Resilience: healthy self-care

A cross-sectional study investigating the associations between stress, resilience
and quality of life amongst healthcare professionals

Master Thesis Clinical Psychology

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Summary

Background: Healthcare professionals endure work-related stress on a regular basis, however, most healthcare professionals cope with the pressure. One explanation for the absence of function impairment might be resilience. In this study, the associations between resilience, stressors and quality of life were investigated in healthcare professionals, and specifically to test resilience as moderator between stress and quality of life.

Method: Data was collected by means of an online survey amongst 89 Dutch healthcare professionals. The survey consisted of socio-demographics questions, resilience (CD-RISC 10, 10 items), chronic stress (Questionnaire Work Pressure, 23 items), incidental stress (Questionnaire Critical Incidents, 12 items), and quality of life (WHOQOL-BREF, 26 items). The associations between resilience, stressors and quality of life were investigated by means of Pearson's correlations and multiple regression analyses.

Results: Participants scored significantly higher than norm groups on resilience and quality of life, and significantly lower than other samples of healthcare professionals on stressors. Chronic stress and incidental stress were negatively associated with quality of life and resilience. Quality of life was positively associated with resilience. Incidental stress had a greater impact on resilience and quality of life than chronic stress. No significant interaction effect was found for resilience, stressors and quality of life.

Conclusion: The sample appeared to be highly resilient with "great" quality of life and sporadic stress. The description of resilience, quality of life, and the causes for stress for participants has added value. However, a longitudinal design would have been the more appropriate design to investigate resilience as process.

Keywords: Resilience, Healthcare professionals, Quality of life, Work-related stress, Critical Incidents

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Prologue

In front of you is my master thesis, a study centered on resilience. A lot can be said about resilience, most of it you will find from the introduction on, certainly in relation to this project. The enthusiasm of creating our own project from scratch began to fade quickly when confronted with the harsh reality of scientific research. We had to readjust to a new direction more than once and we had some setbacks and disappointments. So, now I am not only introduced to the reality of scientific research, I also made the research subject, resilience, my own. However, all is well that ends well and I have studied the concepts of recovery, sustainability and growth to my great pleasure.

By means of this prologue, I would like to thank a few people for their contribution to the realization of this master thesis. First, I would like to thank Dr. Joanne Mouthaan and Dr. Linda Jans for their professional guidance during this project. I have experienced the advice, feedback and process as constructive and enriching. Second, I would like to thank my co-conspirator Bauke van der Sande. We have known each other -and teamed up- from the start, our first year of Criminology, and now we end it together six years later. We have experienced a lot of difficulties with this project but we had more than a few laughs along the way. Third, I would like to thank the healthcare professionals who invested their time and efforts in partaking in the survey. If not for their participating, this study could not have been executed.

I would like to especially thank my sister Mireille Poortinga who is my great example for Resilience, with a capital R.

With this master thesis, I will (almost) finish my master's degree in Clinical Psychology at Leiden University. With the job perspectives in mind, I think I will keep this thesis around as a reminder to be resilient…

Vivianne Poortinga

September 1st 2015

Introduction

Healthcare professionals are at heightened risk for work-related stress and health problems due to the extraordinary demands and circumstances of the job. In addition to the normal work-related stressors like workload, time pressure, and lack of control or autonomy (Bultmann, Kant, Schroer & Kasl, 2002b; Karasek, 1979; Stansfeld & Candy, 2006; Zoer, Ruitenburg, Botje, Frings-Dresen & Sluiter, 2011), more severe stressors are present because of the high-risk nature of the job, such as the death and severe suffering of patients, disruptive behavior, violence, and sexual harassment (Aust, Ruguliesa, Skakona, Scherzerb & Jensen, 2007; Bultmann, Kant, Kasl, Beurskens & Brandt, 2002a; Happel, Reid-Searl, Dwyer, Gaskin & Burke, 2013; Hart, Brennan & de Chesnay, 2014; Jackson, Firtko & Edenborough, 2007).

Stress has a well-documented negative influence on various domains of human functioning such as physical and psychological health, social relationships, and cognitive functioning (Achat, Kawachi, Levine, Berkley, Coakley & Colditz, 1998; Dunkel Schetter & Dolbier, 2011; Monson, Brunet & Caron, 2015). Research has shown that disruptive behavior, low social support, and adversities related to the job can have a negative impact on both physical and mental health in healthcare professionals (Adriaenssens, de Gucht & Maes, 2012; Kogien & Cedaro, 2014; Prunier-Poulmaire, Gadbois & Volkoff, 1998). Work related critical incidents, incidental stress, were positively associated with symptoms of depression, anxiety, and Post-Traumatic Stress Disorder (PTSD) in healthcare personnel (de Boer, Lok, van't Verlaat, Duivenvoorden, Bakker & Smit, 2011; Ray, Wong, White & Heaslip, 2013). In general, approximately 10-15 percent of Dutch and Belgian doctors and nurses met the criteria of PTSD, 25-30 percent displayed symptoms of PTSD and 35-40 percent reported impairment in functioning on social, occupational or other domains after traumatic exposure (Adriaenssens et al., 2014; de Boer et al., 2011). Chronic work-related stress was positively associated with mental health symptoms, such as stress, burnout, and work-related fatigue, and contributed to absenteeism and work disablement (Bultman, Kant, van den Brandt & Kasl, 2002c; Kant, Jansen, van Amelsvoort, Mohren & Swaen, 2004; Nieuwenhuijsen, Bruinvels & Frings-Dresen, 2010; Stansfeld & Candy, 2006; Zoer et al., 2011). For example, approximately 30 percent of employee absenteeism in the Netherlands is due to psychological symptoms or illness (Kant et al., 2004; Prins, van der Burg & Heijdel, 2005).

However, most healthcare professionals are able to cope with the pressure and demands of their profession (Hart et al., 2014; Poulsen, Poulsen, Baumann, McQuitty & Sharpley, 2014; Streb, Haller & Michael, 2014). One of the factors that might explain the natural recovery or the absence of function impairment is resilience. Resilience is defined and conceptualized in many ways, due to theoretical differences (Dunkel Schetter & Dolbier, 2011; Garcia-Dia, DiNapoli, Garcia-Ona, Jakubowski & O'Flaherty, 2013; Zautra, Arewasikporn & Davis, 2010).

