of nurses and organisational outcomes (Keyko, Cummings, Yonge, & Wong, 2016). However, even though reviews on work engagement in nursing exist, gaps in research still remain and continuous research is needed on work engagement in the practice of nursing (Keyko, Cummings, Yonge, & Wong, 2016). More specifically, night-shift nurses are a fundamental element and a critical component in health-care; therefore it is essential to conduct research to understand what motivates them and gives meaning to their work (Powell, 2013).

According to Phiri, Draper, Lambert, and Kolbe-Alexander (2014), even though public hospitals are more stressful and challenging in which to practice, night shift places even further pressure on professional nurses. Night-shift nurses experience challenges in terms of balancing their personal and home responsibilities, for instance having limited family time and the time to resolve family conflicts (Phiri, Draper, Lambert, & Kolbe-Alexander, 2014). Therefore night-shift nurses appear to find it difficult to find a balance between their work, sleep and personal needs (Claffey, 2006). Moreover, night-shift nurses experience reduced access to expert advice and increased responsibility due to the lack of supervisory presence at night, no fully staffed physicians and other specialists in the hospital and lower staffing levels compared to day shifts (Lowson & Arber, 2014; Powell, 2013). This requires nurses to rely on their own judgement, experience and knowledge when making important patient-care decisions. For instance, night staff need to decide when a patient's condition is of such a state that the physician needs to be called at home and in the middle of the night (Claffey, 2006).

Additionally, night-shift nurses lack connectedness and communication with other shift staff and indicate concern over limited educational opportunities available to them and limited participation in daily decision-making processes (Powell, 2013). For instance, night staff feel isolated because, while they are on shift the other staff, including the administration and management staff, are not. As a result of this and the challenge of finding permanent night-shift staff, the change of nurses working rotating shifts occurred (Huntington, Gilmour, Tuckett, Neville, Wilson, & Turner, 2011).

Although the effects of shift work have been extensively researched in a variety of settings (Huntington, Gilmour, Tuckett, Neville, Wilson, & Turner, 2011) and many studies have been published on nursing and nurses, research gaps remain concerning the behaviours and experiences of night-shift nurses (Powell, 2013). In contrast to previous studies, this study implemented a quantitative, 'shortitudinal' design (diary study) and a multilevel research approach, which has more than one measurement point and allows for demonstrating both between-person and within-person variations of need satisfaction and work engagement among nurses on a daily basis (Blanco-Donoso, Garrosa, Demerouti, & Moreno- Jiménez, 2017).

The current challenges faced by the health-care systems in South Africa, especially within the public sector, provide the context for this study of investigating the daily basic needs satisfaction and work engagement of night-shift nurses in a public healthcare context. Hence the aim of this study is to investigate the daily needs satisfaction and work engagement of nurses working night shifts in a South African public hospital. Studies addressing the combination of these topics could not be found in a literature overview; this study will add value to the literature and ultimately contribute to an understanding of engagement differences among night-shift nurses on a daily basis.

Literature review

Self-Determination Theory

The self-determination theory (SDT) is a macro-theory which has been developed over a period of forty (40) years based on the influential work by Edward Deci and Richard Ryan (Vansteenkiste, Niemiec, & Soenens, 2010). According to Leroy, Anseel, Gardner, and Sels

(2015), the SDT is a universal theory of human motivation which has been used to predict human behaviour in different stages of life. The theory focusses on fundamental aspects of personality development, self-regulation and basic psychological needs, and describes the impact of social environments on the motivation, behaviour and well-being of employees (Schutte, Wissing, & Ellis, 2018). Shogren, Wehmeyer, Palmer, Forber-Pratt, Little, and Lopez (2015) state that the self-determination concept originated from the philosophical principle of determinism, which suggests that human behaviours or actions are caused by having a free will to act or not to act as the individual prefers. This implies that employees are active contributors of their own behaviour in terms of making things happen in life, taking action, causing a change and accomplishing a specific goal (Wehmeyer & Abery, 2013). The actions of some could be characterised as acts of autonomy, self-regulation and self-realisation (Wehmeyer & Abery, 2013).

Even so, various authors found that the SDT is driven by the intrinsic motivation which determines people's thoughts, feelings and behaviour (cf. Wehmeyer & Abery, 2013). The SDT reflects on the skills, knowledge and beliefs a person might use and act on, especially in an environment where reaching goals and desired outcomes is valued (Wehmeyer & Abery, 2013). Deci, Olafsen, and Ryan (2017) suggested that it is necessary for organisations to take into consideration the self-determination theory concepts when creating policies, practices and environments that promote both wellness and high-quality performance of employees. Based on their suggestion, this study will take into consideration the SDT to assist health-care organisations in identifying aspects that will promote the well-being and work engagement of nurses. The SDT consists of five mini-theories, namely the cognitive evaluation theory, organismic integration theory, causality orientations theory, basic needs theory and goal content theory (Vansteenkiste, Niemiec, & Soenens, 2010). This study will focus more specifically on the fourth mini-theory, namely *the basic needs theory*.

Basic need satisfaction theory

Van den Broeck, Ferris, Chang, and Rosen (2016) explain that the basic needs satisfaction theory reveals that all people are optimally motivated and experience well-being regardless of their gender, social class and cultural context *if* their basic needs for autonomy, competence and relatedness are satisfied. The basic needs are 'universal nutrients' necessary for optimal functioning and beneficial for every human being (Schutte, Wissing, & Ellis, 2018).

The *need for autonomy* refers to a need for acting independently, having full willingness and experiencing a choice when carrying out an action (Van den Broeck, Ferris, Chang, & Rosen, 2016). Radel, Pelletier, Sarrazin, and Milyavskaya (2011) regard the need for autonomy as essential for individuals' well-being, which is associated with a positive feeling of having the freedom to make decisions and choices. However, in the nursing practice, professional autonomy means having the authority to make decisions in accordance with the extent of the individual's professional knowledge (Skår, 2010). For instance, professional autonomy for nurses means the ability to make some decisions within their own profession and their right and responsibility to act according to the standards of the nursing profession (Varjus, Leino-Kilpi, & Suominen, 2011).

The *need for competence* refers to the desire to experience effectiveness during the mastering of a task, to have the tendency to explore the environment and to search for optimal challenges that will extend one's skills (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). With regard to nurses' need for competence, Nilsson, Lundgren, and Furåker (2009) found that nurses working in public institutions are overall responsible for the nursing process, which requires of them to be competent in nursing and being confident in decision-making (Nilsson, Lundgren, & Furåker, 2009). This highlights the importance, in this study, of considering nurses' need for competence and the effects thereof on their daily work engagement.

Furthermore, the *need for relatedness* refers to the mutual feeling of having supportive connections with colleagues and having a sense of connectedness with others (Leroy, Anseel, Gardner, & Sels, 2015). As a result, if health-care organisations create a work environment that supports the three psychological needs of nurses, positive outcomes can be fostered simultaneously (Kovjanic, Schuh, Jonas, Van Quaquebeke, & Van Dick, 2012).

Vansteenkiste, Niemiec, and Soenens (2010) suggest that by focusing on the basic need satisfaction theory, a variety of motivated behaviours can be identified, the psychological factors that are required for optimal human functioning can be discussed and the theory can be applied to explain positive outcomes from nurses in terms of well-being, productivity and cooperation. In line with this suggestion, this study focusses on determining the dynamics of the need for autonomy, competence and relatedness respectively with the work engagement of nurses – within a multilevel data context.

Job Demands-Resources model

Schaufeli and Taris (2014) report that the Job Demands-Resources model (JD-R model) became highly popular among researchers in recent years due to the flexible framework for the usage thereof. According to Du Plooy and Roodt (2010), the JD-R model suggests that all occupations have job characteristics which can be divided into two different categories, namely job demands and job resources.

Job demands refers to the physical, social, or organizational aspects of a job that require continuous physical and/or mental effort which could result in exhaustion, job stress and negative psychological states such as burnout (Du Plooy & Roodt, 2010). *Job resources* refers to the physical, social, psychological, or organizational aspects of a job that are required for achieving work goals and assist employees to deal with job demands (Bakker, 2017). In other terms, job resources help employees to achieve work goals, reduce job demands and/or stimulate personal growth (Bakker, Demerouti, & Sanz-Vergel, 2014). Bakker, Demerouti, and Sanz-Vergel (2014) point out that job resources have been identified as the main drivers which predict and contribute to work engagement over time as well as on a daily basis. Bakker (2017) states that engaged employees should be exposed to an abundance of job resources which they can use and invest in their work. The more job resources available to employees, the better the employees are able to cope with their daily job demands (Bakker, Demerouti, & Sanz-Vergel, 2014).

