Recommended procedures for doctors and nurses in the management of Kawasaki Disease

Cheruiyot, Kevin
Zeowa, Richard

Laurea University of Applied Sciences

Recommended procedures for doctors and nurses in the management of Kawasaki Disease

Cheruiyot, Kevin
Zeowa, Richard
Degree Programme in Nursing
Bachelor's Thesis
March, 2018

Cheruiyot, Kevin; Zeowa, Richard

Recommended procedures for doctors and nurses in the management of Kawasaki Disease

Year	2018		Pages	32

Kawasaki disease is known to frequently occur in children below five years, and more specifically in male infants and children of Asian background. The acute disease has been on the increase despite today's advanced modern medicine and technology. Given this trend, this thesis intended to describe the recommended procedures for doctors and nurses in the management of Kawasaki Disease (KD). However, the writers of this thesis focused more on the recommended procedures for nurses in the management of Kawasaki Disease.

The method of this thesis is a literature review with inductive qualitative data analysis. To gather relevant literature, two databases were searched, these included CINAHL and Laurea FINNA, using some including and excluding criteria 7 articles were selected and analyzed. The raw data obtained from the analysis of the 7 articles selected were further classified into five subcategories and then further into 2 categories.

Findings indicated that doctors and nurses play a vital role in the managing Kawasaki disease as they help make early referral to pediatric department when they suspect Kawasaki disease suspicion, nurses are responsible for administering medication on a timely basis for easier management, nurses monitor and evaluate the progress of recovering patients while at the same time giving assurances to patients' family members that KD is managable. This was done to reduce the probability of parents and relatives of children diagnosed with KD from suffering depression and anxiety due to fear of losing their loved ones.

Since Kawasaki disease's etiology is unknown, the writers of this thesis recommend that nurses continually educate themselves with the latest developments in pediatric disease conditions so that they understand better the signs and symptoms of KD, and other diseases which imitate KD.

Keywords: Kawasaki Disease, Nursing Intervention, Medical Procedures.

Table of Contents

1   Introduction

Kawasaki disease is an acute vasculitis which predominantly affects infants and children causing coronary artery aneurysms in up to 25% of children who do not receive treatment (O'Connor & Saulsbury 2007, 345).

Kawasaki disease has become a global problem, in Ontario, Canada, annual KD incidence for children 0-4 years of age has increased over time from 14.4 per 100,000 in 1995-7 to 26.2 per 100,000 in 2004-6, across the US, the incidence of KD has increased from 17.5 per 100,000 hospitalization rate for children <5 years in 1997 to 20.8 per 100,000 in 2006, Japan has the highest incidence of KD worldwide, with an average annual incidence rate of 216.7 per 100,000 children age 0-4 years during the years 2007 and 2008 (Luca & Yeung 2012, 1030).

In addition, during an 11-year period study from 1998-2009, a total of 1,390 Kawasaki disease patients were recorded in the registries from the Northern European countries and for Finland the average incidence rate per 100,000 children less than 5 years was 11.4, Norway 5.4, and Sweden 7.4 (Salo, Griffiths, Farstad, Schiller, Nakamura, Yashiro, Uehara, Best & Burns 2012, 770).

The writers of this thesis became interested in the topic because they have friends and family members whose children had suffered KD, and in a situation, it resulted in the death of the child. In this thesis, the methodologies of a systematic review were used because this thesis sought to identify, select, appraise relevant primary studies, to extract, collate and report the findings on the recommended procedures for doctors and nurses in the management of Kawasaki Disease (KD), with a focus on the recommended procedures for nurses in the management of Kawasaki Disease.

Information on the prevalence of KD in Nigeria and Kenya where the authors of this study come from could not be found, however, it is believed that disease prevalence is high in Africa because of the presence of factors which promote diseases generally such as lack of resources to go to hospital, lack of infrastructure such as good road for timely transportation to the hospital, lack of well equipped hospitals, political, social and economic instability, and malnutrition.

2   Kawasaki Disease

Kawasaki disease (KD) is an acute, self-limited vasculitis of unknown etiology, it affects small and medium sized arteries, resulting in endocarditis, cholangitis, myocarditis,

cholecystitis, pericarditis, pancreatic ducts, meningitis, and lymphadenitis, this is because Kawasaki disease affects many organs and it affects the coronary artery particularly causing coronary artery aneurysm (Kato 2004, 137-138).