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Although researchers are still to reach consensus on the definition of resilience (Garcia-Dia et al., 2013, de Terte & Stephens, 2014), most agree that resilience is dynamic rather than static (Dunkel Schetter & Dolbier, 2011). Resilience is "the process involving an ability to withstand and cope with ongoing and repeated demands and maintain healthy functioning in different domains of life such as work and family" (Dunkel Schetter & Dolbier, 2011, p.637). This definition is comprised of three interconnected components: (1) recovery as returning to baseline functioning following a major stressor; (2) sustainability as the capacity to continue forward during exposure to traumatic or demanding stressors and maintain functioning without any disruption; (3) growth as the enhanced adaption beyond original levels of functioning. These three components outline the mechanisms of resilient behavior rather than the outcome of resilient behavior (Bonanno, 2004; Zautra et al., 2010).

The above mentioned skills and resources refer to resilient resources: characteristics of the individual and (social) environment that stimulate the ability to maintain functioning despite the demands of the situation and moderate the effects of stressors on health and adjustment indicators (Dunkel Schetter & Dolbier, 2011; Gowan, Kirk & Sloan, 2014; Newman, 2005). Resilience is idiosyncratic due to the interaction of situational environmental characteristics and the specific resilient traits of an individual (Garcia-Dia et al., 2013; Newman, 2005; Zautra et al., 2010).

These resilient resources, both characteristics of the individual and the environment, correspond to the transactional model of stress from Lazarus & Folkman (1984) with subjective cognitive appraisal style and coping mechanisms as moderators between stressors and mental health consequences. Stress is the subjective experience that the demands of a situation exceed the resources and ability of the person to cope with it (Agaibi & Wilson, 2005; Gowan et al., 2014; Lazarus & Folkman, 1984; Poulsen et al., 2014). The subjective appraisal of an event by the individual determines whether an individual assesses an event as negative and thus stressful (Lazarus & Folkman, 1984; Lazarus, 1990). This process of appraisal depends on an individual's abilities, such as coping mechanisms and cognitive appraisal style (Belsky & Pluess, 2009). Due to the subjective appraisal, the impact of events differs across individuals (Lazarus & Folkman, 1984; Willemen, Koot, Ferdinand, Goossens & Schuengel, 2008). An event can diminish the feeling of control over one's life, the access to supportive resources and feelings of self-confidence and self-competence. This in return diminishes the ability to function in day-to-day life, resulting in stress which over time accumulates in emotional and behavioral problems or psychopathology (Jerusalem, 1993; Willemen et al., 2008).

In the general population and professions at risk for severe stress (Hart, 2014; Jackson et al., 2007; White, Driver & Warren, 2008), resilience was associated with retaining healthy and quality of life (Bonanno, 2004; Gowan et al., 2014; Hart, 2014; Poulsen et al., 2014; Prunier-Poulmaire et al., 1998; Streb et al., 2014).

Resilience accounted for approximately 60 percent of the variance in mental health symptoms for healthcare professionals, both doctors and nurses (Happel et al., 2013; Leners, Sowers & Quin Griffin, 2014). More exposure to chronic and incidental stress was associated with lower scores on resilience, quality of life and higher scores on burnout, compassion fatigue, and PTSD (Leners et al., 2014; Tatano Beck & Gable, 2012). Lifetime trauma, prior exposure to traumatic events, neutralized the effects of resilience on quality of life and mental health symptoms in high-risk professions (Leners et al., 2014; Ray et al., 2013).

Quality of life, the overall well-being of people, is also comprised of components such as social relationships and the environment (Carper et al., 2014; Mastohoff, Trompenaars, van Heck, Michielsen, Hodiamont & de Vries, 2007). The social component consists of social relationships, sexual relationships, and practical social support (Skevington, Lofty & O'Connell, 2004). The characteristics of social relationships and the availability of social, emotional, and practical support are positively associated with mental health and psychological well-being. Research has shown that the availability of a social support system can buffer the effects of stress on quality of life in healthcare professionals, the stress-buffering hypothesis (Achat et al., 1998; Helgeson, 2003; Kheiraoui, Gualano, Mannocci, Boccia & La Torre, 2012). The environmental component consists of financial resources, information and skills, leisure and recreation, home and physical environment, physical safety and security, transport, and access to healthcare and social care (Monson et al., 2015; Skevington et al., 2004). The environmental component is concretely conceptualized which makes it relatable to and comparable for both the individual as the society, in comparison with the other components such as physical and psychological health. This quantification allows for the connection of an abstract theme, quality of life, to an individualized feeling, which in return makes the environmental component significant as component of quality of life (Carper et al., 2014; Jeffres & Dobos, 1995).

The social and environmental components of quality of life also share similarities with the resilient resources. Although, the availability and activation of social support is mentioned as both resilient resource and an indicator of quality of life, resilience is a dynamic process whereas quality of life is a state (Denz-Penhey & Campbell Murdoch, 2008). The environment also has a supporting function for the other domains of quality of life and resilient resources. Financial resources, information, skills, and access to healthcare are closely related to resilient resources, for example social status, social and coping skills, and a healthy lifestyle (Dunkel Schetter & Dolbier, 2011; Gowan et al., 2014). Financial resources, safety, home and environment, leisure and recreation are necessary conditions for physical and psychological health and therefore related to the other components of quality of life (Friborg, Hjemdal, Rosenvinge & Martinussen, 2003; Mastohoff et al., 2007; Ungar & Lerner, 2008).

Resilience amongst healthcare professionals is mostly investigated within subgroups of healthcare professionals, addressing only nurses or doctors. A representative sample of all kinds of healthcare professionals as subject of a (Dutch) study investigating resilience, work-related stress, and quality of life would be a valid scientific contribution to the research area of resilience. Considering the burden for healthcare professionals, the costs involved in treatment, and temporary replacement, organizations may find keystones for the prevention of employees' absenteeism and illness within the research of resilient behavior. Resilience, and research into resilience, capitalizes on a person's strengths and fits the positive perspective within the field of clinical psychology to nurture positive characteristics to improve people's well-being rather than focus on relatively unchangeable deficits (Dunkel Schetter & Dolbier, 2011; Seligman & Csikzentmihalyi, 2000; White, et al., 2008).