The JD-R model describes how job resources and job demands influence work engagement and burnout. This triggers two fairly independent processes, namely a health impairment process and a motivational process (Albrecht, 2015). The model proposes that high job demands lead to the health impairment process, and high job resources lead to the motivational process (Schaufeli & Taris, 2014). In other words, the JD-R model suggests that high job demands relate to burnout and high job resources to engagement (Trépanier, Fernet, Austin, Forest, & Vallerand, 2014).

Even though the study of Hontake and Ariyoshi (2016) on work engagement among nurses in Japan was not able to adequately clarify the relationship between job demands, job resources and work engagement, research shows that work engagement increases when employees are confronted with job demands while simultaneously having access to sufficient job resources

(Bakker, 2017). This is supported by the earlier multilevel study conducted by Vera, Martínez, Lorente, and Chambel (2016) in which it was found that the greater the availability of job resources at the individual level (i.e. job autonomy) and at the team level (i.e. colleague and supervisor social support), the more likely it is that nurses will feel engaged.

There are various authors that argue that the JD-R model can be applied to a variety of work environments and enables researchers to obtain a quick idea of what can be expected in a particular situation and what concepts should be targeted to improve the health, well-being and performance of the workforce (Bakker, Demerouti, & Sanz-Vergel, 2014; Schaufeli & Taris, 2014). Keyko, Cummings, Yonge, and Wong (2016) concluded that the JD-R model offers clear and valuable insinuations for practice and should therefore be used when focusing on work engagement of nurses. Thus the current study refers to the JD-R model but more specifically focusses on the job resources and engagement aspects of the motivational process for nurses in the public sector, at the general level.

Work engagement

Even though researchers conclude that work engagement is a complex construct (Nienaber & Martins, 2014), work engagement is conceptualised as a work-related state of mind which is both fulfilling and positive (Bakker, 2017; Nienaber & Martins, 2014). It is a construct that is characterised by vigour, dedication and absorption (Bakker, 2017; Nienaber & Martins, 2014). Vigour refers to high levels of energy, mental resilience and the willingness to devote effort to one's work even when faced with difficulties (Vera, Martínez, Lorente, & Chambel, 2016). Dedication indicates that an employee is strongly involved in his or her work accompanied by a sense of meaningfulness, enthusiasm, inspiration and significance (Hontake & Ariyoshi, 2016). Absorption refers to being fully concentrated and happily absorbed in one's work and finding it difficult to detach oneself from work (Vera, Martínez, Lorente, & Chambel, 2016). In other words, engaged employees tend to have a connection with their work, and they experience their work as challenging rather than stressful or demanding (Bakker, Demerouti, & Sanz-Vergel, 2014).

Over the last decade, research related to work engagement in nursing practice has been conducted, which enabled the development of initiatives to improve work engagement (Keyko, Cummings, Yonge, & Wong, 2016). However, based on the findings of Koen, Van Eeden,

Wissing, and Du Plessis (2011), it is evident that the management of health-care organisations such as the South African Department of Health still does not implement effective measures to fulfil nurses' need for becoming more engaged.

Furthermore, employees who experience work engagement may be more or less engaged on a specific day depending on the availability of job resources (Breevaart, Bakker, & Demerouti, 2014). In addition, Breevaart, Bakker, and Demerouti (2014) suggest that work engagement may not only vary on a specific day, but according to previous daily diary studies, work engagement also varies among different individual nurses (Breevaart, Bakker, & Demerouti, 2014). Based on these arguments, it is reasonable to assume that variance of work engagement can be expected among different individual nurses on a daily basis.

Even though existing research indicates that work engagement contributes to increased positive outcomes and decreased negative outcomes for nurses and health-care organisations respectfully (Keyko, Cummings, Yonge, & Wong, 2016), a clear gap is evident in the literature when it comes to exploring the daily basic need satisfaction and work engagement of nurses in the public sector working night shifts, in the context also of general perceptions of job demands and job resources.

Relationship between Need Satisfaction and Work Engagement

Silman (2014) states that limited research exists that examines the relations between basic need satisfaction and work engagement. Thus Silman (2014) decided to conduct a study amongst academic staff in Turkey to examine to what extent work-related basic need satisfaction predicted work engagement. The results revealed that the sub-dimensions of basic need satisfaction significantly predicted work engagement. Silman's results are supported by the research conducted by Sulea, Van Beek, Sarbescu, Virga, and Schaufeli (2015) which revealed that fulfilment of psychological needs is positively related to engagement among students.

These findings suggest that when nurses are faced with job demands, they need a sense of fulfilment of autonomy, relatedness and competence in order to be engaged at work (Albrecht, 2015). The SDT suggests that if nurses' working conditions cater for their need for autonomy and competence, it enables them to be more engaged (Deci, Olafsen, & Ryan, 2017). Therefore, according to Albrecht (2015), it is important to understand the degree of satisfaction for basic

needs when dealing with and understanding nurses' engagement in their working environments. Furthermore, Trépanier, Fernet, and Austin (2015) found that the satisfaction of nurses' basic needs has been positively related to work engagement and negatively to burnout and turnover intention. Even though there is support for the relationship between daily need satisfaction and work engagement in previous studies, the dynamics of the satisfaction of nurses' basic needs and the effect on work engagement in the public health-care sector, in the context of job demands and job resources, is not clear.

To conclude, this study seeks to contribute to the literature on daily work engagement by investigating whether daily need satisfaction in the forms of autonomy, competence and relatedness influences variability of work engagement in nurses working night-shift in the public sector. Hence this study seeks to test the following hypotheses:

Hypothesis $_1$: Daily basic need satisfaction, in the form of autonomy, significantly predicts variation in daily work engagement.

Hypothesis $_2$: Daily basic need satisfaction, in the form of competence, significantly predicts variation in daily work engagement.

Hypothesis $_3$: Daily basic need satisfaction, in the form of relatedness, significantly predicts variation in daily work engagement.

Following this, any supported hypothesis will be further explored by isolating the variance of the specific need and then investigating the general job demands and job resources that may contribute to its variability. The same will be done for daily work engagement. This exploration will provide important insight from the general level variables to the study.

Research design

Research approach

For purposes of this study, a quantitative, 'shortitudinal' design with a multilevel research approach was followed by means of which data were collected based on a daily diary survey method. The multilevel research is characterised by data that have a hierarchical or clustered structure which takes into account both between-person and within-person variations (Łaba &

Geldenhuys, 2018). This implies that the variables of this study were measured to analyse and compare results. Nurses working night-shift in a public hospital had to complete daily paper-based questionnaires once a day after working night-shift for seven consecutive workdays – in line with their night-shift cycle. The diary study approach captured the short-term dynamics of experiences in the work context by addressing questions concerning when employees felt engaged (Bakker, 2014). This procedure allowed for studying and examining the predictors of change at both between- and within levels (Demerouti, Bakker, & Halbesleben, 2015; Bolger & Laurenceau, 2013). Furthermore, at the start of the study, one-time questions were posed regarding the nurses' general (overall) level of job demands and job resources (see section on measuring instruments below for more information).

Research method

Research participants

Table 1 presents a breakdown of the participants of the current study.

Table 1

Characteristics of the participants (n=33)

Item	Category	Frequency	Percentage (%)
Gender	Male	7	21.20
	Female	26	78.80
Ethnicity*	African	30	90.90
	Coloured	1	3.00
	White	2	6.10
Job Title	Professional Nurse	13	39.40
	Auxiliary Nurse	3	9.10
	Nurse Assistant	7	21.20
	Enrolled Nurse	8	24.20
	Missing Values	2	6.10
Department	Orthopaedic	5	15.20
	Intensive Care Unit	4	12.00
	Premature	3	9.10
	Surgical	9	27.30
	Medical	3	9.10
	Paediatric	3	9.10

Missing Values	6	18.20

Note: * = Designations are used in line with the terminology of the Employment Equity Act, 55 of 1998.

