



Quality of Life of Elderly Patients after a Successful Cardiopulmonary Resuscitation

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ABSTRACT

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Cardiopulmonary resuscitation (CPR) has continuously raised debate as to whether subjecting the elderly to this intervention is futile or not. The purpose of the thesis was to gather information of elderly CA survivors from published literature. The aim was to synthesise information from previous studies considering the patient's neurological and cognitive outcomes after CPR, levels of physical dependence and social behaviours. The objective was to help the elderly, caregivers, nursing students and healthcare professionals to make informed decisions when planning advanced healthcare directives for the elderly. The PICO strategy (Population or Problem, Interest, Context) was employed in extracting publications of interest in compiling a descriptive literature review.

Majority of the papers showed that elderly CPR survivors presented with negligible neurological deficit and could resume their daily activities post discharge. However, CPR survival rate was exceptionally low. Anxiety, depression, and feelings of vulnerability was common in elderly survivors, reinforcing the need for psychological support.

Elderly CPR survivors achieved a decent quality of life, but it must be considered that survival decreases with age and is also reliant on other confounding factors such as, presenting cardiac rhythm, patient comorbidity and frailty status. Discussion of advanced care directives needs more revision on the part of the healthcare professionals to help patients understand and make sound decisions in time regarding their future care. Guiding the patients on how to find security in their everyday life and support system to help them get through the ordeal experienced is important.

Key words: cardiopulmonary resuscitation, elderly patient, survivors, quality of life

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ABBREVIATIONS AND TERMS

| | |
|-------------|--|
| ADL | Activities of daily living |
| CA | Cardiac Arrest |
| CCI | Charlson comorbidity index |
| CPC | Cerebral performance category |
| CPR | Cardiopulmonary resuscitation |
| DNR or DNAR | Do not resuscitate or Do not attempt resuscitation |
| EQ-5D | European quality of life – 5 dimension |
| EQ-5D-5L | 5-level EQ-D5 |
| EQ-VAS | Vertical visual analogue scale |
| Euro-QoI | European quality of life |
| GOSE | Glasgow outcome scale-extended |
| HR-QoI | Health related quality of life |
| ICD | International classification of diseases |
| ICU | Intensive care unit |
| IHCA | In-hospital cardiac arrest |
| OHCA | Out-of-hospital cardiac arrest |
| OPC | Overall performance category |
| PEA | Pulseless electric activity |
| PTSD | Post traumatic disorder |
| RAND 36 | Research and development 36-item short form survey |
| ROSC | Return of spontaneous circulation |
| SAPS II | Simplified Acute Physiology Score |
| SF-12 | 12-Item short form survey |
| VAS | Visual analog scale |
| WHO | World Health Organization |

1 INTRODUCTION

Quality of life (QoL) is perceived, defined, and viewed differently by different individuals in a variety of settings depending on the area of application. According to World Health Organization (WHO) (2012, 11), it is a concept aimed at capturing the well-being of an individual or a population in regard to both negative and positive elements of life during one's existence in terms of physical function, mental status and normative societal interactions. (WHO 2012, 11; Post 2014, 168; Machin & Fayer 2016, 4.) According to Cai, Verze and Bjerklund Johansen (2021), quality of life is a concept that incorporates different factors that affects person's life. Major cardiovascular events such as cerebral vascular accident or cardiac arrest (CA) can cause profound changes in a person's quality of life and in most times death (Komalasari, Nurjanah & Yoche 2019, 92). One key factor that predicts outcomes for patients is the effective and timely performance of cardiopulmonary resuscitation (Hara, Hayashi, Hikoso, Sakata & Kitamura 2015).

Cardiopulmonary resuscitation (CPR) is a lifesaving procedure performed on a person when experiencing a CA aiming to potentially regain spontaneous blood circulation. (Smekal, Lindgren, Sandler, Johansson & Rubertsson 2014; CPR 2014, 19.) In providing a lifesaving intervention such as cardiopulmonary resuscitation, there's need to look not only at the short-term survival of the patient but what it would mean long term with regard to their QoL especially in cases of aged patients and patients with long term complications. (Megari 2013; Stapleton, Ehlenbach, Deyo & Curtis 2014.)

Cardiopulmonary resuscitation performed on an elderly patient may have positive outcomes but at the same time it may cause unwanted consequences, harm, and prolonged suffering for the patient, their families and the health care workers involved (Razzaque & Razzaque 2013). Prognosis for the elderly is significantly lower, indicating that after resuscitative interventions and discharge from the hospital, death or dependency in life is higher for patients 70 years and older. (de Vos, de Haes, Koster & de Haan 1999; Breault 2011.) This is further supported by a recent study that mentions that the odds of survival for elderly patients to

survive a cardiac event through CPR ranges from 11,6 to 18,7 percent and decreases with age (Hayashi, Matsushima, Bito, Kanazawa, Inoue, Luthe & Wee 2019). With this information in mind, health care professionals are at an ethical dilemma as to whether the elderly patients need to be subjected through CPR, knowing that the chances of survival are low and succeeding costs to health care resources are exceedingly high (Gage, Kenward, Hodgetts, Castle, Ineson & Shaikh 2002).

This is the case when a patient together with their caregivers are at a stage when they would have to make decisions about the future implementation of an advanced directive or a Do not resuscitate or Do not attempt resuscitation order (DNR or DNAR). According to Frank, Heyland, Chen, Farquhar and al (2003), the elderly patients current health status is to be utilized as a predictive factor in determining whether life-saving interventions in the form of CPR is warranted in case the patient's cardiopulmonary status is severely compromised. This is performed at the advanced care planning stage wherein the patient considers their present condition, their expectations of the future and preferences in treatment. (Callahan, Kitko, Van Scoy & Hollenbeak 2020, 813.)

However, given that the elderly may have lower chances of survival after a cardiac episode, the probability of a meaningful QoL is high. In a study by Bunch, White, Gersh, Meverden, Hodge, Ballman, Hammill, Shen and Packer (2003), it was concluded that upon recovery from CA, age alone was not predictive of the patient's neurologic status and neurological recovery. This was further backed by another study which emphasised that advanced age alone was not a reliable indicator on its own to deny a person of CPR (van de Glind, van Munster, van de Wetering, van Delden, Scholten & Hoofst 2013). One must factor in a presence of comorbidities and the person's functional capacity prior to the arrest which would determine their level of dependence and QoL if by any chance they survive the CA (van de Glind et al. 2013).

By systematically searching the reviewed literature, the aim was to explore what QoL meant for the elderly patient after surviving a cardiac event and what pre-arrest factors were important to consider in determining the prognosis. Armed with clear informative information, elderly patients could make informed decisions

in advance concerning their future care if they are cognitively incapable of making any decisions. Articles and journals related to the topic describing the QoL of elderly patients who had survived a CA through CPR was gathered. Reliable databases were searched, and peer reviewed articles and journals were used to compile the information that formed a comprehensive thesis that answered to the thesis question.