In this study, the associations between resilience, work-related stressors, and social and environmental quality of life were investigated in healthcare professionals, and more specifically to test resilience as a moderator for the relationship between stress and quality of life. The research question was: 'Is the relationship between stressors and social and environmental quality of life moderated by resilience in healthcare professionals?' It was expected that chronic and incidental stress were negatively associated with social and environmental quality of life, hypothesis 1. It was expected that resilience and social and environmental quality of life were positively associated. Resilience and chronic and incidental stress were negatively correlated, hypothesis 2. It was expected that duration and severity of stressors influences resilience and quality of life. Chronic stress had a larger negative influence on quality of life and resilience in comparison with the negative influence of incidental stress, hypothesis 3. It was expected that higher scores on resilience negatively moderated the relationship between higher scores on stress and scores on quality of life, hypothesis 4.

Method

Study design

This study had a cross-sectional design and data was collected by the use of an online survey, a one-time measurement. The survey was designed using Qualtrics, web-based software for the design and distribution of a survey. This software also enabled the transference of the data into a program for statistical analysis, Statistical Package for the Social Sciences (SPSS) (IBM Corporate, 2011).

Participants

Participants approached for this study were healthcare professionals existing of first responders, home care, and hospital personnel. Inclusion criteria were minimum of 18 years of age, current employment in a medical profession for the last three months, and understanding of the Dutch language. The aim was to recruit at least 200 participants. In total, eighteen hospitals and fifteen home care organizations were approached to participate in the study. One hospital agreed to participate, three declined to participate and fourteen hospitals did not respond. Two home care organizations declined to participate and thirteen organizations did not respond. Healthcare professionals were contacted by personal contacts and social media, and asked to spread the survey to colleagues using the snowball method. Social media, such as Facebook and internet forums 'Hulpverlenersforum', 'Zorgportaal', 'NurseStation' and 'Nursing' were used to draw attention to the study by placing the advertisement and hyperlink to the survey. Flyers and hard copies of the survey were handed out to employees of Leiden Universitair Medisch Centrum (LUMC), an academic hospital in Leiden, and two homes for the elderly in Leiden and Voorschoten. More organizations, all homes for the elderly, were approached, they have declined to participate due to a reorganization or the absence of employees on account of the holiday period or the multitude of surveys and the burden on employees.

Materials

-Resilience

The CD-RISC 10 is a short version of the Connor-Davidson Resilience Scale (Campbell-Sills & Stein, 2007; Connor & Davidson, 2015). It is a one-factor questionnaire containing ten items that measure a person's ability to manage problems, challenges and adversity. The Dutch version is found reliable with a Cronbach's α of 0.90 (Markovitz, Peters, Schrooten & Schouten, 2014). The response scale is a five-point Likert scale, ranging from 'never' (0), 'seldom' (1), 'sometimes' (2), 'frequently' (3) and 'often' (4), with total sum scores from 0 to 40 (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003).

-Stressors

Stressors were divided into chronic stress and incidental work-related stress. The chronic work-related stress was measured by the questionnaire Work Pressure (de Jong, 2009). The questionnaire is found reliable with a Cronbach's α of 0.93. The questionnaire consists of 23 items on a 5-point scale, ranging from 'never' (0), 'seldom' (1), 'sometimes' (2), 'frequently' (3) 'often' (6). Adding all the points is the total score for chronic work pressure. The grading is based on risk points and risk assessment with a sum score of 0 to 15 points as 'sporadic stress', 16 to 31 as 'regular stress' and 32 and more as 'structural stress'. For every item, there is a second part of the question involving the cause of the stress factor, such as problems with materials, supervisors or content of the job. The total sum score of the causes is counted by the number of times a cause is identified as reason for the experienced stress (de Jong, 2009).

Incidental work stress was measured by a self-developed questionnaire consisting of a list of incidents and the question how many times this happened or one felt this way, based on comparable questionnaires by Carlier, Lambert & Gersons (1993), Garcia-Dia et al. (2013), Lee, Daffern, Ogloff & Martin (2015) and Poulsen et al. (2014). This questionnaire contained twelve items regarding the occurrences of death, violence, verbal abuse, life threatening situations, sexual harassment, and perceived support from colleagues and management. Frequency of these stressors were assessed on a 5-point scale, from 'never' (0), 'seldom' (1), 'sometimes' (2), 'frequently' (3) and 'often' (4). Participants were asked to rate how much the incident influenced them on a scale of 0 to 10 to measure the subjective burden of experiencing these incidents. The total sum score for the incidental occurrences ranged from 0 to 48. The subjective burden was reflected by calculation of mean grades per occurrence. The questionnaire is attached in the appendix, number 1, page 31.

-Quality of life

The WHOQOL-BREF is a short form of the WHOQOL-100 (World Health Organization, 1998), and contains a total of 26 questions and exists of four domains: physical health, psychological health, social relationships, and environment. The social domain contains 3 items and the environmental domain contains 8 items. The response scale is a 5-point Likert scale, ranging from 'very low'(0), 'low'(1), 'neutral' (2), 'high' (3) and 'very high' (4) scores. The scores on the different domains are transformed into scales to compare between the domains due to the unequal number of items (Skevington et al., 2004). The mean score of the items belonging to one domain multiplied by four are representative for the score on the domain and made comparable with other domains (World Health Organization, 1998).

This short form is found reliable with a Cronbach's α of 0.81 for social relationships and a Cronbach's α of 0.93 for the environment (Skevington et al., 2004; Trompenaars et al., 2005; The WHOQOL group, 1996).

Procedure

Approval for this study was granted by the Ethical Committee of Leiden University. Before participants were able to start the questionnaire, they were given information about the design and relevance of this study, the estimated duration, and content of the survey. It was emphasized that participation was voluntary, the results of the survey were anonymous, and participants were able to partake in a lottery for gift certificates. Data was only accessible for both researchers and supervisors. The aim of the study was explained in the debriefing to prevent a social desirability bias. It was not possible to start the survey without accepting the informed consent. After the informed consent, general instructions regarding the questionnaires were given. Participants' progress in the survey was shown by a percentage bar.

The survey started by asking demographic questions, such as age, gender, marital status, living situation, educational level, profession, hours per week, and years of experience. If participants reported to be under age, the survey automatically stopped. All of the questionnaires were preceded by specific instructions for completion. Next, participants filled in the questionnaire about resilience. Then the questionnaires' regarding stressors and quality of life followed.