Convenience sampling was implemented to collect data from nurses working night-shift in a public hospital in the North West Province. The data were gathered among 33 nurses on seven occasions (33 nurses x 7 occasions = 231; $n = 231$). The seven occasions being based on the seven-day shift cycle of the nurses at this hospital; the first occasion being day one of the shift and the seventh occasion the seventh day of the shift. The sample consisted of 26 (78.80%) females and 7 (21.20%) males. In terms of ethnicity, 90.90% ($n = 30$) of participants were African, 6.10% ($n = 2$) white and 3.00% ($n = 1$) of the participants were coloured employees. Furthermore, the majority, 39.40% ($n = 13$) of the participants were professional nurses whereas the rest of the participants consisted of 24.20% ($n = 8$) enrolled nurses, 21.20% ($n = 7$) nurse assistants and 9.10% ($n = 3$) auxiliary nurses respectfully. In terms of the departments in which the nurses were assigned to complete their night shifts, the following was evident: the majority (27.30%; $n = 9$) of the participants worked in the surgical ward, 15.20% ($n = 5$) worked in the orthopaedic ward, 12.00% ($n = 4$) in the Intensive Care Unit and 9.10% ($n = 3$) of the participants worked in the medical, paediatric and premature wards respectively.

Measuring Instruments

The process and the measuring instruments were divided into two categories: i) A general questionnaire in the form of a booklet with multiple questions were completed at the start of a shift to establish baseline information (68 items in total) and ii) a shorter daily measuring questionnaire was used to discover the day-level information for the study (19 items in total). Therefore the daily survey was considered to not be too time consuming.

General work engagement was measured with the 9-item Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006). The 9-item Utrecht Work Engagement Scale has been shown to be operationalized best within the South African context as a single latent factor due to high correlations between the individual components (e.g. Rothmann, Jorgensen, & Marais, 2011), which contains three vigour items (e.g. 'At my work, I feel bursting with energy'), three dedication items (e.g. 'I am enthusiastic about my job') and three absorption items (e.g. 'I get carried away when I am working'). Respondents were required to respond based on a seven-point frequency-rating scale which ranges from (0) 'Never' to (6) 'Always'. The Cronbach's alpha coefficients vary between 0.85 and 0.92 (Schaufeli, Bakker, & Salanova, 2006).

General need satisfaction was measured by using the Work-Related Basic Need Satisfaction scale (WBNS) (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens (2008). The scale was designed to measure the satisfaction of the needs for autonomy (e.g. 'I feel free to do my job the way I think it could best be done'), competence (e.g. 'I really master my tasks at my job'), and the need for relatedness (e.g. 'At work, I can talk with people about things that really matter to me') (Van den Broeck, Ferris, Chang, & Rosen, 2016). The WBNS consists of 16 items which were scored on a five-point Likert scale which ranges from 'Totally disagree' (1) to 'Totally agree' (5). The Cronbach's alpha coefficients were found to be 0.81, 0.85 and 0.82 on average for the three basic needs: autonomy, competence and relatedness (Van den Broeck et al., 2008).

General job demands and general job resources were measured with the Job Demands-Resources Scale (JDRS) developed by Jackson and Rothmann (2005). The JDRS consisted of 32 items which were scored on a four-point scale ranging from 1 (Never) to 4 (Always). The scales of the JDRS will be reliable with α's > 0.70 within the South African context. Specifically, the following job demands and job resources were measured: work load, emotional load, supervisor support, role clarity, job information, participation in decisions, opportunities to learn, job autonomy, colleague support and remuneration.

Daily need satisfaction was measured by means of a daily short questionnaire which consisted of the nine adapted items from the Work-Related Basic Need Satisfaction Scale (WBNS) (Van den Broeck et al., 2010). The three basic needs for autonomy, relatedness and competence were each measured by selected items. The wording of the items were changed slightly to make them applicable to day-to-day measurement (e.g. 'Today, …'). Items were scored on a five-point Likert scale which ranges from 'Strongly disagree' (1) to 'Strongly agree' (5). The Cronbach's alpha coefficients were found to be 0.81, 0.85 and 0.82 on average for the three basic needs: autonomy, competence and relatedness (Van den Broeck et al., 2008).

Daily work engagement was measured by applying the 9-item UWES. The items were included for each dimension and the wording of the items were changed to make them more applicable for purposes of day-to-day measurement (e.g. 'Today, ...'). Items were scored on a scale ranging from (1) 'Strongly disagree' to (5) 'Strongly agree'. The Cronbach's ranged from 0.85 to 0.90 (Schaufeli et al., 2006).

Research procedure

Ethical approval was obtained from North-West University's (NWU) Faculty of Economic and Management Sciences Research Committee before research could commence (Reference: EMSMHW16/06/21-01/01). Following this, the Public Hospital Patient Safety Group (PSG) was approached in order to obtain permission to conduct the research at their facility. The group reviewed the proposed study and granted permission to conduct research within the hospital. The nurses working night shift within different departments were approached and met with in person to explain the objectives of the study, which included information regarding the confidential nature of the study. The principals also received a letter explaining the aims of the study, proof of ethical clearance from NWU and proof of permission to conduct the research in the hospital. Participants then received the measuring instruments of general engagement and general basic need satisfaction (booklet) in hardcopy format on the first day of their shift cycle at the beginning of their night shift. Confidentiality and the voluntary nature of the study were explained, and a basic overview of the purpose of the study was given on the front page of the booklet. Once participants had submitted their informed consent forms to the researcher, each participant received a number which they used and indicated on the general questionnaire and the short daily questionnaires. The general questionnaire was collected at the end of the first day. For seven consecutive days the participants completed the short daily questionnaire of daily engagement and need satisfaction in hard copy at the end of each shift. The short daily questionnaire was collected at the end of each shift. The data were captured in an electronic spreadsheet after which it was examined for potential errors and prepared for statistical analysis.

Statistical analysis

The data were investigated by applying Mplus 8.2 (Muthén & Muthén, 2018). Descriptive statistics and correlations were also provided. Specifically, the means and standard deviations were provided and for the correlational relationships the standard: small, medium and large effect sizes, will be considered (Cohen, 1992). Specifically, multilevel analysis was used for testing the hypotheses whereby repeated measures gave an indication of variance both within participants over days and between participants. The intra-class correlation coefficient (ICC) was used to compare within and between person variance (Nakagawa, Johnson, & Schielzeth, 2017; Field, Miles, & Field, 2012). Therefore the justification for using multilevel analysis

would be sound if significant variation is indicated by the ICC. Specifically, a random intercept model and a random slope model were tested.

Given significant variation, as indicated by specific factors, a model(s) will be investigated to ascertain the effect of general job demands and job resources on daily work engagement (within participants over days). Specifically, the variation in daily work engagement will be isolated as a parameter in the model and the general job demands and job resources will be regressed on this variation. For this model Bayesian estimation was used, since specifying this type of random variance parameter is not available with maximum likelihood and Bayes is a powerful estimation method for smaller sample sizes – providing similar results when maximum likelihood would be feasible. For Bayesian modelling the PSR convergence criterion was used which should be below 1.05 (Muthén, 2010). Furthermore, the parameter trace plots and kernel density plots were provided for any parameters of interest. The parameter trace plots should show sufficient mixing between the two chains and the kernel density plot should show a smoothed distribution for the parameters to be trusted for interpretation. The models were estimated with at least 50,000 iterations. The 95% credibility intervals of the estimates were considered so as to ascertain the impact of the relationships. In terms of the functionality of adding priors to the Bayesian model, no priors were specified and the Mplus default priors were used as the default.

Ethical considerations

Ethical clearance was provided by North-West University's Faculty Research Committee to proceed with this study as per the following reference: EMSMHW16/06/21-01/01. The researcher was committed to follow all the necessary steps in order to conduct the research in an ethical, fair and professional manner. For instance, all aspects of this study were conducted in an ethical manner in that results were dealt with in a confidential manner, participation was voluntary since all respondents were assured that they could withdraw their participation at any time without negative consequences. At no stage of the research process did incidents occur that might have caused any harm to any participant or the organisation.

Results

Descriptive statistics

For each of the daily variables the following ICC's were found: Work engagement (53.8%), daily need satisfaction in the form of autonomy (25.2%), daily need satisfaction in the form of competence (40.3%) and daily need satisfaction in the form of relatedness (33.1%). Table 2 below reflects the descriptive statistics and correlations for these variables.