Kawasaki disease frequently occurs in children <5 years old, the rate of occurrence is higher in male children, and in infants of Asian background, it significantly causes acquired heart disease in children, it is the principal source of acquired heart disease in industrialized countries and the prevalence is on the increase worldwide (Luca & Yeung 2012).

A child suffering from KD must have fever for at least five days, and has four out of five clinical criteria which include red eyes, bilateral non-purulent conjunctivitis, sore erythematous oral cavity, red fissured lips and a ''strawberry'' tongue with protuberant papillae, polymorphous maculopapular skin rash, cervical lymphadenopathy usually unilateral and > 1.5 cm in diameter, erythema and oedema of the hand and feet, desquamation of the skin is seen during the later stage of the illness (Wood and Tulloh 2009, 788).

Kawasaki disease is referred to as incomplete KD when the patient has a fever for 5 days or more and less than 3 clinical features without an alternative explanation for the findings (Miller, M & Miller, 2013). The likelihood of having Kawasaki disease in infants younger than 6 months is rare, and when it occurs, it is usually incomplete and most likely results in the development of coronary artery aneurysms (O'Connor & Saulsbury 2007). When patients have a fever for 5 days or more and have in all, four or fewer of the principal features of KD, they can be diagnosed for KD through a two-dimensional echocardiography or coronary angiography (Gerding 2011, 380).

Kawasaki disease was first described in 1967 by Dr. Tomisaku Kawasaki after he reviewed 50 cases of Japanese children who were having a collection of clinical results which he called mucocutaneous lymph node syndrome (MCLS) (Uehara and Belay 2012).

3   Managing Kawasaki Disease

3.1   Medical procedures in managing Kawasaki Disease.

Based on the presenting signs and symptoms and the results from recommended laboratory investigations, the doctor diagnoses Kawasaki disease. Various treatment options can be used for KD depending on the degree of the coronary artery aneurysm (CAA) which can be seen from a two-dimensional echocardiography or coronary angiography. Kawasaki disease treatment is categorized into acute phase where treatment is focused on reduction of coronary artery wall inflammation, inhibition of platelet activation, and prevention of arterial thrombosis, and a long-term management phase which depends on the changes in the coronary artery, the aim is prevention of myocardial ischemia and infarction (Gerding 2011, 381).

KD is life threatening and leads to coronary artery aneurysms in up to a quarter of untreated patients, but when it is appropriately treated within 10 days of upset of disease, the risk of coronary artery aneurysm is reduced to 5% (Singh, Vignesh, and Burgner 2015, 1084). When KD is diagnosed within 10 days of the upset of the disease, the doctor prescribes intravenous immune globulin (IVIG) and aspirin to be administered by the nurses immediately. However, when the Coronary artery is severely affected by KD, coronary artery bypass grafting, balloon angioplasty, stent insertion, rotational ablation and transluminal coronary revascularisation are performed on the patient by the doctors who are assisted by the nurses (Wood and Tulloh 2009, 790).

3.2   Nursing Intervention

Nursing interventions are actions performed by a nurse which aim at enhancing client outcomes by eliminating or reducing the etiology of the nursing diagnosis, however, when the etiology of the nursing diagnosis cannot be changed, the nursing interventions then aim at treating the signs and symptoms of the disease condition (Berman, Snyder, Kozier and Erb 2007, 223).

Furthermore, Berman et al (2007, 234), conclude that in performing nursing interventions, nurses should hinge interventions on scientific knowledge, nursing research, and professional standards of care (evidence-based practice), they should have good understanding of the interventions they are about to implement and ask questions about those they do not understand, also they should implement a holistic, safe care that is tailored to the individual client, while respecting the dignity of the client, providing teaching and guidance to client and promoting their active participation in their care.

Nursing interventions can be independent, dependent, or collaborative, independent nursing interventions are those activities which the nurse are licensed to do such as physical care, emotional support and comfort, teaching, and counselling, dependent nursing interventions are those activities which the nurse implements under the order or supervision of the physician such as medication, intravenous therapy, or diagnostic test, lastly, collaborative nursing interventions are those activities which the nurse does together with other health team members such as social workers, dietitians, and physiotherapists, example includes when the physician orders a physical therapy sessions for the client, the nurse informs the physical therapy department and plans the client's care to include the therapy sessions (Berman et al 2007, 223).