After the questionnaires, participants were thanked for their participation, debriefed on the aim of the study, and given the contact information of the researchers. Participants could leave their e-mail address if they wanted to receive information about the results of the study and/or if they wanted to partake in the lottery. Participants also had the opportunity to leave a comment or question in an open comment field. If the open comment field was used, an automatic e-mail would be sent to the researchers to monitor the content of the open comments.

Statistical analyses

First, the requirements for the distribution of the data were checked. In general, missing values for the questionnaires were replaced with the mean score of respondents for that particular questionnaire, only if the percentage of missings was below 10 percent. Age, education, and chronic stress did not meet the requirement for normal distribution. No outliers were detected.

Next, descriptive data were analyzed by the use of frequency distributions. Resilience, stressors, and quality of life were analyzed for association with the socio-demographics by means of t-tests for the categorical variables and Pearson's correlations for the continuous variables. Levene's Test for equality of the variances was executed for the t-tests and variances were assumed equal.

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Scales were computed for resilience, chronic stress, incidental stress, and quality of life. A scale is considered to be reliable when $\alpha \leq 0.70$ (Field, 2009). Cronbach's α for the internal consistency of the resilience scale was 0.87, for the chronic stress scale 0.70, for the causes of chronic stress scale 0.89, and incidental stress scale 0.82. Chronic and incidental stressors combined as generic stress scale had a Cronbach's α of 0.97. Cronbach's α for social quality of life was 0.66 and 0.76 for environmental quality of life, both in accordance with earlier research (Skevington et al., 2004).

Pearson's correlations were computed for resilience, stressors, and quality of life to investigate the correlations between resilience, stressors, and quality of life and the direction of the correlations (hypothesis 1 and 2). To test whether chronic stress had a greater impact on quality of life and resilience than incidental stress (hypothesis 3), three multiple regression analyses were conducted to verify if any differences were statistically significant. Chronic and incidental stress were the independent variables in all three multiple regression analyses and included simultaneously. The first multiple regression analysis was conducted with resilience as dependent variable, the second analysis with social quality of life as dependent variable and the third analysis with environmental quality of life as dependent variable. Part correlations for the unique proportion of explained variance of predictors were computed. The requirements for a multiple regression analysis were linearity, independent observations, and normality of residuals and variance. Independent observations were assured due to the design of the data collection. An analysis of standard residuals was executed, which showed no outliers (standard residual minimum=-2.25, -2.47 and -2.87, standard residual maximum=2.14, 2.01 and 2.12). The data met the assumption of collinearity (Tolerance all ≤ 1, *VIF* all ≤ 1.4). The data met the assumption of independent errors (Durbin-Watson value=1.41, 4.01 and 2.05). The histogram of standardized residuals and the normal P-P plot of standardized residuals showed the data had approximately normal distributed errors. The scatter plot of standardized predicted values showed the data met the assumptions of homogeneity of variance and linearity.

Next, two multiple regression analyses were performed to test resilience as moderator between stress and quality of life (hypothesis 4). Stress and resilience were centralized based on the mean score into new variables and used for the analyses. Both multiple regression analyses were conducted with resilience, stressors, and the interaction between resilience and stressors as independent variables, all included simultaneously. The first analysis was conducted with social quality of life as dependent variable and the second with environmental quality of life as dependent variable. Part correlations for the unique proportion of explained variance of predictors were computed. The requirements for a multiple regression analysis were linearity, independent observations and normality of residuals and variance. Independent observations were assured due to the design of the data collection.

An analysis of standard residuals was executed, which showed no outliers (standard residual minimum=-3.21 and -2.48, standard residual maximum=2.16 and 2.06). The data met the assumption of collinearity (Tolerance all ≤ .89, *VIF* all ≤ 1.4). The data met the assumption of independent errors (Durbin-Watson value=1.55 and .64). The histogram of standardized residuals and the normal P-P plot of standardized residuals showed the data had approximately normally distributed errors. The scatter plot of standardized predicted values showed the data met the assumptions of homogeneity of variance and linearity.

*Feasibility study of the online survey*

A feasibility study of the online survey was performed before the data collection started. Nine respondents evaluated the survey on several components; duration, technical functioning, comprehensibility, difficulty of the questions, grammatical or spelling errors, lay-out, and clearness of the survey. The respondents, five males and four females, varied in age from 22 through 58 (*M*=37.6, *SD*=18.9). The educational levels ranged from master degree (*n*=3), bachelor degree (*n*=2), community college (*n*=3), and high school degree (*n*=1). None of the respondents' professions were related to the target group of this study, and were custom officers (*n*=2), financial administrator (*n*=2), psychologist (*n*=1), IT-specialist (*n*=1), catering employee (*n*=1), funeral director (*n*=1), and missing (*n*=1). Overall, several questions were formulated unclear, such as the difference between two questions questioning the feeling of tiredness after work or the direction of feelings of hostility due to the job (Questionnaire Work Pressure). Some of the WHOQOL-BREF questions were unclear such as how satisfied one was with his/her transportation or how well one was able to move. The Questionnaire Work Pressure missed a category 'not applicable' for the respondents who were not experiencing stress. Feedback from the feasibility study led to adjustments to enhance comprehensibility and lower the degree of difficulty of the questions to improve the clarity of the survey. Several adjustments were made for syntax, and grammatical or spellings errors were removed. The information and introduction pages were reformulated into more accessible language. A new answer category was added to the Work Pressure Questionnaire for those respondents who were not experiencing stress. The instruction to this questionnaire was adjusted according to these changes. The Incidental Stress Questionnaire was designed in a way that participants were not obliged to answer the follow-up question when answered 'never' to the previous question. Due to the technical failure of this design, participants were asked to answer the follow-up question with the possibility to rate 'zero'. The duration of the survey was evaluated too extensive, however, no adjustments could be made regarding the duration due to the necessity of all questionnaires.

Results

Participants

In total, 186 participants started the online survey and 89 surveys were completed, forming the final sample, and resulting in a drop-out rate of 52 percent. Most of the drop-outs occurred after the information page or the socio-demographic questions, see figure 1 for the drop-out chart and exclusion process. No significant differences in the socio-demographics were found between the participants and the drop-outs, except for the difference between participants and drop-outs regarding hours per week ($t(132)=-3.90$, $p<.001$). The participants who had completed the survey worked more hours per week in comparison with the drop-outs.