Hence, it is of utmost importance that the patient makes an informed decision at the advanced care planning stage while they are still cognitively capable (Lipman, Kalra & Kirkpatrick 2015). The information in this thesis aims at bringing an understanding of what quality-of-life elderly patients have after a major cardiopulmonary event and what factors have led to these outcomes

2 THEORETICAL STARTING POINT

2.1 Understanding quality of life

The QoL of an individual is at the center of the practice of health care professionals. For nurses, it is essential to have a deep understanding, that for patients, QoL is grounded on a set of physical, mental, spiritual, and social conditions that give them a sense of well-being. (Pérez-Vergara, Cañas-Lopera, Ortiz, Rojas, Laverde-Contreras & Sánchez-Herrera 2021, 846-847.) Well-being means a unique experience for everyone. It is immeasurable and intangible. An understanding of a person's well-being can only be derived from a person's description of it and through observation. (Pérez-Vergara et al. 2021, 847.) For this thesis, strive to obtain descriptive information about elderly CA survivors based on the physical ability to perform activities of daily living (ADL), psychological and social well-being which serves as measures for an elderly individual's QoL is the core factor.

For elderly people, the measurement of one's QoL is made more challenging due to associated decline in intellectual capacity and functional abilities (Schölzel-Dorenbos, Olde Rikkert, Adang & Krabbe 2009). Dementia associated with aging may distort person's ability to describe their own functional capacity. With increasing age, poorer outcomes can be expected for an elderly patient which warrants a more comprehensive outcome measurement in determining whether the interventions provided are meaningful. (Schölzel-Dorenbos et al. 2009.)

2.2 Background and Definition of cardiopulmonary resuscitation

Resuscitation can be traced back to biblical times when a boy was revived and brought back to life through the procedure of mouth-to-mouth ventilation. Thereafter, the act of resuscitation was abandoned because it was deemed unsatisfactory until the 17th century when a Dutch human society re-introduced it so as to save the victims of drowning. (Perkins, Griffiths, Slowther, George, Fritz, Satherley, Williams, Waugh, Cooke, Chambers, Mockford, Freeman, Grove, Field,

Owen, Clarke, Court & Hawkes 2016.) By 1940's and 1950's, major developments were made whereby defibrillators were introduced to treat victims of CA. In the 1960's, Kouwenhoven officially published the landmark paper on cardiopulmonary resuscitation marking the birth of modern CPR. (Hurt 2005; Perkins et al. 2016.)

CPR is a lifesaving procedure performed on a person experiencing CA aiming to potentially regain spontaneous blood circulation. (Smekal et al. 2014; CPR 2014, 19.) During a CA, the supply of blood to the essential body parts stops which can rapidly lead to organ failure due to oxygen deprivation and eventually death if not treated within few minutes. (Torpy, Lynn & Glass 2010; Graham, McCoy & Schultz 2015.)

CPR has been clinically practiced for over five decades and has become a common phenomenon in the medical world. It is performed on thousands of patients experiencing CA each year. (Tjelmeland, Alm-Kruse, Andersson, Bratland, Hafstad, Haug, Langørgen, Larsen, Lindner, Nilsen, Olasveengen, Soreide, Skogvoll & Kramer-Johansen 2020.) Despite the fact that there have been continuous developments in the CPR, the unsatisfactory clinical outcomes in terms of survival to discharge is yet to be improved. (Xue, Leng, Gao, Chen, Li, Li, Huang, Cheng, Zhang & He 2013.)

2.3 Discussion of advanced care directives and it's dilemmas

Regardless of the development and guidelines surrounding the science of CPR, there is still a lot of controversies and ethical questions that create difficult challenges for healthcare professionals during decision making as to whether CPR should be applied to an elderly patient of CA or not. This is a continuous distressful situation for both patients and their relatives. CPR does not guarantee life and it is not without risk but gives one a chance at survival. However, the chances of survival can be gravely low and carries the risks of internal fractures, brain damage and organ raptures. (CPR 2014.)

The elderly is usually in a very vulnerable place when it comes to decision making at this stage in their lives, most particularly when deciding if extreme measures should be taken to save their lives when a cardiac event occurs. (Frank et al. 2003; Lipman et al. 2015.) Elderly patients are frail physically and cognitively and subjecting them to a very intense procedure such as CPR and its succeeding life supporting measures may not align with other people's ethical values. (Razzaque & Razzaque 2013.)

On the other hand, some may argue that CPR and its success gives an elderly patient another chance at life and denying these procedure means denying the elderly the right to live hence depriving them of the right to self-determination regarding their care. With the help of undertaking an advanced directive, these issues are resolved and gives the patient a chance to decide for themselves. (Mentzelopoulos, Haywood, Cariou, Mantzanas & Bossaert 2016.) However, even with the freedom of choice, the elderly in particularly may find it difficult to make that decision due to lack of information (Frank et al. 2003). Most of the times, the decision made by the patient and their relatives in advanced care directives rely heavily upon the opinion of the medical team. (Frank et al 2003.)

In a survey conducted by Adams and Snedden (2006), involving one hundred patients over the age of 70 years old, it was concluded that the demographic of the elderly cohort had an erroneous understanding regarding the CPR and its efficacy. As such, physicians and healthcare professionals need to improve the communication with the elderly patients regarding future care, as it is ideally beneficial for elderly patients that such discussions are carried out at an early stage when the patient is of sound mind and relatively good health to be able to make sound medical decisions regarding their future care. (Adams & Snedden 2006.)

For successful discussion leading to a common understanding, the physicians and medical professionals are encouraged to approach the elderly patients in nonthreatening manner, open mind and bearing no biases. It is crucial when discussing matters concerning life and death. Hence, of utmost importance that information regarding benefits and risk of CPR is relayed to the elderly patients in layman's language while avoiding the use of medical jargons. (Adams & Snedden 2006.)

Given that there are two conflicting sides involved in this research, it is a moral obligation that the thesis remains as objective and unbiased as possible in presenting the facts that have been collected from previous studies. Upon conducting this research, other information related to the thesis research question, which revolves around the administration of CPR on the elderly and the planning and implementation of advanced health care directives, the implementation of a DNR order, the factors that lead to the outcomes affecting the elderly patients' life after CPR, chances of survival after a cardiac event and receiving CPR as an elderly will be encountered. This information may not directly answer to the research question, but it is necessary in building the theoretical framework needed to conduct this study.

3 PURPOSE, TASKS, AND OBJECTIVES

The purpose of this thesis was to gather literature reviewed information on over 65 years of age CA elderly survivors in or out of hospital who had been revived through CPR. The information was collected from peer reviewed literature and reliable databases such as CNAHL and MEDLINE to have an insight on the quality of life of elderly CA survivors and determine the factors that led to the said outcomes.

The objective of the thesis was to help the elderly patients, their caregivers, nurses, physicians, and nursing students to be able to make an informed decision at the advanced care planning stage and whether a Do-not-resuscitate order is warranted while considering the patient's future care.

The aim of this thesis was to synthesise information from previous studies considering the patient's neurological and cognitive outcomes after CPR, levels of physical dependence and social behaviours. Quality of life is subjective and immeasurable. (Post 2014.) Thus, by collecting these data, the aim was to give a picture of what kind of life the patient leads after a successful CPR is performed on them.

Task question:

- What is the quality of life of an elderly patient after a successful cardiopulmonary resuscitation?