4 Statement of Purpose and Research Question

The purpose of this study is to describe the recommended procedures for doctors and nurses in the management of Kawasaki Disease.

The research question is: what kind of recommended procedures can be implemented by doctors and nurses in the management of Kawasaki disease?

5 Methodology

Jesson, Matheson & Lacey (2012, 164), posit that methodology is a description of research method followed in the conduct of research and in the reporting or interpretation of its results. In order to provide answers to the research question in this thesis, the methodology taken includes literature review, literature search, inclusion and exclusion criteria, data appraisal, data extraction, data analysis, and reporting of findings.

5.1 Literature review

A literature review identifies, analyses, assesses and interprets a body of knowledge on given topic or subject (Coughlan & Cronin, 2017, 159). In this thesis, a literature review was carried out using the principles of systematic review. A systematic review is ''a process that uses an explicit and transparent methodology to re-analyze and synthesize evidence from previously conducted research studies on a given topic. Systematic reviews are generally classed as 'research on research' or secondary research because they do not collect new data but use the findings from previous research'' (Coughlan & Cronin, 2017, 163).

The principles of a systematic review were used in this study, because this study seeks to identify, select, appraise relevant primary studies, to extract, collate and report the findings on the nursing interventions in the management of Kawasaki disease, and according to Khan, Kunz, Kleijnen & Antes (2011, 194), ''systematic literature review is a research that summarizes the evidence on a clearly formulated question using systematic and explicit methods to identify, select and appraise relevant primary studies, and to extract, collate and report their findings. By following this process, it becomes a proper piece of research''.

5.2   Literature search

Literature search entails systematically researching the existing databases, textbooks, and journals (Jesson, Matheson & Lacey 2012, 163), in other to identify suitable literature to provide answers to a given research/review question (Coughlan & Cronin, 2017, 159). The databases searched for data included Laurea Finna which is an online search portal of Laurea University of Applied Sciences where it's printed, and electronic collections are found; and Cumulative Index to Nursing and Allied Health Literature (CINAHL) which also is an online database with more than 600 full text journals on nursing, and other health disciplines, and covers indexing for over 3000 journals. These databases were chosen because they are rich with professional journals in nursing and medicine.

Between 20th November 2017 – 20th December 2017 an electronic literature search was carried out in the above-mentioned databases using search terms of ''Nursing intervention AND Kawasaki disease'', ''Nursing management AND Kawasaki disease'', and ''Kawasaki disease''. The Boolean operator ''AND'' was applied in order to focus the search for related literature (see table 1 below).

DATABASES	SEARCH TERMS	Exclusion criteria	Number of hits	1st screening	2nd screening
CINAHL	Nursing interventions AND Kawasaki disease	Full text only, English Language, published 2008-2017	0	0	0
CINAHL	Nursing management AND Kawasaki disease	Full text only, English Language, published 2008-2017	1	1	1
CINAHL	Nursing AND Kawasaki disease	Full text only, English Language,	2	1	1

		published 2008-2017			
LAUREA FINNA	Nursing interventions AND Kawasaki disease	Full text only, English Language, published 2008-2017	288	2	1
LAUREA FINNA	Nursing management AND Kawasaki disease	Full text only, English Language, published 2008-2017	664	21	2
LAUREA FINNA	Nursing AND Kawasaki disease	Full text only, English Language, published 2008-2017	1467	37	2
TOTAL			2420	62	7

Table 1: Overview of literature search

5.3 Inclusion and exclusion criteria

Aveyard (2014, 177), writes that inclusion and exclusion criteria are predefined standards put in place to focus the literature search. These criteria helped to maintain transparency and trustworthiness in the literature search process as well as produced quality articles which were reviewed in this thesis in other to provide answers to the thesis research question. The criteria for choosing the articles for review were: articles which were published between year 2008 to year 2017, as this provided the most recent articles which have the most recent data on the thesis research question; articles written in English language, as English is the language used in this thesis; articles which are full text; articles with an abstract, as the abstract provides a summary of what the article is about, therefore promoting the inclusion or exclusion of the articles into those to be reviewed.