Figure 1. Flow chart of the drop-out and exclusion process.
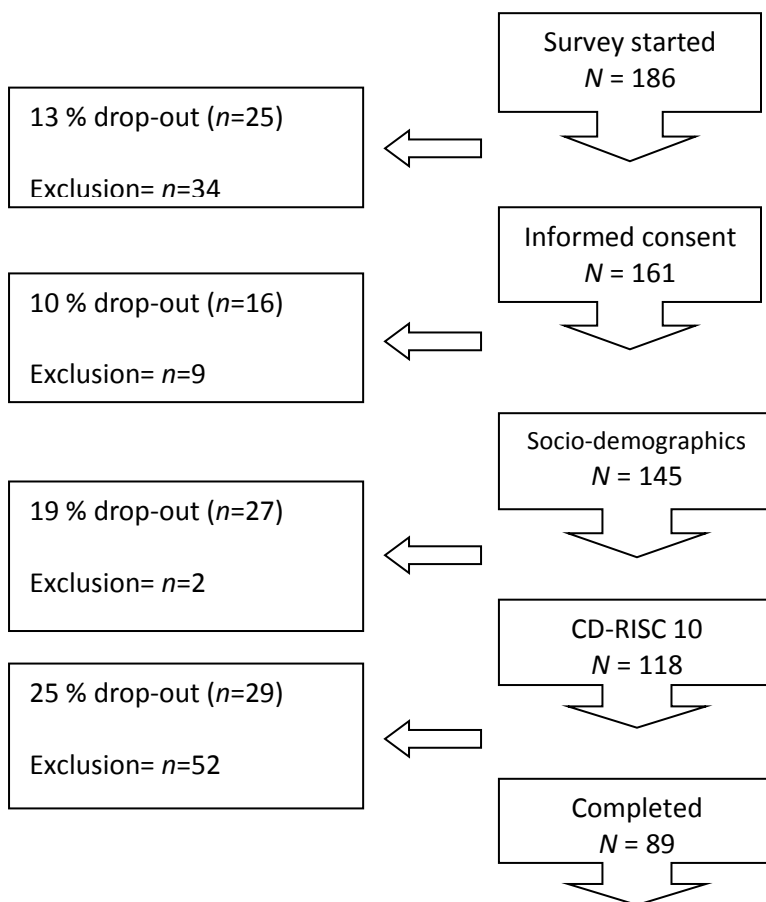
-Socio-demographic characteristics

Table 1 gives an overview of the socio-demographic characteristics. Participants were mostly female (n=70, 79 %), on average 39.6 years of age (SD=13.4), married or cohabitating (n=50, 56 %) and higher educated (n=46, 65 %). Participants worked mostly as nurse (n=41, 46 %), on average for 33.1 hours per week (SD=10.5) with on average 14.2 years of experience (SD=12.2).

Table 1. The socio-demographic characteristics of the participants (*N*= 89).

Socio-demographics	Total sample (*N*=89)
Gender (female), *N* (%)	70 (79 %)
Education, *N* (%)	
High	46 (65 %)
Moderate	17 (24 %)
Low	8 (11 %)
Marital status, *N* (%)	
Single	18 (20 %)
Married/ cohabiting	50 (56 %)
Non-cohabiting	13 (15 %)
Divorced	5 (6 %)
Other (widow(er))	3 (3 %)
Living situation, *N* (%)	
Alone	24 (27 %)
With partner; no children	22 (25 %)
With partner and children	27 (30 %)
With children; no partner	6 (7 %)
Other (parents or roommates)	10 (11 %)
Profession, *N* (%)	
Doctor	5 (6 %)
Nurse	31 (35 %)
Nurse (IC, CCU, Trauma)	10 (11 %)
First responder	1 (1 %)
Caregiver	15 (17 %)
Co-assistants and interns	15 (17 %)
Other (physical therapist, assistant)	12 (14 %)
Age, *mean* (*SD*)	39.6 (13.4)
Years in profession, *mean* (*SD*)	14.2 (12.2)
Hours per week, *mean* (*SD*)	33.1 (10.6)

Main outcomes of Resilience, Chronic and Incidental Stress, and Quality of life

-Resilience

Table 2 shows the mean score, standard deviation, and division into categories on the CD-RISC10. These scores differed significantly (*t*(87)=11.80, *p*<.001) from the norm scores for the general population (*M*=31.2, *SD*=6.0) and population exposed to trauma (*M*=26.1, *SD*=5.9) (*t*(87)=20.5, *p*<.001) with higher scores for this sample (Connor & Davidson, 2015). The scores on resilience were not significantly associated with the socio-demographic characteristics.

Table 2. Outcomes of Resilience, chronic and incidental stress and quality of life (*N*=89).

Resilience, *mean* (*SD*)	38.1 (5.5)
Resilience, *N* (%)	
0-20: low	1 (1.1 %)
21-50: high	88 (98.9 %)
Chronic stress, *mean* (*SD*)	15.4 (6.5)
Chronic stress, *N* (%)	
0-15: sporadic stress	57 (64 %)
16-31: regular stress	30 (33.7 %)
> 32: structural stress	2 (2.3 %)
Incidental stress, *mean* (*SD*)	25.4 (7.6)
Incidental stress, *N* (%)	
0-20: low	24 (26.9 %)
21-40: moderate	63 (70.8 %)
41-60: high	2 (2.3 %)
Social quality of life, *mean* (*SD*)	16.1 (2.6)
Social quality of life, *N* (%)	
0-10: low	1 (1.1 %)
11-15: good	31 (34.8 %)
16-20: high	57 (64 %)
Environmental quality of life, *mean* (*SD*)	16.9 (1.8)
Environmental quality of life, *N* (%)	
11-15: good	19 (21.3 %)
16-20: high	70 (78.7 %)
Overall quality of life, *mean* (*SD*)	4.1 (0.8)
Overall quality of life, *N* (%)	
Score 2	3 (3.3 %)
Score 3	11 (12.4 %)
Score 4	47 (52.8 %)
Score 5	28 (31.5 %)

-Chronic stress

Table 2 shows the mean score, standard deviation, and division into risk groups for the chronic stress scale. No norm scores were available. Of the participants, 64 percent (*n*=57) scored between 0-15, the sporadic stress category. For 39 percent of the participants (*N*=89) the causes of chronic stress were 'not applicable'. Box 1 gives an overview of the 5 most scored causes for chronic stress. The scores on the Questionnaire Work Pressure were not significantly associated with the socio-demographic characteristics.