4 METHODOLOGICAL STARTING POINT

4.1 Method

Given that the aim of the thesis was to find descriptive information concerning the elderly's quality of life post CA, the research was classed as a qualitative study. Hence, the PICO strategy (Population or Problem, Interest, Context) was devised for this study to extract publications of interest. This framework was used in developing clinical focused questions concerning peoples' beliefs, attitudes, experiences, opinions and perceptions (Cooke, Smith & Booth 2012). Qualitative research approach was most suited for this topic because the aim was to provide a deep understanding and insights regarding real-world issues. Qualitative research is not concerned with test treatments and the quantification of variables but rather is based on the subjective view of reality. This type of research gives a subjective point of view that has consequences in providing and improving health care. (Chalmers & Cowdell 2021, 47.)

The gathered data in the thesis described an elderly's' QoL based on attributes such as ability to carry out ADL, mental status, and social capabilities. By conducting a qualitative literature review, peer-reviewed articles that explore the thesis topic was selected. Selection of literature of interest was done by performing searches in CNAHL and ProQuest MEDLINE using key terms like "quality of life", "aged", "cardiopulmonary resuscitation" and "wellbeing or survivors" linked with connectors such as "AND "and "OR". The newest articles with possible newest information were selected and used in the thesis. Research articles dating from the year January 2011 up until December 2021 was included in the research.

4.2 Literature search and terms used

A systematic search of published articles from January 2011 to December 2021 discussing the QoL of the elderly after successful cardiopulmonary resuscitation was conducted, and the findings were analysed from electronic databases CNAHL and MEDLINE.

The following search words were affirmed together with the university librarian using the CNAHL and Medline database as shown in Table 2, “Resuscitation Cardiopulmonary”, “Cardiopulmonary resuscitation” or CPR, “Aged”, “Aged, 80 and over”, “frail elderly”, “senior”, “older people”, “geriatric”, centenarians”, “Quality of Life” or Well-being or Survivors”.

TABLE 2. Search terms

| | String- 1 experi- ence | String 2-Population | String 3- out- come | Limiters |
|-------------------|--|--|------------------------|--|
| Boolean operators | And | And | And | Publication |
| OR | “Cardiopulmonary resuscitation” | Aged | “Quality of life” | 2011-2021, Peer reviewed, English language, Elderly >65yrs |
| OR | “Resuscitation cardiopulmonary” or cpr | “Frail elderly” | “Well-being” | Main title: quality of life of the elderly after cpr |
| OR | | “Aged, 80 and over” | Survivors | |
| OR | | Aged or elderly or senior or “older people” or geriatric | | |
| OR | | Centenarians | | |

4.3 Inclusion and Exclusion criteria

To validate inclusion into the study, the articles that were extracted must be peer reviewed, published in English between January 2011 and December 2021, exploring experiences and QoL of the elderly people (>65 years) after a successful CPR both in and out of hospital. After a thorough analysing and reading, the final 12 articles were chosen to compile a descriptive review.

The exclusion criteria eliminated publications that had a population sample of infants, children and young adults as these cohorts were not relevant to the study which was primarily concerned with describing the experiences of the geriatric population. Publications discussing the use of extracorporeal membrane oxygenation were also not warranted into the study as they were not descriptive of the quality of life of elderly patient survivors post CPR but as a means of life support to ensure a successful resuscitation.

The search generated seven hundred and ninety-five articles and through appraisal by title, six hundred and eighty-nine articles were excluded. Of the remaining one hundred and six, forty-seven articles were further removed as duplicates leaving fifty-nine articles. After reading the fifty-nine articles, forty-seven articles were removed as they had a cohort including the general population which was the misrepresentative of the target population in this study. All writers were involved in the process of selecting appropriate publications included.

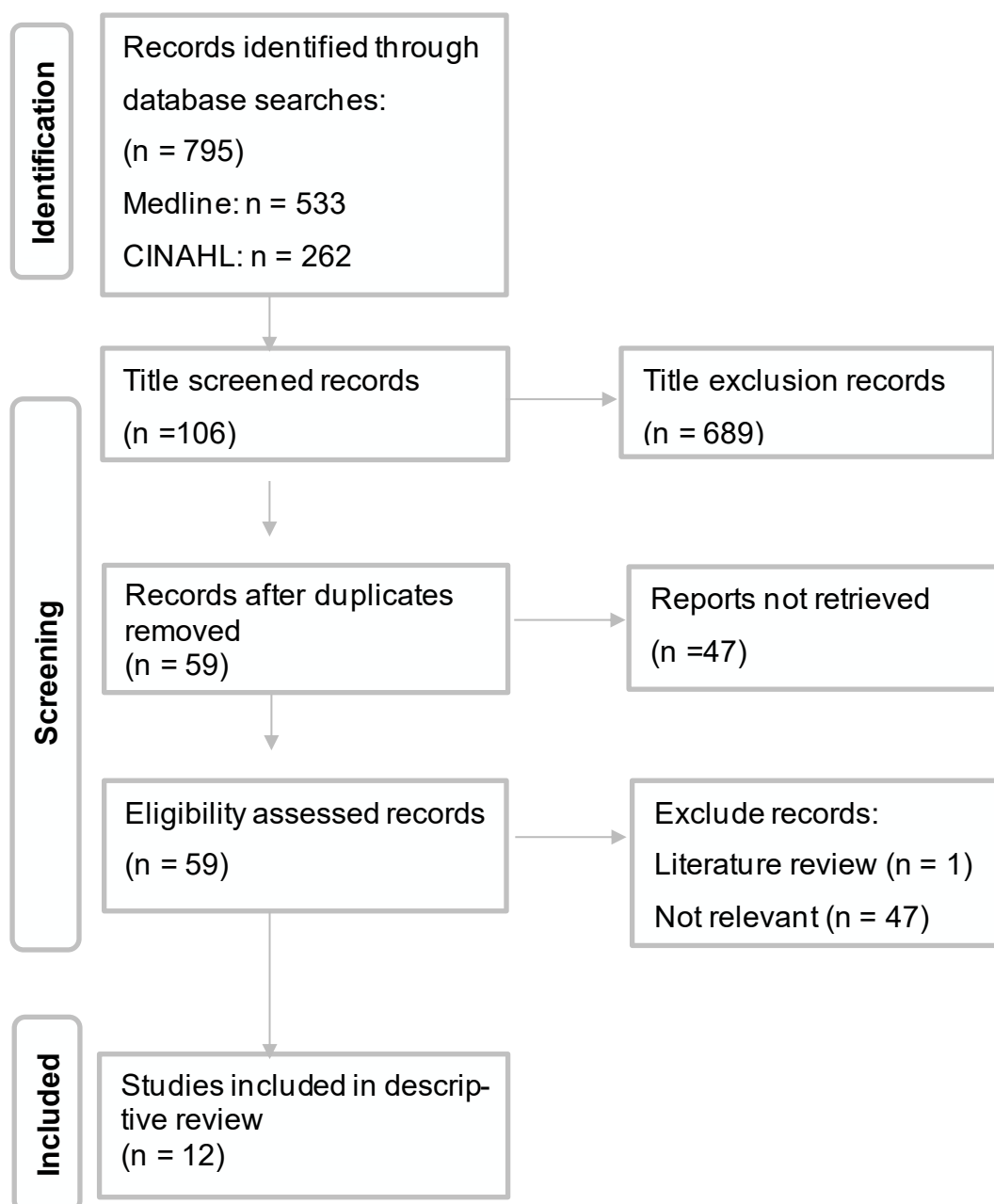


FIGURE 1. Prisma flow diagram (Page, McKenzie, Bossuyt, Boutron, Hoffmann, Mulrow, Shamseer, Tetzlaff, Akl, Brennan, Chou, Glanville, Grimshaw, Hróbjartsson, Lalu, Li, Loder, Mayo-Wilson, McDonald & Moher 2021).