Table 2

Descriptive statistics and correlation matrix for the day-level variables

Variable	M	SD	1	2	3	4
1. Work engagement	3.30	0.66	1.00			
2. NS: Autonomy	3.69	0.60	0.60[b]	1.00		
3. NS: Competence	3.97	0.67	0.67[b]	0.76[b]	1.00	
4. NS: Relatedness	3.07	0.66	0.18	0.24	-0.10	1.00

Notes: M = Mean; All correlations statistically significant $p < 0.05$; b = Large practical effect

As depicted in Table 2, the mean of all the scales were above the middle point of the five-point scale with similar standard deviations. As for the correlations, daily work engagement highly correlated with daily need satisfaction, both in the form of autonomy ($r = 0.60$; large effect) and competence ($r = 0.67$; large effect), but only had a small correlation with daily need satisfaction in the form of relatedness ($r = 0.18$; small effect). Daily need satisfaction of autonomy and competence were also highly related ($r = 0.76$; large effect), but both had low correlations with relatedness ($r = 0.23$, $r = -0.10$; small effects).

The effects of daily basic need satisfaction on daily work engagement as outcome

Table 3 below reflects the results from the modelling of the effects of the three daily basic need satisfaction variables on daily work engagement – specifically for the intercept only and intercept and slope models.

Table 3

The results from the multi-level modelling

	Intercept only		Intercept and slope	
Variable	**Est**	**SE**	**Est**	**SE**
Constant	1.15†	0.26	1.03†	0.39
NS: Autonomy	-	-	0.16†	0.10
NS: Competence	-	-	0.34*†	0.09
NS: Relatedness	-	-	0.10†	0.06
Log-likelihood				
AIC	302.99	-	298.41	-
BIC	323.65	-	329.39	-
SABIC	304.63	-	300.87	-
Variance	0.15†	0.04	0.01†	0.11

Note: SE = Standard error * = significant p < 0.05; $\dagger$ = unstandardized; AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion; SABIC = Sample size-adjusted Bayesian Information Criterion.

The results indicated that daily need satisfaction in the form of autonomy ($\gamma = 0.16$; SE = 0.10; $p = 0.11$) and daily need satisfaction of relatedness ($\gamma = 0.10$; SE = 0.06; $p = 0.09$) did not significantly explain variation in daily work engagement. However, daily need satisfaction of competence indicated a significant increase over time in daily work engagement ($\gamma = 0.34$; SE = 0.09; $p < 0.001$). The AIC and SABIC statistics for the intercept and slope model were lower than the values for the intercept only model, even though this was not the case with the BIC – the difference was still below 10 which would have indicated a significantly improved model. Preference is also given to the SABIC as it also factors in the sample size. These results supported H$_2$ and rejected H$_1$ and H$_3$ of the study. Consequently the analyses entered an exploratory phase to investigate the effects of the general variables on the variability in daily need satisfaction of competence and daily work engagement.

The impact of general work engagement, job demands resources on the variability in daily need satisfaction in the form of competence

Given the support for H$_2$, this model explored the effect of the general level variables measured at the start of the study on the variability of daily need satisfaction of competence. The model converged according to the PSR criteria of less than 1.05 within 300 iterations. However, to be more confident in the generated estimates, the iterations were increased to 50,000 to ensure a smoothed parameter distribution. Table 4 gives an account of the estimates from the model and

the figures present the trace plots and kernel density plots for the parameters of interest and for the Bayesian model.

Table 4

Estimates with 95% credibility intervals

Path	Estimate	Posterior SD	Lower 95%CI	Upper 95%CI
General work overload → Daily NS: Competence	0.08	0.16	-0.24	0.40
General emotional load → Daily NS: Competence	0.50*	0.18	0.15	0.86
General supervisor support → Daily NS: Competence	-0.11	0.28	-0.66	0.46
General role clarity → Daily NS: Competence	-0.20	0.25	-0.67	0.30
General job information → Daily NS: Competence	0.22	0.25	-0.27	0.73
General participation in decisions → Daily NS: Competence	0.52	0.32	-0.13	1.14
General opportunities to learn → Daily NS: Competence	-0.60	0.32	-1.21	0.03
General job autonomy → Daily NS: Competence	-0.01	0.20	-0.41	0.37
General colleague support → Daily NS: Competence	0.35	0.19	-0.02	0.72
General remuneration → Daily NS: Competence	0.12	0.18	-0.22	0.47
General work engagement → Daily NS: Competence	-0.04	0.04	-0.13	0.05

Note: * = Did not cross zero; SD = standard deviation; CI = credibility interval.

It is evident from Table 4 that general emotional load explained significant variability in daily need satisfaction of competence ($\gamma = 0.50$; SD = 0.18; 95% CI[0.15, 0.86]). It should be noted that the credibility for general colleague support was close to not crossing zero ($\gamma = 0.35$; SD = 0.19; 95% CI[-0.02, 0.72]). None of the other variables were of interest, all crossing zero.
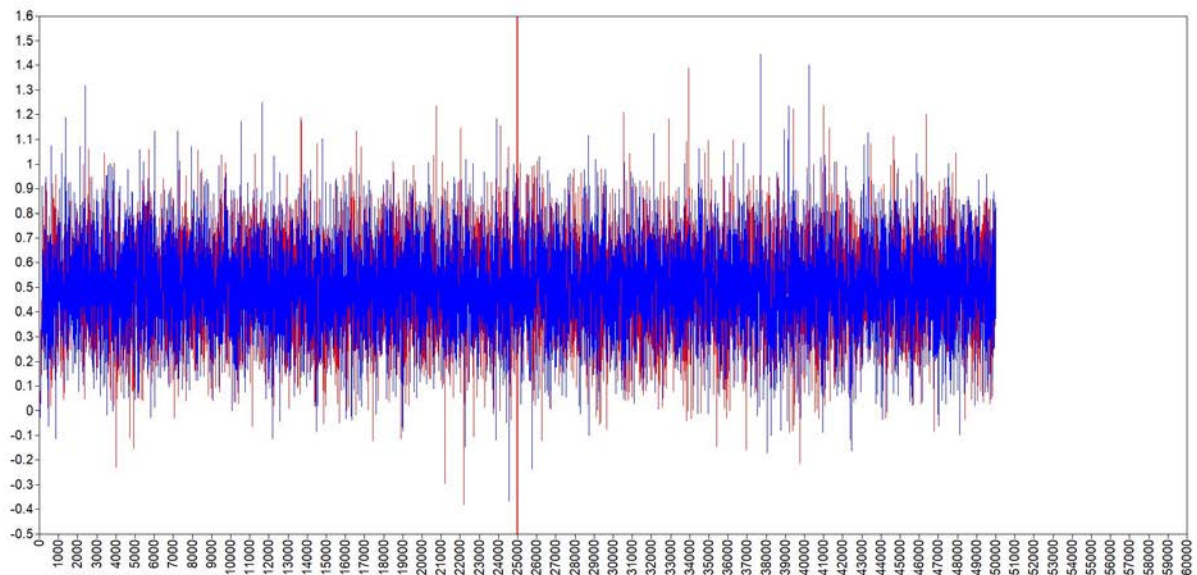

Figure 1. *The chain-mixing trace plot for general emotional load on daily need satisfaction of competence*
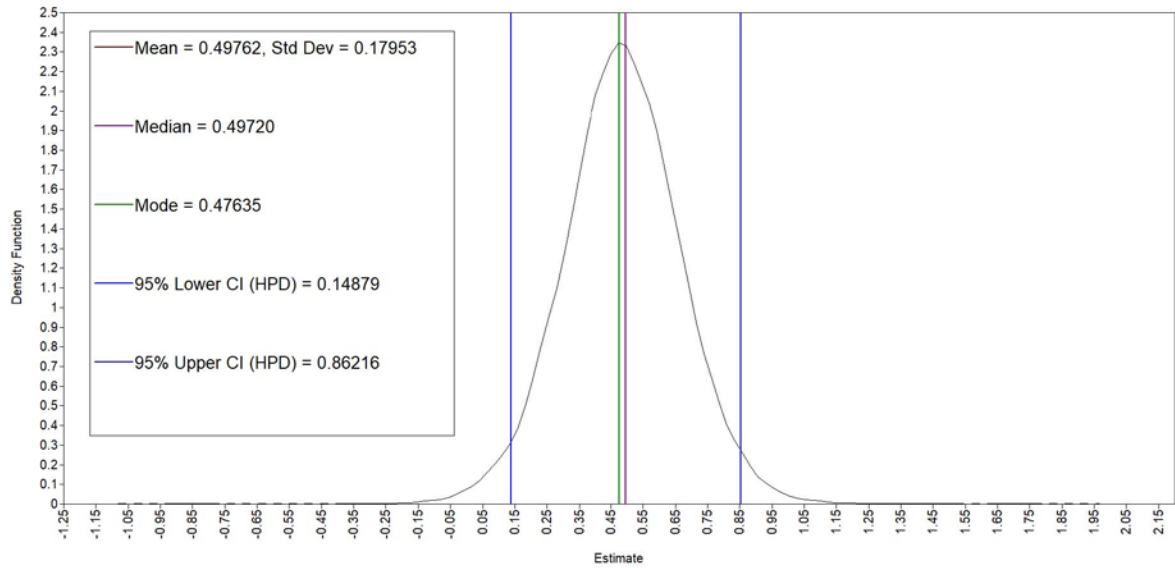
Figure 2. *The kernel density plot for general emotional load on daily need satisfaction of competence*

As becomes evident, the figures indicate sufficient chain-mixing and a normal distribution of the parameter. This was also the case for all of the other parameters in the model.