Box 1. Top 5 most scored causes for chronic and incidental stress (*N*=89)

	Chronic Stress	*Mean* (*SD*)	Incidental stress	*Mean* Impact (*SD*)
1	Job quantity	11.6 (7.6)	Conflicting assignments	4. 3 (2.4)
2	Critical incidents	9.8 (10.1)	Experience with death and/or suffering	3.9 (1.5)
3	Certain tasks	7.5 (5.1)	Feeling too highly or poorly educated	3.5 (2.1)
4	Severity of the job	7.0 (4.6)	Trouble separating work and private life	3.2 (2.7)
5	Contact with manager(s)	5.3 (3.5)	Experience with life threatening situations	2.4 (2.2)

-Incidental stress

Table 2 shows the mean score, standard deviation, and division into categories of the scores on incidental stress. No norm scores were available. Of the participants, 70 percent (*n*=63) scored between 21 and 40, meaning below or around the middle. The scores on the Incidental Stress Questionnaire were not significantly associated with the socio-demographic characteristics, except for the association between lower educational levels and higher scores on incidental stress (*t*(6)=2.3, *p*< .05).

Box 1 gives an overview of the 5 most scored causes for incidental stress related to the subjective impact. Most of the participants never encountered sexual transgressing behavior (*n*=65, 73 %), violent or aggressive behavior (*n*=54, 61 %), physical threats (*n*=54, 61 %) or verbal threats (*n*=37, 42 %), a life threatening situation for themselves or others (*n*=43, 48 %), or the need to use force to prevent escalation (*n*=79, 89 %). Less than 10 percent of the participants experienced above mentioned incidents repeatedly or often, with an average impact of 7.5 on a scale from 0 to 10 (*SD*=1.3).

-Quality of life

Table 2 shows the mean score, standard deviation, and division into categories on the overall quality of life, social and environmental quality of life. The scores of participants differed significantly from the norm scores, with higher scores of this sample on all domains, for overall quality of life (*M*=3.5, *SD*=0.9) *t*(88)=7.9, *p*<.001, social quality of life (*M*=14.3, *SD*=3.2) *t*(88)=6.4, *p*<.001, and environmental quality of life (*M*=13.5, *SD*=2.6) *t*(88)=17.4, *p*<.001 (Hawthorne, Herrman & Murphy, 2006; Skevington et al., 2004). The scores on the overall quality of life of the WHOQOL-BREF were not significantly associated with the socio-demographic characteristics, except for the association between higher scores on the overall quality of life and higher age (*r*=-.25, *p*<.05). Higher scores for social quality of life were reported by married (*t*(4)=3.5, *p*<.01), cohabitating participants (*t*(4)=2.7, *p*<.05) who were working more hours per week (*r*=-.3, *p*< .05), and with an average or low(er) educational level (*t*(6)=2.8, *p*<.05).

The scores on the environmental domain of the WHOQOL-BREF were not significantly associated with the socio-demographic characteristics, except for higher scores on environmental quality of life for higher educated participants ($t(6)=3.8$, $p<.01$).

The associations between resilience, chronic and incidental stress, and quality of life
-Hypothesis 1. Chronic and incidental stress were negatively correlated with social and environmental quality of life

Table 3 shows the correlation coefficients between chronic and incidental stress and social and environmental quality of life. Both chronic and incidental stress were significantly and negatively correlated with social and environmental quality of life, as expected in hypothesis 1.

Table 3. Pearson's product-moment correlation coefficients between resilience, chronic and incidental stress, and quality of life ($N=89$).

	Resilience	Chronic stress	Incidental stress
Resilience			
Chronic stress	-.29**		
Incidental Stress	-.35***		
Social quality of life	.38***	-.39***	-.39***
Environmental quality of life	.41***	-.30**	-.52***

*** $p<.001$ ** $p<.01$ * $p<.05$

-Hypothesis 2. Resilience and social and environmental quality of life were positively correlated, resilience and chronic and incidental stress were negatively correlated

Table 3 shows the correlation coefficients between resilience and social and environmental quality of life and chronic and incidental stress. Both social and environmental quality of life were significantly positively correlated with resilience, as expected in hypothesis 2. Both chronic and incidental stress were significantly negatively correlated with resilience, as expected in hypothesis 2.

-Hypothesis 3. Chronic stress had a larger negative correlation with quality of life and resilience in comparison with the negative correlation of incidental stress

The correlations of incidental stress with resilience and quality of life were larger in comparison to chronic stress, as shown in table 3. Multiple regression analysis showed incidental stress ($\beta=-.28$, $t(87)=-2.34$, $p<.05$) as only significant predictor of resilience ($F(2, 85)=6.75$, $p<.01$, $R^2_{Adjusted}=.12$).
Both chronic ($\beta=-.26$, $t(88)=-2.24$, $p<.05$) and incidental stress ($\beta=-.26$, $t(88)=-2.26$, $p<.05$) were significant predictors for social quality of life, however with very similar values ($F(2,86)=10.82$, $p<.001$, $R^2_{Adjusted}=.18$). Incidental stress ($\beta=-.26$, $t(88)=-2.24$, $p<.05$) was the only significant predictor of environmental quality of life ($F(2,86)=15.61$, $p<.001$, $R^2_{Adjusted}=.25$).

-Hypothesis 4. Resilience as moderator between stressors and quality of life

Table 4 and table 5 show the results of the multiple regression analyses to investigate whether resilience functioned as moderator between chronic and incidental stress and consecutively social quality of life ($F(3,84)=9.63$), $p<.001$) and environmental quality of life ($F(3,84)=10.98$, $p<.001$). No significant interaction effect was found for resilience on quality of life and stressors. Resilience and stress significantly predicted social and environmental quality of life. In both analyses was the unique part of variance explained larger for stress than resilience.

Table 4. Linear multiple regression analysis with social quality of life as dependent variable and resilience, stress, and interaction between resilience and stress as independent variables (N=87).