When these restrictions were applied, the primary search produced a total of 2420 articles, from these, 62 articles which seem to be relevant to this study were selected for further studies based on their title and abstract. The last selection was done based on an assessment of the full-text article for its quality and relevance in answering the research question. 7 articles which answer the research question and are of good quality were finally selected for inclusion.

The stages of the literature search process can be described by the PRISMA flow diagram (Moher, Liberati, Tetzlaff, & Altman & the PRISMA Group 2009). This process is seen in figure 1 below.

```
                ┌─────────────────────────┐      ┌─────────────────────────┐
 ┌──────────┐   │ Records identified      │      │ Records excluded:       │
 │ Identifi-│   │ through database:       │─────▶│ Based on titles and ab- │
 │ cation   │   │ CINAHL, LAUREA FINNA,   │      │ stracts, duplicates.    │
 └──────────┘   │ Full text only, English │      │ (n = 2358)              │
                │ Language, published     │      └─────────────────────────┘
                │ 2008-2017               │
                └─────────────────────────┘
                             │
                             ▼
 ┌──────────┐   ┌─────────────────────────┐      ┌─────────────────────────┐
 │ Screening│   │ Full-text articles      │      │ Full-text articles      │
 │          │   │ assessed for            │─────▶│ excluded:               │
 └──────────┘   │ eligibility:            │      │ Of low quality or did   │
                │ (n = 62)                │      │ not answer research     │
                └─────────────────────────┘      │ question. (n = 55)      │
                             │                    └─────────────────────────┘
                             ▼
 ┌──────────┐   ┌─────────────────────────┐
 │Eligibility│  │ Studies included:       │
 │          │   │      (n = 7)            │
 └──────────┘   └─────────────────────────┘
```
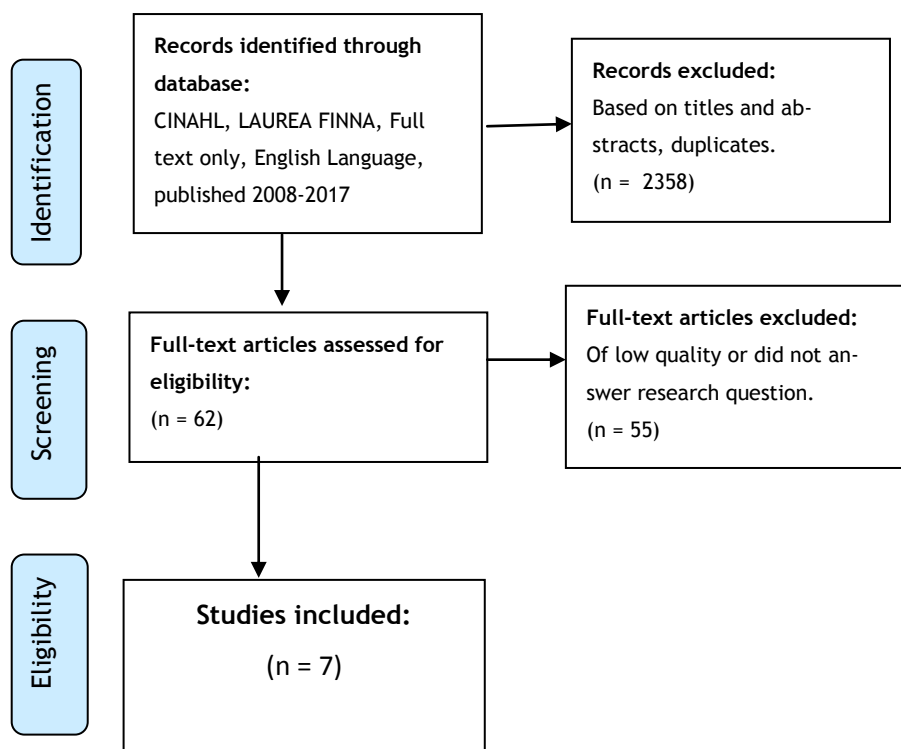
Figure 1: Literature search process in line with PRISMA flow chart of record selection and screening process (Moher, Liberati, Tetzlaff, Altman & The PRISMA Group 2009).