The process of how the twelve included articles came about has been shown in Figure 1. After the search was conducted both in CINAHL and MEDLINE, the total of the retrieved articles was shown in numbers. Thereon, by eliminating the articles not meeting the required standards for the descriptive literature review, there was a total of twelve articles left and they were all review and analysed by both writers.

4.4 Thematic analysis

It is a technique that assists the writer/s in grouping qualitative data into corresponding themes or patterns after the data has been analysed (Clarke & Braun 2017). In Table 1, it is shown how themes were arranged into categories.

Overarching themes that were identified from the data included the use of tools measuring the quality of life, poor survival, and good neurological function. Themes on the anxiety, depression and the overall mental well-being of the cohort were also identified and grouped.

5 FINDINGS

The perception of quality of life is subjective and can vary from one person to another and this is apparent in this study as most of the publications analysed did not directly implicate what QoL meant but different tools were used to quantify and describe the target population's QoL in terms of neurological outcome, physical capability, and state of mental health.

Of the 12 publications included in the thesis, there were 10 quantitative and 2 qualitative publications respectively. The quantitative publications used different tools and metrics to determine the quality of life whereas the qualitative studies determined the quality of life by interviewing the subjects regarding their opinions and own life experiences after surviving CA through CPR. As such, themes were categorized as to whether they were quantitative or qualitative

5.1 Quantitative publications' findings

The QoL of elderly survivors post CPR was a recurring theme in the quantitative investigations. The overarching themes identified were neurological outcome and survival percentages in time intervals ranging from day of discharge and 3 years. Utstein Guidelines recommend the use of CPC (Cerebral Performance Category Scale) for the reporting of CA. (Idris, Bierens, Perkins, Wenzel, Nadkarni, Morley, Warner, Topjian, Venema, Branche, Szpilman, Morizot-Leite, Nitta, Løfgren, Webber, Gräsner, Beerman, Youn, Jost, Quan & Hazinski 2017; Pound, Jones, Eastwood, Paul & Hodgson 2020.)

A favourable neurological outcome for most CA in elderly survivors belonging to the study cohort was measured through the CPC making it the most common theme. CPC was a recommendation by Utstein Guidelines for standardized reporting of CA outcomes in terms of neurological performance. (Idris et al. 2017; Pound et al. 2020.) Other than the CPC index, EQ-5D was used in measuring the functional capacity in the five health dimensions which included mobility, self-care, usual activities, pain/discomfort and anxiety/depression. (Andrew, Mercier, Nehme, Bernard & Smith 2018; Ruch, Stoessel, Stein, Ganter & Button 2019.)

The general physical and mental health was measured using the SF-12 (Andrews et al. 2018). The use of tools to provide a quantifiable description of an individual's QoL was also another theme identified in the publications included. Other than CPC and EQ-5D, lesser used tools were EQ-VAS, SF-12, SAPSII, RAND36, GOSE, OPC, Barthel Index and HR-QOL.

The Charlson Comorbidity Index (CCI) was also a commonly used tool in the studies that met the criteria, but as a theme, it was not reflective of the QoL experiences of the cohort after CPR as this tool was often used to measure pre-morbidity prior to the CA and resuscitation event. (Hellevuo, Sainio, Huhtala, Olkkola, Tenhunen & Hoppu 2018; Kangasniemi, Setälä, Huhtala, Kämäräinen, Virkkunen, Jämsen, Yli-Hankala & Hoppu 2018; Roedl, Jarczack, Becker, Fuhrmann, Kluge & Müller 2018.) Survival to discharge and a follow up of differing time intervals was also identified as a common theme. These themes were identified and grouped under headings conclusion, tools used and survival in table 1.

5.1.1 Quality of Life

This is a projection upon various aspects of life of an individual or population in terms of both positive and negative elements or aspects within a specific period. Some of the most common aspects include personal health, societal status, psychological health, and autonomy. (WHO 2012; Post 2014, 168; Machin & Fayer 2016, 4.) A better part of the quantitative research publications included in this review were primarily concerned in reviewing outcomes and prognosis post CPR instead of exploring QoL in terms of lived experiences by the cohort.

Most of the publications included in the review utilised the CPC to measure the outcome of CPR in terms of neurologic function. To aid in providing a numerical representation of QoL and outcome, different tools were used in these studies. Tools such as HR-QoL, RAND 36, Barthel Index, VAS, EQ-5D-3L and EQ-5D-5L were used in determining the functioning of physical and mental aspects of daily life. (Andrew et al. 2018; Hellevuo et al. 2018; Tiainen, Vaahersalo, Skrifvars, Hästbacka, Grönlund & Pettilä 2018; Ruch et al. 2019.)

Most of the quantitative studies chosen for this review, pointed to a similar conclusion that the elderly had a favourable or good neurological outcome, good functional outcome, good or excellent quality of life after CPR despite the age. (Libungan, Lindqvist, Strömsöe, Nordberg, Hollenberg, Albertsson, Karlsson & Herlitz 2015; Hirlekar, Karlsson, Aune, Ravn-Fischer, Albertsson, Herlitz & Libungan 2017; Andrew et al. 2018; Hellevuo et al. 2018; Kangasniemi et al. 2018; Roedl et al. 2018; Tiainen et al. 2018; Ruch et al. 2019.)

But those conclusions relied heavily on the CPC scores of the cohort which was heavily standardized and did not consider other factors that influenced a person's quality of life such as psychosocial and physical capabilities. Most of the quantitative studies equated a favourable neurological outcome to a good QoL which did not give a comprehensive representation of QoL. Four out of the twelve studies utilised adjunct assessments such as EQ-5D, EQ-VAS and RAND 36 to further illicit validated QoL scores instead of primarily focusing on the degree of neurological deficit. (Andrew et al. 2018; Hellevuo et al. 2018; Tiainen et al. 2018; Ruch et al. 2019.) In this regard, qualitative studies that explored the narrative from the perspective of CA survivors themselves were included.

5.1.2 Tools used and definitions

Quality of life is unquantifiable and a concept that is highly individualized. (Felce & Perry 1995; Higginson & Carr 2001.) and it can mean differently from one person to another (Machin & Fayer 2016, 4). Due to the nature of QoL as an immeasurable variable, metrics and tools are utilized in clinical settings to describe QoL numerically. The ability to perform certain motor and mental tasks are assigned numerical values and these are used as a standard to categorize patients based on their level of neurological deficit or lack of. (Higginson & Carr 2001; Belazi, Goldfarb & He 2002.)