The impact of general work engagement, job demands and resources on the variability of daily work engagement

A model was also explored, including daily work engagement as outcome and the job demands, job resources and general work engagement to gauge the impact of the general factors on daily work engagement. The model converged according to the PSR criteria of less than 1.05 within 5 000 iterations. However, to be more confident in the generated estimates, the iterations were increased tenfold to 50 000 to ensure a smoothed parameter distribution. Table 5 gives an account of the estimates from the model and the figures present the trace plots and kernel density plots for the parameters of interest and for the Bayesian model.

Table 5

Estimates with 95% credibility intervals

Path	Estimate	Posterior SD	Lower 95%CI	Upper 95%CI
General work overload → Daily work engagement	-0.01	0.08	-0.18	0.15
General emotional load → Daily work engagement	0.07	0.09	-0.11	0.25
General supervisor support → Daily work engagement	0.08	0.14	-0.19	0.37

General role clarity → Daily work engagement	-0.29*	0.13	-0.53	-0.04
General job information → Daily work engagement	-0.11	0.13	-0.36	0.14
General participation in decisions → Daily work engagement	0.06	0.16	-0.27	0.37
General opportunities to learn → Daily work engagement	0.00	0.17	-0.32	0.33
General job autonomy → Daily work engagement	-0.05	0.10	-0.25	0.16
General colleague support → Daily work engagement	0.18	0.10	-0.01	0.37
General remuneration → Daily work engagement	0.09	0.09	-0.09	0.27
General work engagement → Daily work engagement	-0.01	0.02	-0.05	0.04

Note: * = Did not cross zero; SD = standard deviation; CI = credibility interval.

Table 5 only indicates one variable that did not cross zero – general role clarity had a negative impact on the daily variability in work engagement ($\gamma = -0.29$; SD = 0.13; 95% CI[-0.53, 0.04]). Once again, general colleague support was also close to crossing the threshold, but did not ($\gamma = 0.18$; SD = 0.10; 95% CI[-0.01, 0.37]). None of the other variables were of interest, all crossing zero by some margin.
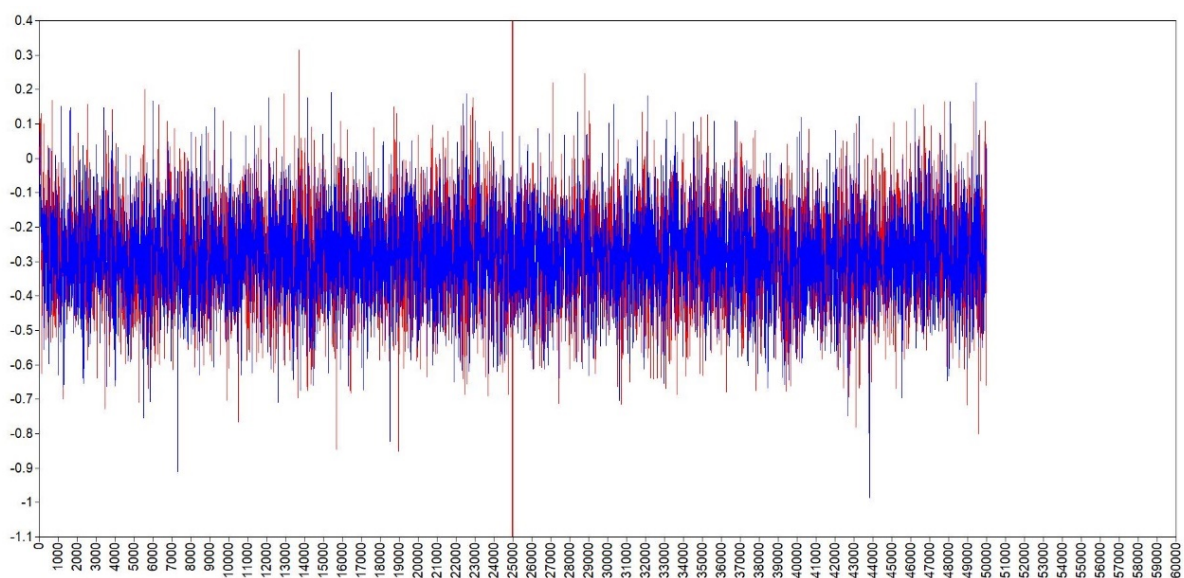

Figure 3. *The chain-mixing trace plot for emotional load on daily need satisfaction of competence*
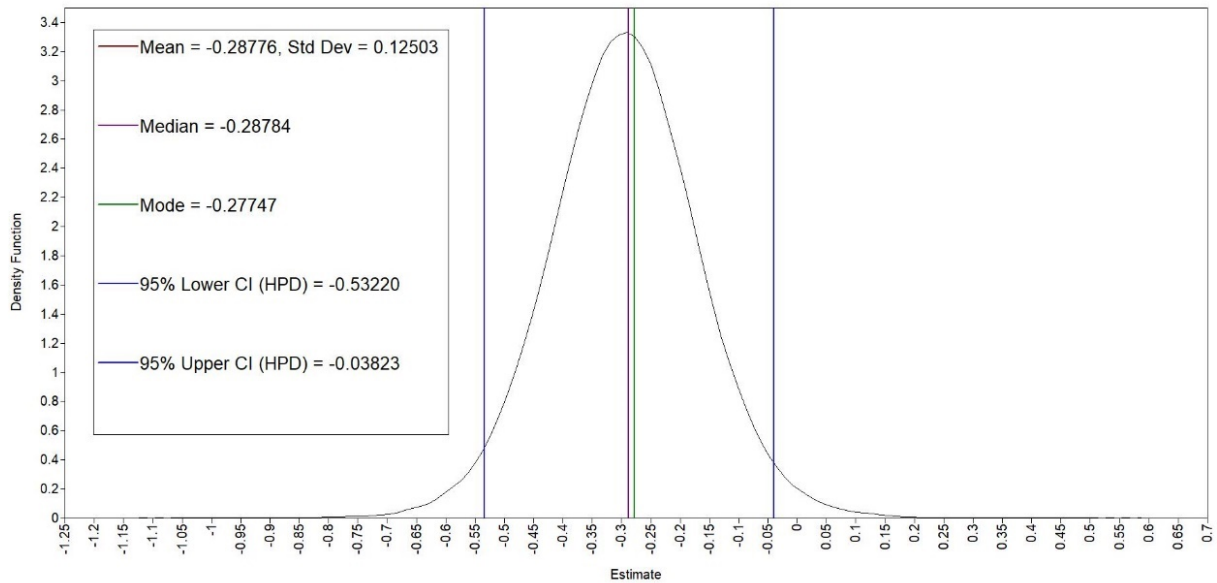
41

Figure 4. *The kernel density plot for general role clarity on daily work engagement*

As can be seen the figures indicate sufficient chain-mixing and a normal distribution of the parameter. This was also the case for all of the other parameters in the model.

Discussion

Outline of the results

The aim of this study was to investigate the variation in nurses' work engagement from day to day (7-day consecutive night shifts) in accordance with the satisfaction of their three basic psychological needs as indicated by the SDT – autonomy, competence and relatedness – within a public health-care context. This is the first multilevel diary study to take into consideration all of these factors in a single study within public health-care nursing. This research was important as it contributes to the existing research that examines the relations between work-related basic need satisfaction and work engagement (Silman, 2014). This was the first study to investigate the relationship between the satisfaction of night-shift nurses' basic needs and the effect thereof on work engagement based on a multilevel diary study in the public health-care sector of South Africa.