5.4   Data Appraisal

In conducting a literature review it is pertinent to evaluate the strength and quality of the articles included in the review (Teing 2007, 105), this is referred to as data appraisal. This process ensures that poor quality articles are not included in the review as the quality and strength of the articles included in the literature review determine the quality and trustworthiness of the literature review.

As a way of making sure that dependable articles were included in this review, it was agreed that Johns Hopkins Research Evidence Appraisal Tool be used to appraise the strength and quality of the articles included in this literature review. This is because this

type of critical appraisal tool is fashioned particularly to support evidence-based practice in nursing (Dearholt & Dang 2012, 119), of which this review is about.

Johns Hopkins Research Evidence Appraisal tool has two aspects, the first evaluates the strength of the evidence to be included in the review, while the other evaluates its quality. A scale ranging from level I to level V shows the strength of the evidence, with level I to III showing the strongest, and level V showing the weakest evidence. The evidence included in this literature review were ranging from levels I to III as they were the strongest.

Furthermore, Johns Hopkins Research Evidence Appraisal tool grades the quality of evidence into A (high quality), B (good quality) and C (low quality). Evidence graded as good and high quality were included in this literature review, and evidence which were of low quality or containing major flaws were discarded. Out of the seven articles selected for review, one is a systematic review of randomized controlled trial (RCT) which is of level I according to Johns Hopkins Research Evidence Appraisal tool, and six are non-experimental study which are of level III according to Johns Hopkins Research Evidence Appraisal tool also. One of the seven articles selected is considered quality A which is of high quality, and six are Quality B which are of good quality.

Table 2 below is Johns Hopkins Nursing Evidence-Based Practice tool showing the Strength and quality of Research Evidence Rating Scheme (Dearholt & Dang 2012, 108).

Evidence Level	Quality Guides
Level I Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis	A High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence
Level II Quasi-experimental study Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis	B Good quality: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence
Level III Non-experimental study Systematic review of a combination of RCTs,	C Low quality or major flaws: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn

quasi-experimental, and non-experimental studies, or non-experimental studies only, with or without meta-analysis, Qualitative study or systematic review with or without a meta-synthesis	
Level IV Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence Includes: • Clinical practice guidelines • Consensus panels	**A** <u>High quality:</u> Material officially sponsored by a professional, public, private organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years **B** <u>Good quality:</u> Material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years **C** <u>Low quality or major flaws</u>: Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the last 5 years
Level V Based on experiential and non-research evidence Includes: • Literature reviews • Quality improvement, program or financial evaluation • Case reports • Opinion of nationally recognized experts(s) based on experiential evidence	**Organizational Experience:** **A** <u>High quality:</u> Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence **B** <u>Good quality:</u> Clear aims and objectives; consistent results in a single setting; formal quality improvement or financial or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence **C** <u>Low quality or major flaws:</u> Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial or program evaluation methods; recommendations cannot be made **<u>Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference:</u>** **A** <u>High quality:</u> Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field **B** <u>Good quality:</u> Expertise appears to be credible; draws fairly

	definitive conclusions; provides logical argument for opinions C **Low quality or major flaws:** Expertise is not discernable or is dubious; conclusions cannot be drawn

Table 2: Johns Hopkins Nursing Evidence-Based Practice, Strength, and quality of Research Evidence Rating Scheme (Dearholt & Dang 2012, 108)

Level of Evidence	Number of Articles	Quality A (High Quality)	Quality B (Good Quality)	Quality C (Low Quality or major flaws)
Level I	1	1		
Level III	6		6	
Total	7			

Table 3: Johns Hopkins Nursing Evidence Appraisal illustrating the strength and quality of evidence of the accepted 7 articles.

5.5   Data Extraction

When study findings are identified and transferred to another study, it is referred to as data extraction (Munn, Tufanaru, & Aromataris 2014, 53); mostly it is done for answering the research question of the new study. Raw data is often imported into an intermediate data extracting system before it can be processed for data manipulation where it will be padded with more data prior to being converted to useful information (Turner, Kitchenham, Brereton, Charters & Budgen 2010, 468). A data extraction form was used during data extraction in this review to minimize the risk of error (Teing 2007, 105).