Variable	$β$	t	p	Part correlation
Resilience	.26	2.59	.011*	.24
Stress	-.38	-3.47	.001**	-.33
Interaction: Resilience * Stress	-.09	-.85	.396	-.08
$R^2_{Adjusted}$	.23			

*** $p<.001$ ** $p<.01$ * $p<.05$

Table 5. Linear multiple regression analysis with environmental quality of life as dependent variable and resilience, stress, and interaction between resilience and stress as independent variables (N=87).

Variable	$β$	t	p	Part correlation
Resilience	.27	2.71	.008**	.25
Stress	-.36	-3.37	.001**	-.31
Interaction: Resilience * Stress	.01	.06	.957	.01
$R^2_{Adjusted}$	.25			

*** $p<.001$ ** $p<.01$ * $p<.05$

Discussion

Summary of the findings and comparison with other findings

In this study, the associations between resilience, work-related stressors, and social and environmental quality of life were investigated in healthcare professionals, and more specifically to test resilience as a moderator for the relationship between stress and quality of life.

The scores on resilience and social and environmental quality of life were higher in comparison with the norm scores. The scores on chronic and incidental stress were lower in comparison with other samples, and participants reported higher levels of incidental stress in comparison with chronic stress. Quality of life related more with incidental stress than chronic stress. Hypothesis 1 was confirmed; higher chronic and incidental stress related more to lower social and environmental quality of life. Hypothesis 2 was confirmed; higher resilience related more to higher quality of life and lower stress. Hypothesis 3 was rejected; chronic stress did not relate more to quality of life and resilience than incidental stress. Incidental stress related more to lower quality of life and resilience in comparison to chronic stress. Hypothesis 4 was rejected, the relationship between stress and social and environmental quality of life was not moderated by resilience in healthcare professionals in this study. The rejection of this hypothesis resulted in a negative answer to the research question.

The distribution of the participants in terms of the socio-demographics seemed to be a reflection of the general population of healthcare professionals (Hellenthal, 2012; Wagenvoort & Largo-Janssen, 2010). Stress has a negative impact on human functioning and quality of life, and the results of the associations between stress and quality of life were in accordance with earlier findings (Achat et al., 1998; Helgeson, 2003), who found that all forms of stress lower the quality of life and day-to-day functioning. Resilience was positively associated with quality of life and negatively associated with stress, these results were in accordance with earlier findings (Denz-Penhey & Campbell Murdoch, 2008; Leners et al., 2014), who found that resilience can buffer the effects of stress which in return lowers the risk of PTSD while retaining healthy and professional quality of life.

An explanation of the high scores on quality of life may be one of the following. The existence of severe stressors or even traumatic exposure does not necessarily influence social quality of life, although the overall quality of life has been found often decreased (Monson et al., 2015). Social quality of life was significantly influenced by living situation, which could function as proxy for the availability of social support, and working fewer hours per week which could be interpreted as less exposure to stressors and more time available to actually turn the available social support to good account (Barrera, 1986; Cohen & Syme, 1985; Yeh & Liu, 2003). The population in this study, and the general population of healthcare professionals, mostly existed of females. Females are more prone to seek social support in comparison to men (Walen & Lachman, 2000).

Environmental quality of life was significantly influenced by education, an indication for social status, access to certain information, and financial compensation (Cooper, 1993; Dunkel Schetter & Dolbier, 2011).

The finding that chronic stress did not relate more to resilience than incidental stress was not in accordance with earlier findings (Aldwin, Levenson & Spiro, 1994; Friborg et al., 2003; Luthar & Zigler, 1991), who found that trauma exposure, repeated exposure to stress, and life events influenced resilience stronger than isolated events. A possible explanation for these results can be found in the differences between the reported chronic and incidental stress in comparison with other samples. Of the participants, 39 percent declared the chronic stress as not applicable. Most of the participants rated their stress levels as sporadic. The relative burden of the incidental stress was higher in comparison with chronic stress in this sample, although still lower than other samples (de Boer et al., 2011).

The finding that the associations between stress and quality of life were not moderated by resilience was not in accordance with other research findings (Fletcher & Sarkar, 2013; Friborg, Hjemdal, Rosenvinge, Martinussen, Aslaksen & Flaten, 2006), who found that resilience moderated the relationship between stress and pain or mental health. An explanation of these results can be found in the high scores on resilience and quality of life in comparison with low scores on incidental and chronic stress. The population in this study appeared to have experienced less stress and more quality of life in comparison with other population samples. The definition of stress, the subjective experience that the demands of the situation exceed the ability of the person to cope with, can explain this (Agaibi & Wilson, 2005). Participants in this study may have experienced situations as demanding, however, not so aggravating that they were not able to cope with the demands and were experiencing stress. Multiple studies indicated with increasing age, and thus years of experience and education, healthcare professionals mastered stress management (Friborg et al., 2003; Gillespie et al., 2009; Shields & Ward, 2001; Toureneau & Cranley, 2006; Xianyu & Lambert, 2006). In this study, the mean age of the participants was 40 with an average of 14 years of experience. This could have been of influence for the scores on chronic and incidental stress. Furthermore, resilient people may not even have experienced the stressors in such a way because of the resilient coping mechanisms and cognitive appraisal style which could have led to the assessment of situations as not demanding and resulting in low scores on chronic and incidental stress (Belsky & Pluess, 2009; Willemen et al., 2008). Quality of life had a stress-buffering effect on its own due to the similarities with resilient resources and may not have been distinguishable from resilience in this cross-sectional study design (Helgeson, 2003; Kheiraoui et al., 2012).

In conclusion, quality of life was significantly positively associated with resilience and significantly negatively associated with stressors. Incidental stress had a greater negative impact on quality of life in comparison with chronic stress and the relationship between stressors and quality of life was not moderated by resilience.

Strengths and limitations

Although this study resulted in a negative conclusion to the research question, the study had its merits. A strength of this study was the usage of validated questionnaires for resilience and quality of life which enabled for a precise description of the level of resilience and quality of life for this sample of healthcare professionals. A description of these concepts within this population had value on its own, isolated from answering the hypotheses.

Despite that the participants in this study were not experiencing high levels of stress, the causes for the experienced stress were described. The quantity and severity of the job, trouble separating private life and work, and feeling inadequately educated were non-specific job factors. Participants were also experiencing stress due to job specific factors, such as life threatening situations, only the frequency and impact were smaller than expected. In general, organizational factors were more important causes for stress amongst healthcare professionals in this study. Although this finding was unexpected, the causes for stress give a clear view of the needs and/or concerns of the healthcare professionals in this study.