In conducting the thematic analysis for this study, it was identified that the use of tools and metrics to measure QoL as one of the overarching themes. The most common of these tools used in the research articles was the CPC. (Libungan et al. 2015; Chan, McNally, Nallamotheu, Fengming Tang, Hammill, Spertus, Curtis & Tang 2016; Hirlekar et al. 2017; Hiemstra et al. 2018; Kangasniemi et al. 2018;

Roedl et al. 2018; Ruch et al. 2019.) CPC is a simple tool which comprises of a 5-point scale to measure a patient's neurological status with 1 indicating mild or no neurological deficit, 2 indicating moderate neurological disability, 3 indicating severely compromised neurological status, 4 as indicative of comatose and 5 as brain death (Al-Dury, Rawshani, Israelsson, Strömsöe, Aune, Agerström, Karlsson, Ravn-Fischer & Herlitz 2017).

The Utstein Guidelines recommended the use of CPC for reporting outcomes for CA patients and this metric was identified in all the studies that were included. Autonomy and the ability to perform motor tasks with ease is associated with a good QoL (Rondón García & Ramírez Navarro 2018) and this requires an intact neuromotor axis. (Wolpert & Landy 2012.) CA impedes blood flow to the brain resulting in hypoxic injury which leads to impaired motor and/or sensory function, depending on the locus of brain injury. (Torpy et al. 2010; Graham et al. 2015.)

EQ-5D and its variations such as EQ-5D-3L and EQ-5D-5L were also used in measuring the QoL of elderly CPR survivors (Andrew et al. 2018; Hellevo et al. 2018; Tiainen et al. 2018; Ruch et al. 2019.) However, not as frequent as CPC. These tools were developed by the Euro-QoL research foundation as a tool for respondents to describe their health status and is popular in clinical trials as well as real-world clinical scenarios. (EuroQol Research Foundation 2019.)

The descriptive system of measurement measures health in five areas: self-caring, mobilization, typical activities, anxiety/depression, and pain/discomfort. Every dimension has three levels of response based on degree of severity. The subject is asked to describe their health status by ticking the box which well describes their level on each health dimension. (EuroQol Research Foundation 2019.)

Other lesser used tools came up in the thematic analysis such as the short form survey 12 (SF-12) (Andrew et al. 2018). This was a self-reported outcome tool which rated a person's QoL numerically ranging from 0-100 based on eight domains: Limitations in various areas of activeness such as physical, social, role activity, usual role activities, general body pain, overall status of mental health, vitality, and general perception on health. (Montazeri, Vahdaninia, Mousavi, Asadi-Lari, Omidvari & Tavousi 2011.)

The CCI as a metric was used as a tool to determine the level of comorbidity associated pre and post CA conditions. (Hellevuo et al. 2018; Kangasniemi et al. 2018; Roedl et al. 2018.) The CCI was designed to categorize comorbidities in patients based on the International Classification of Diseases (ICD) diagnosis codes and each comorbidity was weighed from 1-6 which was adjusted to risk of death and consumption of clinical resources. The weighed sum resulted in a single comorbidity score. (Glasheen, Cordier, Gumpina, Haugh, Davis & Renda 2019.)

5.1.3 Good neurological outcome and functional capacity

The decision as to whether an elderly individual should be subjected to CPR is difficult. Loss of independence and poor neurological outcome after surviving CPR is a common fear in elderly patients. (Druwé, Benoit, Monsieurs, Gagg, Nakahara, Alpert, van Schuppen, Élő, Huybrechts, Mpotos, Joly, Xanthos, Roessler, Paal, Cocchi, Bjørshol, Nurmi, Salmeron, Owczuk, Piers 2020.) This fear is warranted as hypoxic brain injury can bring about cognitive disability, limitations on mobility, vegetative state and even brain death for survivors. (Marinšek, Sinkovič & Šuran 2020).

Quality of life in the event of surviving a cardiac event relies on having good cognitive faculties. (Graham et al. 2015, 55.) Vast majority of the articles that were included used the (CPC) to measure the neurology status of the cohort. Numerous papers suggested that a high percentage of elderly CA survivors achieved a favourable neurological outcome after CPR. (Libungan et al. 2015; Hirlekar et al. 2017; Andrew et al. 2018; Hellevuo et al. 2018; Hiemstra et al. 2018; Roedl et al. 2018; Tiainen et al. 2018.)

In one study, the cohort was stratified into three age groups and their findings indicated that a favourable neurological outcome represented by CPC scored 1 and 2 ranged from 92 percent in 70-79 age group, 93 percent in the 80-89 age group and 88 percent in the group over 90 years of age (Hirlekar et al. 2017). Studies that included EQ-5D as a tool of measurement reported a slightly lower functional outcome partly due to a more comprehensive assessment of QoL.

Andrew et al. (2018), found that 60.6 percent of CA survivors resided in their homes without the necessity of extra help and 66.6 percent had favourable functional capacity. An EQ-5D-3L assessment was also utilized in conjunction with CPC for CA survivors after 1 year and the outcome remained favourable. Their findings pointed out that 72 percent of survivors belonging to the 66 years old of age and above cohort reported no self-care problems as opposed to 24 percent reporting problems with washing and dressing. 68 percent reported no pain and discomfort, and 68 percent had no problems with usual activities 1 year since surviving CA. In the same study, data from EQ-VAS questionnaire indicated that 86 percent of the cohort were not anxious or depressed. 14 percent reported moderate anxiety and depression. (Ruch et al. 2019.)

Comorbidity was also considered in some studies as a predictive factor in determining the QoL of patients post CA. In the studies that used the CCI, all their results suggested poor outcome and quality of life post CA. Survival was linked to higher morbidity as represented by their CCI scores. (Hellevuo et al. 2018; Kangasniemi et al. 2018; Roedl et al. 2018.)

Despite differences in methodology, use of tools and locations, findings across all studies were consistent in reporting that a vast majority of elderly survivors of CA had little to no neurological deficit and their quality of life was comparable to pre CA conditions (Hellevuo et al. 2018). However, elderly survival of CA was shown to be exceedingly low in all the publications.

5.1.4 Poor survival

The rate of mortality alongside the quality of life is a common concern in advanced directive discussions regarding whether CPR should be attempted on the elderly. Studies included in this review factored in survival rates for CA patients and was a theme identified during analysis. Despite the diverse research methods and jurisdictions represented by the publications included in this review, results pointed to a low survival rate to discharge for the elderly CA patients. Research containing data on survival rate to discharge varied from as low as 5 percent to as high as 33 percent. The disparity was due to the differences in research employed and the size of the cohort being studied.

It is also important to note that survival to CA decreases with age (Gershengom, Li, Kramer & Wunsch 2012). As such, this may account for the difference in the survival rates as the samples included in this review is from 65 years and above and the survival rates for younger patients may be significantly higher than patients closer to their 90s.