Munn et al. (2014, 53), postulate that to reduce error and minimize bias, it is necessary that at least two different people review the data independently. The two writers of this literature review, separately reviewed each article selected for review, and using the extraction form, extracted relevant data which will help to answer the research question. The writers then came together, discussed their findings and chose the most relevant data into a single form (see appendix 1).

5.6   Data Analysis

Data analysis is the basic process through which credible and trustworthy results can be established in a qualitative research. It entails converting raw facts and figures into themes and categories or narratives. According to Elo & Kyngäs (2008, 107) there exist various approaches to data analysis that can be used by researchers. However, in this study, the data were analyzed using the inductive qualitative content analysis. Content analysis can be used with a quantitative or qualitative data, and inductively or deductively, in nursing studies, the qualitative content analysis is mostly used with an aim of building a model to describe the phenomenon in a conceptual form with the concepts being obtained from the data (Elo & Kyngäs 2008, 107).

Qualitative content analysis is systematic and objective, through this approach, replicable and valid inferences can be drawn from data with a view to providing a working action guide, knowledge and insights (Elo & Kyngas, 2008, 100). To determine all the data crucial for answering the research question, the selected articles were thoroughly read so as to reduce the risk of unintentionally omitting essential data. Furthermore, every piece of raw data was codified by ascribing to it a particularly devised sentence. Five sub-categories were arrived at when all data were grouped into sub-categories according to similarity. Lastly, from the five sub-categories two categories were deduced, and that brought the process of moving specific data to generalized theory to an end. The data analysis process is described in Table 4.

Summarized data	Sub-categories	Main categories
- Nurses looked out for Kawasaki disease (KD) symptoms, and when they observed those, they made an early referral of the children to pediatric medical assessment. - Doctors make diagnosis of disease. - It was recommended for doctors and nurses to consider the possibility of atypical/incomplete KD in children with a high temperature but who have a few of the clinical features of KD. - It was recommended for doctors and nurses to get acquainted with common differential diagnoses that can share features of KD,and have the history of immunization status of KD patient reviewed.	Timely Diagnosis	
- Nurses administered intravenous immunoglobulin (IVIG) and aspirin. - Nursing monitoring of KD patients entailed 4 hourly checking of the pulse rate, respiratory rate, blood pressure, body temperature, and completion of the pediatric early warning score. - The nurse kept the KD patient as comfortable as possible while the patient was admitted to		Management of KD patients with no

the ward. - Nurses provided emotional support and reassured the parents and relatives of KD patients. -Nurses provided up to date information to parents and relatives of KD patients on the clinical progress - Over the next 36 hours from IVIG administration if KD patients become afebrile nurses kept them under observation for the next 2 days and an echocardiogram was performed.	Timely treatment	coronary artery involvement
- During discharge of KD patients, nurses provided a plan to the parents on how to continue aspirin treatment. - During discharge of KD patient, nurses informed the parents to take their child for an appointment in two weeks' time in outpatient clinic. -The nurses advised the parents to take their child back to the hospital for urgent medical assessment if he becomes increasingly febrile or unwell in the next few weeks. - Nurses taught parents and relatives of KD patients on how to continue post-discharge care of their child.	Nursing Guidance	
When there is coronary artery involvement, doctors and nurses still carry out those interventions which they do when there is no coronary artery involvement, but in addition to those, they also implement the following underlisted interventions: - Pediatric cardiologist followed up on patients who developed cardiovascular complications. - Nurses helped develop a database of KD patients and extent of their aneurysm. - The anesthesiologist [or the nurse anaesthetist] and the surgeon assess the KD patient for surgery.	Follow up on KD patients with coronary artery aneurysm(s)	Management of KD patients with coronary artery involvement
- KD patients with persistent or regressed aneurysms should be followed at regular interval, treatment regimens tailored on basis of size of the aneurysm and flow characteristics. - Percutaneous catheter interventions may be necessary in patients with narrowing vessel lumen leading to ischemia. - Surgical approaches that use both venous and arterial grafts have been carried out on patients with narrowing vessel lumen leading to ischemia. - Cardiac transplantation performed for KD patients.	Interventions for KD patients with coronary artery aneurysm(s)	

Table 4: Findings of the data analysis

6   Findings

The seven articles which were selected were systematically reviewed and the findings were grouped into five sub-categories and two main categories. The main categories show that the kind of recommended procedures implemented by doctors and nurses in the management of Kawasaki are grouped into management of KD patients who have no coronary artery aneurysm; and management of KD patients who have coronary artery aneurysm(s).