Although contradicting earlier findings (Aldwin et al., 1994; Friborg et al., 2003; Luthar & Zigler, 1991), the finding that incidental stress had greater impact on quality of life and resilience in comparison with chronic stress for this sample has merit. When confronted with acute events, the impact was greater on quality of life and resilience. However, in general the healthcare professionals in this study are able to cope with the demands and pressure of their profession.

However, the study also had some limitations. The data collection used in this study existed of self-report questionnaires. Self-reporting enhances the chance of social desirability, however due to the relative anonymity of the Internet these chances are lowered. There also might have been a volunteer bias due to the design of the data collection. Participants were invited for participation and they decided for themselves if they were interested. Data from volunteer participants, who are invested in the subject and inclined to participate, is mostly more accurate than a probability sample (Chang & Krosnick, 2009). However, research also suggested that people with (more) complaints are less likely to participate, resulting in a non-representative sample (Bootsma- van der Wiel et al., 2002; Couper, 2000; Groves, 2006).

In relation to this subject, the non-response for participants was high. Most of the organizations contacted for participation declined and from the total of 1.4 million Dutch healthcare professionals, only 186 were inclined to start the survey and only 89 finished the survey, resulting in a drop-out rate of 52 percent. Although the socio-demographics of the participants in combination with the geographic distribution over the country showed a reflection of the general population of healthcare professionals, the sample in this study was with 89 participants of 1.4 million possible participants not representative and thus cannot be generalized to the population.

Strict boundaries between resilient resources and the quality of life components were unclear. Activating social support, the access to financial and practical support were part of resilient resources but also measurements of quality of life. Although resilience is a process and quality of life a state, the similarities between the measurements of the two concepts made it impossible in a cross-sectional design to conclude which factor influenced what. The cross-sectional design of this study did not allow for causal explanations in terms of which phenomenon preceded. Resilience was described as a dynamic- rather than a static process and a longitudinal design would have been more appropriate to investigate the concept. Other studies used semi-structured interviews, mental health questionnaires and focused on psychopathology instead of quality of life to investigate the relationship between resilience, stressors, and mental health outcomes. That would have been a more accurate method to established participants' mental status and stress level instead of the stress questionnaires used in this study.

The questionnaires for chronic and incidental stress may not have discriminated enough between the two forms of stress. First of all, both questionnaires were not validated and second, both questionnaires asked for quite similar concepts. The chronic stress questionnaire listed critical incidents as one of the causes of chronic stress and the Incidental Stress questionnaire asked for specific incidents while relating incidents to the subjective impact. Both questionnaires also focused on organizational factors, the questionnaire Work Pressure by means of the causes for stress and the Incidental Stress Questionnaire by relating the frequency of occurrences to the subjective impact of the occurrences. A recommendation would be to validate the Questionnaire Work Pressure.

Research implications
Despite earlier research findings, exposure to stressful occurrences, and working in a high-risk profession, the participants in this study were not experiencing high levels of stress. A suggestion for further research may be to investigate whether with age and experience healthcare professionals indeed mastered stress management.

The participants in this study experienced stress due to conflicting assignments and contact with manager(s) and/or colleagues amongst others. A suggestion for further research may be to investigate whether different management styles influences the levels of stress in health care professionals.

Clinical implications

A clinical implication of this study was the greater impact of incidental stress on quality of life in comparison with chronic stress. Critical and acute incidents seemed to influence resilience and quality of life more in comparison with ongoing demands and stressors. Furthermore, a large portion of the reported stress existed of the job conditions, such as overtime, work hours, severity of tasks, and contact with manager(s) and/or colleagues. A prominent finding was the great impact of contact with manager(s) and/or colleagues on the reported stress and the participants. This may provide keystones for the schooling of healthcare professionals, especially managers, to emphasize the role of support from managers in dealing with the consequences from critical incidents.

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Appendix

1. Questionnaire Incidental Stress

Heeft u het afgelopen jaar in uw werk te maken gehad met:

1. Het gevoel te hoog of te laag opgeleid te zijn voor het werk dat u moet doen?
2. Moeite om werk en privé uit elkaar te houden?
3. Twijfel of het werk wat u deed zinvol was?
4. Het naar huis meenemen van gebeurtenissen van de dag omdat er op werk geen tijd of steun was?
5. Tegenstrijdige opdrachten of informatie van collega's of management?
6. De dood of groot lijden van anderen?
7. Een levensbedreigende situatie richting uzelf of anderen?
8. Een gevoel van fysieke bedreiging richting uzelf of anderen?
9. Een gevoel van verbale bedreiging richting uzelf of anderen?
10. Gedrag zoals schelden en spugen richting uzelf of anderen?
11. De noodzaak om zelf geweld te gebruiken om escalatie te voorkomen?
12. Seksueel grensoverschrijdend gedrag richting uzelf of anderen?

Antwoordschalen
Nooit: komt niet voor
Zelden: minder dan eens per kwartaal
Soms: één keer per kwartaal
Frequent/herhaaldelijk: maandelijks
Vaak: wekelijks

Kunt u aangeven op een schaal van 0 tot 10 hoeveel invloed deze incidenten op u hebben gehad?

1. Het gevoel te hoog of te laag opgeleid te zijn voor het werk dat u moet doen?
2. Moeite om werk en privé uit elkaar te houden?
3. Twijfel of het werk wat u deed zinvol was?
4. Het naar huis meenemen van gebeurtenissen van de dag omdat er op werk geen tijd of steun was?
5. Tegenstrijdige opdrachten of informatie van collega's of management?
6. De dood of groot lijden van anderen?
7. Een levensbedreigende situatie richting uzelf of anderen?
8. Een gevoel van fysieke bedreiging richting uzelf of anderen?
9. Een gevoel van verbale bedreiging richting uzelf of anderen?
10. Gedrag zoals schelden en spugen richting uzelf of anderen?
11. De noodzaak om zelf geweld te gebruiken om escalatie te voorkomen?
12. Seksueel grensoverschrijdend gedrag richting uzelf of anderen?

0 = geen invloed
10 = heel veel invloed