The results from the modelling of the effects of three daily basic need satisfaction variables on daily work engagement revealed that daily basic need satisfaction, in terms of autonomy, did

not significantly predict variance in daily work engagement (H_1 Rejected). This is contrary to the results of a recent cross-sectional study by Heyns and Rothmann (2018) which revealed that the satisfaction of autonomy in the sense of control and freedom to exercise choice positively relates to work engagement within a South African agricultural business. Possible reasons why the current study contradicts this, could be that professional autonomy in nursing is a complex issue and the concept varies in comparison to other business sectors (Matekaase, 2011). Education, legislation and organisational policy/culture may have impacts on nurses' perception of autonomy and their need to operate in a more professional independent manner (Iliopoulou & While, 2010). For instance, professional autonomy for nurses means the ability to make some decisions within their own profession and their right and responsibility to act according to the standards of the nursing profession (Varjus, Leino-Kilpi, & Suominen, 2011). Furthermore, the work environment of nurses is also complex, as nurses receive only a minimal amount of time at work to perform autonomous tasks or make decisions whereas the greater amount of time is used for administering medications (Garcia, Fernández, & Martínez, 2016). Autonomy of nurses has been studied for several years, yet researchers still find it challenging to define and understand the concept (Verjus et al., 2011).

Daily basic need satisfaction, in the form of competence, significantly predicted variation in daily work engagement (H_2 Supported), indicating that competence explained significant variance in daily work engagement. This is in line with the findings of a previous study indicating that the fulfilment of basic needs for competency positively influences work engagement (Silman, 2014). Deci, Olafsen, and Ryan (2017) suggest that if nurses' need for competence is fulfilled within their working conditions, it enables them to be more engaged. Thus the nurses' daily working conditions which cater for fulfilling the need for competence may have varied on particular days, which caused variation in daily work engagement over time. The nurses might have been able to accomplish and master their assigned tasks on particular days whereas on other working days the conditions might not have presented them with the opportunity. Nilsson, Lundgren, and Furåker (2009) found that nurses working in public institutions have the overall responsibility for the nursing process which requires of them to be competent in nursing as well as confident in decision-making. This highlights the importance of considering nurses' need for competence and the importance of further analysing this hypothesis.

In terms of H_3, results indicated that daily basic need satisfaction, in the form of relatedness, did not significantly predict variation in daily work engagement. Therefore hypothesis 3 was not supported. This was contrary to expectations and the results of Vera, Martínez, Lorente, and Chambel (2016), which demonstrated that the need for social support has a direct positive relationship with work engagement in nurses. These results demonstrate that even though the nurses might have experienced a mutual feeling of having supportive connections with colleagues (Leroy, Anseel, Gardner, & Sels, 2015) on a daily basis, it did not predict or have an impact on the variation in their daily level of work engagement. According to Van den Broeck, Ferris, Chang, and Rosen (2016), the need for relatedness is occasionally characterized as being less important for some outcomes than the needs for either autonomy or competence. Thus the need for relatedness might be less crucial for outcomes such as work engagement in this context and should be further explored. However, the results for general colleague support in the exploratory phase below should also be taken into consideration which are discussed further down below.

In terms of the results from the modelling of the effects of three daily basic need satisfaction variables on daily work engagement, the results supported H_2 and did not support H_1 and H_3 of the study. Consequently the analyses further entered an exploratory phase to investigate the effects of the general variables (work engagement, job demands and job resources) on the variability in daily need satisfaction of competence and daily work engagement.

First, the effect of the general work engagement, general job demands and general job resources measured at the start of the study on the variability of daily need satisfaction of competence was explored. The results showed that general emotional load explained significant variability in daily need satisfaction of competence scores of the nurses. According to the JD-R model, emotional demands are job demands (Trépanier, Fernet, Austin, Forest, & Vallerand, 2014) and job demands contribute to burnout (Crawford, LePine, & Rich, 2010). This relates to the findings of Mon Spânu, Băban, and Panagopoulou (2015) that emotional demands of nurses are predictors of emotional exhaustion and depersonalization. Emotional demands of nursing refers to tasks such as paying attention, interpreting and understanding patients' feelings and needs, and being able to deal with emotional situations such as dealing with relatives and restless patients (Louch, O'Hara, Gardner, & O'Connor, 2016). Such emotional demands can cause nurses to experience overwhelming emotions which could lead to negative consequences

for their well-being and quality of patient care (Blanco-Donoso, Garrosa, Demerouti, & Moreno-Jiménez, 2017).

Furthermore, high emotional demands nurses face is a feature of the nursing profession and is evident throughout nurses' daily working routines (Louch et al., 2016; Portela, Kröning Luna, Roetenberg, Silva-Costa, Toivanen, Araújo, & Griep, 2015). Therefore emotional demands could be interpreted by nurses as challenges that provide opportunities to develop personal and professional abilities (Bakker & Sanz-Vergel, 2013). It could be stated that how the participants interpreted their general emotional load in terms of being challenges or hindrances could have influenced their daily scores on competence. Nurses develop their competences on how to deal with emotionally stressful events by practising and observing, and by receiving support and guidance from other more experienced colleagues (Ten Hoeve, Kunnen, Brouwer, & Roodbol, 2018). This implies that colleagues' support as a job resource plays an important role and gains a positive effect – especially when nurses experience emotionally demanding conditions (Blanco-Donos, Garrosa, Demerouti, & Moreno-Jiménex, 2017).

The credibility interval for general colleague support was close to not crossing zero ($\gamma = 0.35$; SD = 0.19; 95% CI[-0.02, 0.72]); thus it might be assumed that general colleague support may explain significant variability in daily NS: Competence. This result can be explained in line with the findings of Basson and Rothmann (2017), indicating that colleague support plays a significant role in the satisfaction of autonomy, relatedness and competence needs. Furthermore, the findings of Ten Hoeve, Kunnen, Brouwer, and Roodbol (2018) indicate that colleague support in terms of 'lending a hand' when dealing with stressful and demanding situations made nurses feel confident in their tasks. Taking these findings into consideration, and by noting that night-shift nurses experience lower staffing levels than do day-shift nurses, reduced access to expert advice and increased responsibility due to the lack of supervisory presence at night, no fully staffed physicians and other specialists in the hospital (Lowson & Arber, 2014; Powell, 2012) could be reasons for significant variability in daily need satisfaction of competence.

Next, the impact of general work engagement, general job demands and general job resources on the variability of daily work engagement was explored. The results indicated that general role clarity, a job resource, had a negative impact on the daily variability in work engagement ($\gamma = -0.29$; SD = 0.13; 95% CI[-0.53, 0.04]). This finding suggest that nurses who scored higher

on role clarity showed less variability in daily work engagement scores. This finding is in line with current literature which states that job resources (e.g. role clarity) have been identified as the main drivers, which predicts and contributes to work engagement over time as well as on a daily basis (Bakker, Demerouti, & Sanz-Vergel, 2014). Whitaker, Dahling, and Levy (2007), found that role clarity is related to task performance; thus employees should be familiar with the standards that they are expected to meet and be clear of what their supervisors or colleagues expect of them in order to improve their job performance. However, role clarity for professional nurses requires not only a job description and clear goals but should also give them an understanding of what to deliver, and what is expected within their professional role (Boström, Hörnsten, Lundman, Stenlund, & Isaksson, 2013) – also during shifts. Martin and Weeres (2016) point out that role clarity of nurses is complex as it is influenced by a variety of factors such as legislation, regulatory frameworks and healthcare structures. Hence nursing management need to master the task of clearly defining the roles of nurses based on the needs of patients and the knowledge required from the nurse to make effective decisions in daily practice (Martin & Weeres, 2016). It should be noted that a lack of role clarity may be caused by nurses changing shifts, as shifts vary in terms of work tasks and patients' needs (Donald, Bryant-Lukosius, Martin-Misener, Kaasalainen, Kilpatrick, … & DiCense, 2010). Furthermore, the findings of Boström, Hörnsten, Lundman, Stenlund, and Isaksson (2013) demonstrated that role clarity among nurses enhances work engagement and correlates with nurses experiencing health promotion, colleague support, perception of mastery and empowering leadership. De Villiers and Stander (2011) highlight the importance of developing effective relations between supervisors and subordinates in terms of good relations resulting in better understanding of roles, which will empower and engage employees. In other words, employees with high quality relationships with their supervisors experience higher levels of role clarity (Kauppila, 2014). Therefore, in general, if the participants of this study were familiar with and clear about what their supervisors or colleagues expected of them in their roles, it could have resulted in less variance in daily work engagement scores.