Management of KD patients with no coronary artery aneurysm

Recommended procedures implemented by doctors and nurses in the management of Kawasaki disease

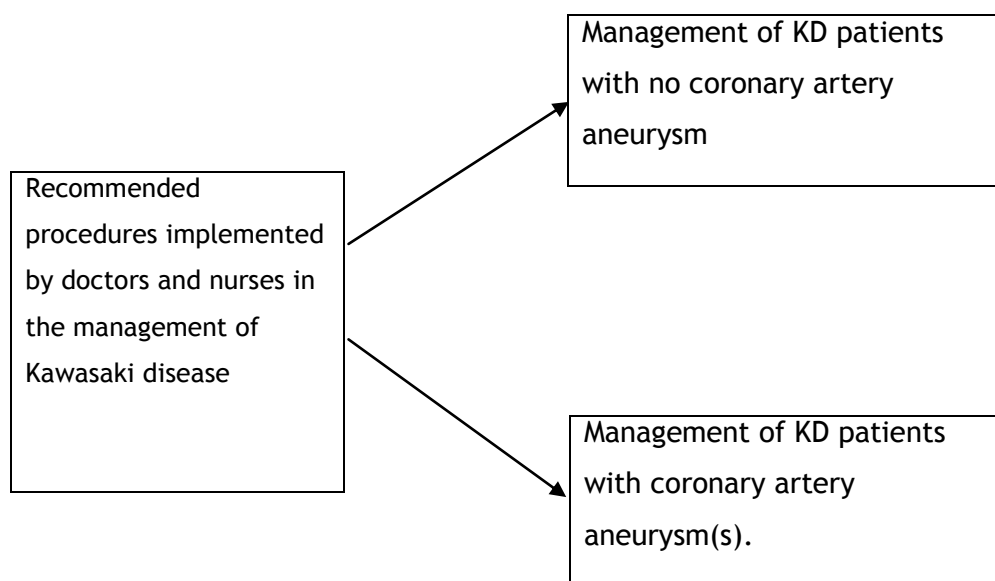Management of KD patients with coronary artery aneurysm(s).

Figure 2: The recommended procedures implemented by doctors and nurses in the management of Kawasaki Disease, with two main categories

6.1 Management of KD patients with no coronary artery aneurysm

6.1.1 Timely Diagnosis

Kawasaki disease can only be diagnosed based on clinical suspicion and findings from physical examination, though coronary artery abnormalities can be discovered through an echocardiogram, Kawasaki disease should be suspected when a child has high fever lasting for more than five days and has four out of five clinical criteria which include bilateral bulbar non-purulent conjunctivitis, dry chapped lips, strawberry red tongue, swollen hands, and feet, peeling of fingers and toes usually a late sign, skin rashes on the body (polymorphous, no vesicles or crusts), and swollen lymph nodes especially in the neck area (Paul, Paul & Mcallister 2016, 34-35).

Though the medical responsibility of diagnosing a disease falls on the doctor, but it is recommended for doctors and nurses to get acquainted with common differential diagnoses that can share features of KD, and have the immunization history of the KD patient reviewed as they need to exclude all other diseases that share the same symptoms with KD. Doctors and nurses are also advised to consider the possibility of atypical/incomplete KD in children with high temperature but who have a few of the clinical features of KD as that can be misleading (Paul, Heaton & Routley 2013, 256-257).

Doctors and nurses that work in the primary care and emergency department encounter febrile children on day-to-day basis, it is recommended that they consider the clinical criteria for Kawasaki disease especially when the child has high fever lasting for more than five days though febrility in children most of the time is caused by other common childhood illnesses (Paul, Heaton & Routley 2013, 258). It is advised that community practitioners become aware that time is of the essence in the management of Kawasaki disease and if they encounter any suspicion of Kawasaki disease, they should make an early referral for specialist management (Paul et al. 2016, 34).