One large observational study with sample of 11,396 patients divided the sample population into three cohort groups and their results showed survival in the 70-79 age group was 27.9 percent as opposed to 15.1 percent in the over 90 years old cohort with an average of 21.03 percent for the entire sample population. (Hirlekar et al. 2017.) All the researches included in the thesis were mainly conducted in European and North American jurisdictions which accounted for the higher than the global average of 10 percent CA survival rate (Haydon, van der Riet & Maguire 2017), owing to robust EMS and bystander responses in these regions which is 9-10 minutes according to the study of Cabral, Castro, Florentino, Viana, da Costa Junior, de Souza, Rêgo, Araújo-Filho and Medeiros (2018).

Follow up post arrest was conducted in time periods ranging from 30 days to 3 years in the publications included in this thesis. Survival to 30 days accounted for a lower rate of survival with rates ranging from 2.4 percent to 6.7 percent (Libungan et al 2015), as opposed to survival to one year 23 percent to 76 percent. (Chan et al. 2016; Hiemstra et al. 2018; Roedl et al. 2018.) Vulnerability within the first thirty days of CA was high which accounted for the disproportion in survival rates between the two time periods.

Deducing an accurate survival rate representative of the entire elderly population over 65 was impossible as all studies employed different research methods, included diverse samples, and occurred in different time periods and locations. However, one common pattern seen in many studies was the inverse survival rate in relation to age. (Hirlekar et al. 2017; Hiemstra et al. 2018; Kangasniemi et al. 2018.)

A retrospective study included in the review conducted between 2001 and 2010 compared the survival rates of elderly CA survivors >75 years compared to their

younger counterparts and results from that period showed a 33 percent survival rate for the elderly population as opposed to 57 percent in the younger population (Hiemstra et al. 2018). In another retrospective study in the review conducted between January 2010 and 2016, out of the 651 patients that survived CA to follow up, the majority belonged to the 65-74 age group accounting for 44.4 percent, followed by 34 percent from the 75-84 age group and only 4.6 percent of patients >85 years old surviving. (Andrew et al. 2018.)

Similarly, another study which divided the sample population into slightly different subsets showed 24 percent survival in patients between ages 70 and 89 and only 15.1 percent in patients over 90 (Hirlekar et al. 2017). This trend is to be expected as increasing age is associated with higher levels of comorbidity and frailty which is a factor in CA survival. (Fernando, Mclsaac, Rochweg, Cook, Bagshaw, Muscedere, Munshi, Nolan, Perry, Downar, Dave, Reardon, Tanuseputro & Kyeremanteng 2020.)

Notably, data extracted from studies that considered the kind of rhythm the patients had at the time of arrest, suggested that elderly CA survivors who had a shockable rhythm such as VF and VT, had higher survival rates as opposed to non-shockable rhythms such as asystole and PEA. (Libungan et al. 2015; Hirlekar et al. 2017; Kangasniemi et al. 2018; Roedl et al. 2018; Ruch et al. 2019.) This was well demonstrated in a study by Ruch et al. (2019), which placed a shockable rhythm group to have 60 percent rate of achieving return of spontaneous circulation (ROSC) through CPR.

A similar study with patients grouped into ages 70-79, 80-89 and over 90 had their initial rhythms at arrest recorded and survival rates were 58 percent, 42 percent and 41 percent respectively. Patients with non-shockable rhythms placed survival rates for the three age groups at 20 percent, 14 percent and 10 percent respectively (Hirlekar et al. 2017). The initial shockable rhythm was predictive of better functional capacity and greater autonomy post arrest survival. (Kangasniemi et al. 2018.)

5.2 Qualitative publications' findings

The Qualitative Studies included provided a more in-depth description of the post CA experience for the survivors. Of the two qualitative studies included, one used the hermeneutic method, where interpretation was used to have an essential understanding of the lived experience of the survivors (Bremer, Dahné, Stureson, Årestedt & Thylén 2019). The other was a case study using telephone interviews (Burden, Pollock & Paget 2020). Through thematic analysis, two overarching themes were sort out in the post CA survivors: vulnerability and anxiety/depression.

5.2.1 Vulnerability

Surviving a resuscitation attempt can have profound effects on a person's mental well-being as the experience makes the person even more aware of their own mortality. Any neurological deficit brought upon on the person because of CA may significantly impact their well-being and how they conduct their daily affairs. An elderly person who may have previously lived independently in their own home may then be discharged to a nursing home facility and this could create a scenario where the patient feels most vulnerable. (Haydon, van der Riet & Maguire 2017.)

In a qualitative study conducted through a series of telephone interviews analysing the QoL of elderly CPR survivors over 80 years, it was asserted that CPR becomes less effective with advancing age and of the five families or patients who were part of these study, only one had any positive comment on the experience. (Burden et al. 2020.) A common theme in the cases in the study was that the elderly person was living independently before the CA but upon discharge experienced functional deficits that required nursing home care. Many expressed that the loss of independence and having to rely on others was reason enough not to have been "brought back" (Burden et al. 2020). Of the only positive comment extracted from the case study, the patient's spouse expressed that he was happy his wife pulled through as it meant that they had more time together (Burden et al. 2020).

It was also identified that feelings of vulnerability arose upon discharge as the transition from the hospital environment to home meant that medical responsibilities ended and patients found themselves on their own again with feelings of uncertainty and vulnerability. (Bremer et al. 2019.) The study asserted the importance of having discussions regarding an elderly person's CPR at an early stage, as inappropriate CPR could cause unwanted distress for the patient and the loved ones hence robbing an individual of a dignified, natural death.

4.2.7 Anxiety and depression

Anxiety is an emotion of fear that emerges when one is faced with traumatizing situations or dreadful feelings of anticipated events (Dean 2016). Depression is a debilitating condition one experiences when feeling demotivated and lack interest in general for a period of more than two weeks (Haydon et al. 2017). A major life event such as surviving CA can trigger anxiety, depression and in worse cases, post traumatic disorder (PTSD) (Wilder Schaaf, Artman, Peberdy, Walker, Ornato, Gossip & Kreutzer 2013).

In both qualitative publications included in this thesis, most of the patients in the cohort expressed feelings of depression and anxiety after the CA event. Patients reported feelings of fear being in darkness, fear of going to bed at night and altogether, an altered view of life and death. Surviving meant that their focus had shifted from experiencing life to focusing on their impaired abilities. Also, the change in roles and degree of independence raised feelings of loneliness, hopelessness, and abandonment. (Bremer et al. 2019; Burden et al. 2020.)

6 DISCUSSION

Twelve publications included in this thesis represent the research concerned with elderly's QoL after a successful CPR, both in and out of the hospital. Diverse methods and tools were used in evaluating specific functional abilities and neurological outcomes after a successful CPR. Given the fact that the QoL is subjective and intangible, it could therefore be difficult to measure (Pérez-Vergara et al. 2021). Factors affecting and defining one's daily living is individualized on preferential needs and lifestyle of choice. Hence, it is challenging to successfully describe what QoL is like for the elderly CPR survivors considering the range of tools and methods used. These tools aim to quantify the QoL, experience of the subjects in the literature by measuring the functional capacity and range of capabilities a person has, which has a direct correlation with their neurological status.