Once again, general colleague support was close to crossing the threshold, but did not (γ = 0.18; SD = 0.10; 95% CI[-0.01, 0.37]). Therefore general colleague support might have an impact on the variability in daily work engagement. This is supported by Vera, Martínez, Lorente, and Chamber (2016) in an earlier multilevel study which found that the greater the availability of job resources at team level (e.g. colleague support), the more likely it is that nurses will be engaged. Furthermore, Yang, Sliter, Cheung, Sinclair, and Mohr (2017) state

that often research focuses on the recipient of social support and often does not consider the influence thereof on the provider of social support, especially within demanding occupations such as nursing. Their findings suggest that providing colleague support could either have a positive or negative impact on the provider – especially negative if the support is provided out of obligation (Yang et al., 2017). Moreover, as mentioned previously within this chapter, working conditions in public hospitals in South Africa are less satisfactory in terms of shortage of staff and the availability of job resources (Manyisa & Van Aswegen, 2017). According to the findings of Jardien-Baboo, Van Rooyen, Ricks, and Jordan (2016), nurses working in the South African public sector stated that limited resources served as a barrier to deliver expected patient-centred care. More specifically, night-shift nurses experience lower staffing levels than do day-shift nurses (Lowson & Arber, 2014; Powell, 2012). Thus the variability in daily work engagement of the participants might have been a result of changes in job resources in terms of access to colleague support on particular days, or being either the provider or recipient of colleague support, and the effects thereof could have had an influence.

Practical implications

The study assists in explaining the extent nurses' work engagement varies from day to day in accordance with the degree to which the three basic psychological needs are satisfied in the daily work activity of night-shift nurses. By determining the influence of the three basic psychological needs on variance of daily engagement could make organisations aware of why employees display fluctuations in their performance on a daily basis. It is important for organisations to know that employees experience fluctuating levels of work engagement when performing their work, because the variance in engagement levels influences employee, team and organisational outcomes (Bakker & Albrecht, 2018).

The findings of this study are even more important for health-care organisations which face high turnover of nursing due to negative outcomes of workload, resources available, role uncertainty and poor working conditions (Klopper, Coetzee, Pretorius, & Bester, 2012). Health-care organisations need to consider strategies which can be implemented with a view to eliminate fluctuations in the availability of job resources, especially role clarity, to ensure less variance of daily engagement.

On the basis of the results obtained in this study, the following possible interventions are proposed. With regard to addressing emotional demands, the need for enhanced training and support for nurses to enable them to manage the emotional demands throughout their daily routines has been recognised (Kinman & Leggetter, 2016). The results of this study indicate the importance of implementing training programmes among nurses to provide them with tools to enable them to better cope with their daily emotional demands. The training needs to focus on enhancing nurses' emotional competences and level of self-awareness in terms of trait emotional intelligence. By making staff self-aware of emotional intelligence qualities might enable them to find a balance to give personal attention to patients while recognising coping mechanisms to protect themselves from burnout (McQueen, 2004). Nursing staff could be requested to complete an emotional intelligence questionnaire and the results could be used to gain an understanding of staff's emotional demands within their roles. The results would enable the organisation to get an overview of staff's suitability for the role and likelihood of success. Based on the results, development plans or formal coaching programmes can be referred to.

Furthermore, to address colleague support, a supportive work environment and teamwork among nurses should be promoted – peer coaching programmes can be implemented during which colleagues can talk to and support each other through difficult times. In order to satisfy the need for competence, the effectiveness of the current organisation's performance management systems could be reviewed. It should be determined whether management and employees understand the performance management system and what it entails. Continuous performance discussions should occur between supervisors and employees, which is an opportunity for supervisors to review an employee's current progress against his/her performance management plan and to identify areas in which the employee can be supported. The focus is therefore on the employee and to assist him/her to perform at their best. Individual development plans should be created for each employee based on the outcomes of the performance discussion to identify the necessary training courses or interventions to address possible development areas. Job enrichment can also be considered to enhance competence levels among staff. With regard to role clarity, management should ensure each employee has a job profile, stipulating his/her required roles and responsibilities for the specific position. Legislation for the nursing profession, regulatory frameworks and healthcare structures need to be considered when compiling or updating job profiles (Martin & Weeres, 2016).

Limitations and recommendations for future research

Some limitations of this study should be noted. The first limitation of the study was that it was only conducted within a public organisational context of South Africa, which should be considered with regard to the external validity of the results, i.e. generalisation. The study concentrated on nurses working night shift in the public health sector. Thus, for future research, additional investigation is necessary in other different sectors and/or multiple organisations in order to determine whether the results can be compared and generalised beyond this particular professional group.

Secondly, the study was based on self-reports which may raise questions on the measurement of bias (Bakker & Sanz-Vergel, 2013). However, evidence suggests that participants in diary studies appear to show minimal cognitive processing before reporting their current states during a certain point in time (Bakker & Sanz-Vergel, 2013). Furthermore, maintaining participation for seven (7) consecutive working days was challenging. As such, the researcher was committed to distribute and collect questionnaires on a daily basis as promised to the participants. Hence participants started trusting the process which ensured continuous commitment and participation. Other implementations that could assist with this process could be mobile phone applications that can prompt nurses before or after each shift. However, the financial implications of this should be considered as well as how effective it might be when compared to in-person booklets after shifts.

Conclusion

After considering the results, evidence has been presented that significant positive relationships were found between daily need satisfaction of competence and the variation in daily work engagement and for general emotional load's impact on variability in daily competence respectively. A negative relationship was also found between general colleague support and daily work engagement variability. Health-care organisations need to address colleague support by promoting a supportive work environment and teamwork among staff; address emotional demands by means of interventions which are designed to increase staff's level of self-awareness; and provide tools to help staff cope with their emotional demands. In order to enhance competence levels among staff, job enrichment and effective performance

management systems can be explored by health-care organisations. These findings need to be addressed within health-care organisations so as to manage daily variance of employee engagement levels, which will sustain performance and enable the achievement of organisational goals.

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CHAPTER 3
CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Conclusions, limitations and recommendations

In this chapter an overview is given of the conclusions, limitations and recommendations of this study. The present outcomes of the study in accordance with the specified research objectives will be discussed, followed by an explanation of possible limitations that could have affected the study and recommendations for future research.

3.1 Conclusions

This study aimed at adding to literature which focus on the linkage between daily need satisfaction in terms of the Self-Determination theory and work engagement on a daily basis of nurses. Even though the relationship between work engagement and daily need satisfaction has been shown in previous studies, this was the first study to investigate the relationship between the satisfaction of nightshift nurses' basic needs and the effect on work engagement based on a multilevel diary study in the public health-care sector.

The first specific objective of this study was to determine how self-determination theory, basic need satisfaction, work engagement and job demands-resources are conceptualised in the literature. A literature review was conducted in chapter two. This literature review gives an overview of how the factors are conceptualised and explains the relationships between factors based on existing literature. *Self-determination theory* (SDT) was conceptualised as a universal theory of human motivation which focusses on fundamental aspects of personality development, self-regulation, and basic psychological needs (Leroy, Anseel, Gardner, & Sels, 2015). SDT describes the impact of social environments on the motivation, behavior and well-being of employees (Schutte, Wissing, & Ellis, 2018). The *basic need satisfaction theory* is a mini-theory of the SDT which demonstrates that people are motivated and experience well-being if their basic needs for autonomy, competence and relatedness are satisfied (Van den Broeck, Ferris, Chang, & Rosen, 2016). *Work engagement* is a state of vigour, dedication and absorption that influences and predicts organisational outcomes in terms of job performance (Bakker, 2014). The *Job Demands-Resources model* suggests that all occupations have job characteristics which can be divided into two different categories, namely job demands and job resources (Du Plooy & Roodt, 2010). The JD-R model describes how job resources and job demands influence work engagement and burnout. *Job demands* refer to the physical, social,

or organizational aspects of a job that requires continuous physical and/or mental effort which could results into exhaustion, job stress and negative psychological states such as burnout (Du Plooy & Roodt, 2010). *Job resources* refers to the physical, social, psychological, or organizational aspects of a job that are required in achieving work goals and assist employees to deal with job demands (Bakker & Demerouti, 2017).