Data extracted from most of the selected publications included in this report asserted that survival from CPR decreases with age and for the elderly, it is dismally lower as compared to the referent population. CPR in the elderly presenting with non-shockable rhythm is also negligible. The elderly cohort covers people >65 years, and it can be deduced that a patient who is 67 years old has a higher survival rate and better neurological outcome than a 90-year-old survivor. It was also recommended that a threshold should be put in place in which performance of CPR is considered futile in patients with high frailty scores as this only creates unnecessary distress and denies a patient of dignified death. This stresses the importance of thorough and informed decision-making during advanced directive planning where patients' wishes are respected in the event that they are no longer functionally and mentally capable of making any decisions for themselves.

Although CPR survival rates are low for the elderly cohort, neurological deficit is negligible among the survivors. Many survivors post CPR had high CPC scores and neurological capacity that allowed them to resume usual activities of daily living with minimal outside help. However, survivors also reported feelings of anxiety and depression post discharge. Feelings of vulnerability were reported by survivors from fear of the event happening again. The transition from a highly

monitored and secure medical environment to home also creates feelings of vulnerability and helplessness particularly in the elderly.

In Burden et al. (2020), the patients were interviewed by telephone or printed reply slip. Open questions were asked of the patients so as to allow them to freely describe their current health status and express their post CPR thoughts and feelings. (Burden et al. 2020.) In one of the seven cases involving an 84-year-old woman interviewed by telephone, she expressed her gratitude for being resuscitated but also regretted due to the excruciating post CA pain as she says:

I get frightened...I know I shouldn't say it because I am lucky, they worked on me and I had the helicopter and everything but they shouldn't have... I'm hurting all over. My husband and me, we have talked it over, we wouldn't want to be resused (sic) like that. (Burden et al. 2020.)

However small the study sample was, with an inclusion of 47 cases in that article, all the patients had few things in common. Wishing they had not been revived through the means of CPR. In the event that the patient died shortly after the administration of the CPR, the relatives and family members were left guessing as to what would have been best for the elderly patient or what they could have wanted. (Burden et al. 2020.)

In comparing both qualitative publications included in this thesis, all the elderly patients had a lot of things in common. There were feelings of regret wishing they had not been resuscitated, feelings of abandonment after being discharged from the hospital, the fear of the unknown as to what their life post CPR upholds for the future. Patients expressed feelings of anxiety, depression anger, bitterness and insecurity. (Bremer et al. 2019; Burden et al. 2020.)

Having thoroughly analysed all the articles included in this review, it is evidently clear that in more or all of the quantitative articles, more attention and focus was paid on the patient's neurological status after a successful CPR hence concluding that the patient's QoL was good, favourable or excellent based on the neurological outcome.

However, the qualitative publications included in the review suggested otherwise. Patients' quality of life was viewed based on various aspects of life such as psychological, physical abilities, and societal status. It was therefore concluded that more focus needs to be paid on patient's feelings of insecurity and abandoned after a successful CPR as well as the importance of recognizing the substantial risks associated with functional declining of the patients post CPR.

Discussions of advanced directives regarding future care is necessary in early stages when the patient is of sound mind to spare the patient of the risks associated with the aftermath of CPR. And in the event that the patient survives CPR, it is imperative that he/she is provided with security, support system and survival tools post CA.

6.1 Ethics and reliability

In conducting this study, the writers were morally and ethically obligated to remain as objective and unbiased as possible. There are ethical questions involving the administration of CPR to the elderly, and if that is morally and ethically correct will come up as a direct consequence of conducting this research. The challenge was to be objective and only neutral to both ethical arguments involved in administering or denying CPR to the elderly. This way, the delivery of an unbiased and objective description of the QoL of elderly survivors of a CA was warranted. As such, the guidance given by Tampere University of Applied Sciences and thesis supervisors was adhered to, so as to conduct reliable research which guaranteed the yielding of same results when the method was repeated.

The writers are aware of the importance of being acquainted with the chosen topic of interest and together with the named supervisor/s, the resources required to complete the work was ascertained. In the initial stages of the thesis process, the authors were oriented to the guidelines of research and research ethics, handling of personal information and data protection as underlined by TAMK. It is an understanding that the thesis is a public document, and it will be examined through a plagiarism identification system. The authors are aware of their right to a high-quality thesis process. (TENK 2012) Prior to conducting the thesis, the

necessary agreements were signed, and necessary research permits were acquired. If need be, a preliminary ethical review is conducted by the named thesis supervisor.

7 TIMETABLE AND FUNDING

The selection of the topic for the thesis and the plan writing began in August of 2021. During the initial stages of the process, the authors, and the named supervisor from TAMK had a working life meeting, where the chosen topic of the thesis was discussed and narrowed down to the main topic which was agreed upon both by the writers and the working life supervisor/s. The research permit was applied in January of 2022. The thesis plan was implemented in February of 2022 after the permit was secured and the topic agreed upon by both parties. The revision and submission of the final work was completed in November 2022. The writers were responsible for any expenses the thesis might have caused.

8 CONCLUSIONS

In conjunction to the information gathered, it is safe to conclude that elderly CPR survivors achieve a decent quality of life, but it must be considered that survival decreases with age and is also reliant on other confounding factors such as presenting cardiac rhythm, patient comorbidity and frailty status. Discussion of advanced care directives needs more revision on the part of the healthcare professionals so as to help patients understand and make sound decisions in time regarding their future care. It is imperative for the healthcare team to understand that patients feel insecure and abandoned when they leave the hospital after surviving a CA. Guiding the patients on how to find security in their everyday life and support system to help them get through the ordeal, they have experienced is important.

In the process of extracting the data from the publications, it was very evident that most of the studies conducted to measure the quality of life were done quantitatively and there was a scant amount of research that had been done to consider the lived life experiences of the survivors through qualitative research. It is therefore a recommendation that more studies should be done to explore the actual life experiences and opinions of the elderly CPR survivors in which they give an account of how the CA and its survival has impacted their quality of life.

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APPENDICES

Appendix 1(6)

TABLE 1: Thematic analysis

| Authors | Aim | Study Sample | Method | Tools used to measure QoL | Survival to discharge or follow up | Conclusion |
|---|---|------------------------|--|---------------------------------------|--|--|
| 1. Heillevuo, Sainio, Huhtala, Ollola, Tenhunen & Hoppu 2018. | To compare the QoL before and after CA and analyse the factors associated with outcome. | Mean age: 66 N= 222 | Quantitative, Questionnaire, logistic regression, | Euro-QoL (EQ-5D), CCI | 36% (79/222) survived to 6 months post discharge. | Quality of Life after 6 months is good in CA survivors even with comorbidities. |
| 2. Bremer, Dahne, Stureson, Årestedt, & Thyllen 2019. | To illuminate meanings of people's lived experiences of surviving an IHCA | Mean age: 71 N=8 | Qualitative, Hermeneutic method, 3 phase, naive understanding, structural analysis, and comprehensive understanding. | Narrative interviews | Only CA survivors with cardiac aetiology were included in the study. | 74% of those surviving critical illness have symptoms of depression and anxiety. Sudden feelings of vulnerability. |
| 3. Andrew, Mercier, Nehme, Bernard & Smith 2018. | To describe the 12-month functional recovery and HRQOL of OHCA elderly survivors, including those arresting in elderly homes. | Mean age: 75 N=876 | Quantitative: Retrospective Analysis | HR-QoL, SF-12, Euro-QoL-5D, GOSE, VAS | 9.7% (876/9016) survived to discharge. 651 participated in the 12 month follow up. 2575 OHCAS in elderly home care, only 2.2% survived to discharge. | 60.6% of survivors resided at home without additional care after 1 year. 66.6% reported good functional recovery. A total of 116 (17.9%) were actively working before the CA and 75(64.7%) went back to work after CA. |

Continues

TABLE 1. Thematic analysis

| Authors | Aim | Study Sample | Method | Tools used to measure QoL | Survival to discharge or follow up | Conclusion |
|---|---|---|--|---------------------------|--|---|
| 4. Roedl, Jarczak, Becker, Fuhrmann, Kluge & Muller 2018. | To evaluate CA and patient characteristics as well as ICU and neurological outcome after CA in patients over and equal to 90 years old | Age group: 90 & above N=657 | Quantitative: Single center retrospective study | CPC, SAPS II, CCI, OPC | 46% (19/48) survived ICU 23% (11/48) survived to one year post discharge | 86% of those who survived CA in the ICU had a good neurological outcome (CPC1/2). 6% (1/48) have severe neurologic disability (CPC3). 55% of those who survived one year post ar- rest have a favourable neu- |
| 5. Hiemstra, Bergman, Absalom, Naalt, Harst, Vos, Nieuwland, Nijsten & Horst 2018. | To study whether elderly patients benefit to the same extent compared with younger patients and at long term follow up as compared with the general population. | Age group: 75 years & above N=810, 125 are elderly | Quantitative | CPC | 33% of the elderly survived OHCA compared to 57% of the younger age group. 76% of the elderly cohort survived to 1 year and 59% to 5 yrs | 73% of the elderly had CPC1 and 83% have for the younger cohort at hospital discharge. 7.3% of elderly had greater than CPC2 compared to 2.5% in the younger cohort. |

TABLE 1. Thematic analysis

| Authors | Aim | Study Sample | Method | Tools used to measure QoL | Survival to discharge or follow up | Conclusion |
|--|--|-------------------------------|--------------------------------------|-------------------------------------|--|--|
| 6. Chan, McNally, Nallamothu, Tang, Hammill, Spertus, Curtis 2016. | To study the long-term outcomes among elderly survivors and resource use. | Age group: over 65 N=16206 | Quantitative Study: | CPC | 6.95% survived to discharge (1127/16206). 12.7% survived to 30 days, 31.8% survived to 1 year and 47.2% at 3 years | 1 in 3 died within the 1 st year. At hospital discharge, 52.6% were discharged from home (most without requirement for health care at home). 38.3% moved to a rehabilitation with skilled nursing. 8% went to hospice facilities and 1.2% went to |
| 7. Ruch, Stoessel, Stein, & Button 2019. | To provide data for survival, quality of life and costs directly related to the cardiac arrest for a region of Switzerland served by one emergency medical | Mean age: 68 N=88 patients | Quantitative: Retrospective Analysis | CPC, EQ-5D & EQ-5D-5L, RAND 36, VAS | 18% (16/88) survived to discharge. 16% (14/88) survived to follow up after 2 years and 7.5 months | 16% (14/88) had an excellent quality of life overall with no limitations to daily life. Of the 14 patients, 1 was in critical condition and 1 did not consent. All the survivors had good neurological outcome: 11 scored CPC1, and 1 scored CPC2. |

TABLE 1. Thematic analysis

| Authors | Aim | Study Sample | Method | Tools used to measure QoL | Survival to discharge or follow up | Conclusion |
|--|--|-----------------------------------|---|---------------------------|------------------------------------|---|
| 8. Libungan, Lindqvist, Stömsöe, Nordberg, Hollenberg, Albertsson, Karlsson, Herlitz 2015. | To determine OHCA elderly patients thirty days mortality rate and neurological outcome. | Age group: over 70 N=3660 5 | Quantitative Study: Logistic regression | CPC | 13.5% survived to 30 days after CA | High mortality rate is associated by advanced age >70yrs in OHCA patients. However, there's an existence of 10% survival chance in patients >90yrs. Neurological status is the same regardless of age. |
| 9. Kangasniemi, Setälä, Huhtala, Kämäräinen, Virkkunen, Jämsen, Yli-Hankala & Hoppu 2018. | To study the outcomes of resuscitation attempts for a cohort group of elderly patients who had OHCA in the Pirkanmaa region. | Age group: over 65 N=65 | Quantitative: Observational | CCI, CPC | | 5% of CA survivors had favorable neurological outcome. There were discrepancies in elderly care homes and primary care facilities in resuscitation protocols with patients receiving CPR despite having DNAR. 8% (4/52) and 4% (2/52) survived to discharge and 90 days respectively. |

TABLE 1. Thematic analysis

| Authors | Aim | Study Sample | Method | Tools used to measure QoL | Survival to discharge or follow up | Conclusion |
|---|--|---|------------------------|---|-------------------------------------|---|
| 10. Burden, Pollock & Parget 2020. | To investigate the post resuscitation quality of life in patients >80yrs through case studies. | Age group: over 80 N=47 | Qualitative Case Study | Interviews | 10.6% (5/47) survived to discharge. | 2/5 survivors discharged to nursing homes due to significant functional decline and potential functional decrease in >80yrs who had a successful CPR. Most of the patients and relatives who were contacted after the successful CPR had negative experiences and views to express. The study encourages early discussion of CPR with patients and relatives to avoid detrimental results and respect patient's wishes. |
| 11. Tainen, Vaahersalo, Skrifvars, Hästbacka, Grönlund & Pettilä 2018. | To study the neurological and functional outcome of OHCA patients and their health-related quality of life a year later. | Age group: over 66 N=50 patients out of a cohort of 206. | Quantitative Study | CPC, Barthel Index, EQ-5D-3L and EQ-VAS | 11.2% (23/206) survived to one year | 90% of OHCA survivors had good long term functional outcome with HRQOL similar to age and gender matched population. |

TABLE 1. Thematic analysis

| Authors | Aim | Study Sample | Method | Tools used to measure QoL | Survival to discharge or follow up | Conclusion |
|---|--|--------------------------------------|----------------------------------|---------------------------|---|---|
| 12. Hirlekar Karlsson, Aune, RAvn-Fischer, Albertsson, Herlitz & Libun- gan 2017. | A large observational study investigating factors associated with survival and neurological outcome in IHCA survivors. | Age group: over 70 N=11396 | Quantitative Observational Study | CPC | 21.03% survived to discharge 20.6% survived to 30 days | Advanced age is associated with poor 30-day survival rate after successful IHCA. Poor risk profile and treatments less aggressive might have a role in these findings. Relatively, discussions regarding advanced care should be individualized following the high survival rates among different subgroups. There is good neurological outcomes in most CA survivors including the >90yrs of age. No significant association was found between age and good neurological outcome: (CPC score:1-2) 92%, 93%, and 88% in the three-age group respectively. |