The second specific objective was to determine the impact of daily need satisfaction on daily work engagement. The results of this study showed that daily work engagement was highly correlated with both daily need satisfaction of autonomy ($r = 0.60$; large effect) and competence ($r = 0.67$; large effect), but only had a small correlation with daily need satisfaction of relatedness ($r = 0.18$; small effect). The daily need satisfaction of autonomy and competence were also highly related ($r = 0.76$; large effect), but both had low correlations with daily need satisfaction of relatedness ($r = 0.23$, $r = -0.10$; small effects). The satisfaction of autonomy within the nursing profession is complex as education, legislation and the organizational culture may have an impact on nurses' perception of autonomy. Furthermore, the work environment of nurses in complex in the sense that nurses receive only a minimal amount of time at work to perform autonomous task or making decision whereas the greater amount of time is used for administering medications (Garcia, Fernández, & Martínez, 2016). The understanding of the concept among the participants and how autonomy is defined within the organization may have influenced the significant results to predict variance in daily work engagement. The findings of daily need satisfaction of competence significantly predicting variation in daily work engagement which suggest that if nurses need for competence is fulfilled within their working conditions, it enables them to be more engaged. The results of daily needs satisfaction for autonomy demonstrate that even though the nurses might have experienced mutually feeling of having supportive connections with colleagues (Leroy, Anseel, Gardner, & Sels, 2015) on a daily basis, it did not predict or have an impact on the variation in their daily level of work engagement. Thus, the need for relatedness might be less crucial for outcomes such as work engagement in this context and should be further explored.

Objective three was to explore the impact of general job demands, general job resources and general work engagement on significant daily variable variations. Based on the results which supported H_2 and rejected H_1 and H_3 of the study, the analyses went into investigating the effects of the general variables on the variability in daily need satisfaction of competence and

daily work engagement. The results of this study showed that general emotional load explained significant variability in daily need satisfaction of competence. General colleague support was close to not crossing zero ($\gamma = 0.35$; SD = 0.19; 95% CI[-0.02, 0.72]) and could also be considered a significant predictor of variability in daily need satisfaction of competence. As discussed previously, emotional demands is job demands according to the JD-R model which suggest that the emotional demands of nursing (e.g. dealing with relatives and restless patients) could lead to negative consequences for their well-being (Blanco-Donoso, Garrosa, Demerouti, & Moreno-Jiménez, 2017). However, the way nurses interpreted their emotional demands in terms of being challenges, hindrances or accepted features of the nursing profession could have influenced their daily level of competence. Colleague support plays an important role when nurses deal with demanding situations (Ten Hoeve, Kunnen, Brouwer, & Roodbol, 2018), but due to lower staffing levels during night-shift and limited access to expert advice, the colleague support that nurses may need cannot be fulfilled. Thus, staff working night-shifts may feel less confident and competent in their tasks, thus creating variability in daily need satisfaction of competence.

The final objective of the study was to present recommendations for future research and practice. This objective was achieved by presenting these considerations in the remaining sections of the manuscript below.

3.2 Limitations

The first limitation lies in the fact that a convenience (non-probability) sampling method was used for the purposes of this study. This means that this study was conducted within a single organisation and focused exclusively on nurses, working seven consecutive night-shifts within the public health-care sector. Therefore, the external validity of the results i.e. generalisation to other occupations and industries, should be done with caution.

Secondly, the participants of this study are night shift nurses. The impact of daily need satisfaction on work engagement could differ for day-shift workers if considering the working conditions, length of the shifts in terms of consecutive days and the availability of job resources. The results of workers with different shifts need to be considered. Furthermore, maintaining participation for seven (7) consecutive working days was challenging. As such,

the researcher was committed to distribute and collect questionnaires on a daily basis as promised to the participants. Thus, participants started trusting the process which ensured continuous commitment and participation

Moreover, the study focused only on a small number of nurses working night-shifts. Thus, it might be possible that potential selection biases from nurses working within the same unit might have influenced the manner in which the questionnaires were completed and impacted the results. Future studies need to consider ways to prevent possible bias among the participant.

The study was based on self-reports which may raise questions on the measurement bias (Bakker & Sanz-Vergel, 2013), the responses could be biased on the participant's own subjective opinions. However, evidence suggests that participants in diary studies appears to show minimal cognitive processing before reporting their current states during a certain point in time (Bakker & Sanz-Vergel, 2013).

Furthermore, it should also be noted that objective data in terms of performance ratings and personality traits were not considered. This data could have had an impact on the results or played a mediating role between the constructs. Regardless of the above-mentioned limitations, the results contribute to literature, to future studies and highlight valuable implication to consider for the health-care sector.

3.3 Recommendations

3.3.1 Recommendations for practice

When management of health-care organisation consider the importance of the evidence at hand that high turnover in nursing is an on-going problem, nurses in the public sector are generally more dissatisfied with their working conditions and health-care organisations' ongoing goal is to deliver quality patient care. It becomes impossible for health-care organisation not invest in efforts to develop or maintain the motivation and work-related well-being of nurses.

Based on the findings of this study, it evident that organisations need to focus on interventions that are likely enhance or sustain the competence level of nurses. It is determined that if nurses'

need for daily competence is fulfilled within their working conditions, it influence their daily level of work engagement. Organisations need to consider staff's performance ratings to identify possible areas for individual development and/or job enrichment can also be considered to enhance and sustain competence levels of staff. By eliminating fluctuations in the nurses' level of daily competence, it could result in less variance in daily engagement levels which influence performance outcomes.

Furthermore, in the nursing profession, staff are exposed to high emotional demands from their patients, families, and co-worker. The impact thereof on their well-being and health should be recognised by health-care organisations (Blanco-Donoso, Garrosa, Demerouti, & Moreno-Jiménez, 2017). The organisations need be aware of how nursing staff may respond differently to the same demands, in order to develop support and training programmes accordingly (Louch, O'Hara, Gardner, & O'Connor, 2016). The programmes need to focus on making staff aware of their emotional intelligence levels and to create a better understanding and approach towards their emotional demands. This will enable staff's likelihood of success in their emotional demanding roles.

The findings of this study also highlights the importance of colleague support among nursing staff. It was found that colleagues support influence respectively, the variance in daily competence and daily work engagement among staff. Organisations need to consider ways to enhance colleagues support among staff by means of implementing peer coaching programmes and focusing adequate nurse staffing. This might result in staff feeling competent to do their tasks and more engaged on a daily basis.

Health-care organisations need to as part of the organisational culture, implement policies and take actions aimed at recognising identifying and implementing interventions which will promote role clarity, colleague support among staff and address competence levels and ways to cope with their general emotional demands. The implementation of effective interventions will improve the health-care quality being delivered to patients and customers (Blanco-Donoso, Garrosa, Demerouti, & Moreno-Jiménez, 2017). Therefore, it is recommended that awareness be raised within health-care organisations on the impact of daily need satisfaction on daily work engagement of night-shift nurses and the plausible effects thereof on individual, team and organisational outcomes.

3.3.2 Recommendations for future research

The first recommendation for future studies is to focus on repeating this research approach within the public and private health-care sectors with representative samples of nurses working different shift cycles. Future researchers should also attempt to investigate these findings in different sectors and/or multiple organisations in order to determine if the results can be generalised beyond this particular professional group, as context might play an important role.

This study was able reveal significant predictions in terms of daily need satisfaction of competence's impact on daily work engagement, general emotional load's impact on daily need satisfaction of competence and general role clarity's impact on daily work engagement. However, more research is required to help nurses more effectively manage the emotional demands of practice (Kinman & Leggetter, 2016). And although the effects of shift work have been extensively researched in a variety of settings (Huntington, Gilmour, Tuckett, Neville, Wilson, & Turner, 2011) and many studies have been published about nursing and nurses, research gaps remain concerning the behaviours and experiences of night-shift nurses (Powell, 2013). One potential avenue to investigate, would be to conduct qualitative interviews with nurses in order to obtain more in-depth data regarding the quantitative findings.

The majority of literature investigated general work engagement, basic need satisfaction theory and Job Demands-Resources model within a general context. According to Bakker and Demerouti (2017), evidence gathered on the effects of interactions within the JD-R model and the effects on employee wellbeing and outcomes over time is still lacking. Multi-level models result in a better understanding of psychological occurrences unfolding within organisations and the knowledge gathered can help guide organisations to develop more effective interventions (Bakker & Demerouti, 2017). A recommendation for future studies would be to make use 'shortitudinal' research designs with a multilevel research approach to allow the investigation of daily variances and relationships between psychological constructs.

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