6.1.2 Timely Treatment

The aim of the KD treatment therapy is to as quickly as possible reduce the systemic and tissue-level inflammation, to achieve this, KD patients should be treated as soon as the diagnosis is established (Newburger, Takahashi & Burns 2016, 1742). When Kawasaki disease is treated on time, it reduces coronary artery damage by up to 75% (Golshevsky, Cheung & Burgner 2013, 473). The American Heart Association guidelines (1993) in To, Krazit & Kaye (2013, 211) writes that diagnosis for KD can be made as early as in day 4 of fever, and treatment started immediately.

The mainstay for treating Kawasaki disease is the administration of intravenous immunoglobulin (IVIG) as this has reduced the risk of developing cardiac complications from 20-40% to about 5% when it is administered within 10 days of onset of illness, however, if the IVIG administered becomes refractory, a further dose of IVIG with immune-modulating therapy is necessary (Paul et al. 2013, 257). In addition, Kim SH, Kim KH & Kim DS (2009) in Paul, Heaton & Routley (2013, 257) state that it is necessary that every child treated for Kawasaki disease receives oral aspirin under supervision, as it has antiplatelet effects.

The children diagnosed with KD are firstly managed as inpatients in the paediatric ward, the paediatric nurses especially during and after the IVIG administration monitored the clinical observations of the patients such as four hourly pulse rate, respiratory rate, blood pressure and temperature checks, and completed the Paediatric Early Warning Scoring System which provided a forewarning time of 11 hours or less and alerted the clinical team of the possibility of early intervention (Paul et al. 2013, 255-258).

The nurse makes sure that the child diagnosed with KD and who is treatment in the pediatric ward is as comfortable as possible, the nurse controls his or her temperature and

promotes adequate fluid intake, if the child gradually becomes afebrile over the next 36 hours from the time the IVIG was administered, the nurse observes him/her for the next 2 days, and an echocardiogram is performed to ascertain the condition of the coronary artery (Paul et al. 2013,255- 258).

6.1.3   Nursing Guidance

When a child treated of KD is being discharged from the hospital, the nurse clearly explaines a follow up plan to the parents or relatives of the child being discharged, emphasizing on the need to monitor the child's temperature at home, this is because fever can persist or recur in up to 30% of children with KD, and the recurrence may happen several days after hospital discharge (Paul et al. 2013, 257- 258).

Parents or relatives of KD patient upon the discharge of their child, the nurse tells them to take their child back to the hospital for urgent medical assessment if he/she becomes increasingly febrile or unwell in the next few weeks, this is because if KD recurrences are not treated, they may led to coronary artery aneurysm, myocarditis, toxic shock, and sudden death, the nurse provides a plan to the parents on how to continue aspirin treatment and informs the parents to take their child for an appointment in two weeks' time in outpatient clinic.(Paul et al. 2013,255-258).

6.2   Management of KD patients with coronary artery aneurysm(s)

When there is coronary artery involvement, the doctors and nurses still carry out those procedures which they do when there is no coronary artery involvement, but in addition to those, they also implement the procedures grouped under: follow up on KD patients with coronary artery aneurysm(s); and interventions for KD patients with coronary artery aneurysm(s).

6.2.1   Follow up on KD patients with coronary artery aneurysm(s)

Pediatric cardiologist follows up on patients who developed cardiovascular complications to determine the extent of their aneurysm(s) and to work out the best intervention for them, in some cases the progression of KD becomes rapid and surgical intervention is the best therapy, this necessitates a coronary artery bypass grafts for obstructive lesions, because KD patients undergoing anaesthesia have higher potential for morbidity and mortality, the surgeon and the anaesthesiologist [or the nurse anaesthetist] accurately evaluate the degree of the KD pathogenesis with regard to cardiac involvement, and they

come up with the appropriate intraoperative and postoperative monitoring and an anaesthetic plan that leads to the best outcome (To et al. 2013, 211-212).

In the U.S, there are no data about the number of young adults who experienced KD in childhood (Gordon, Kahn, & Burns 2009, 1911). Gersony (2009, 1921), notes that children who survive Kawasaki disease can continue to have cardiovascular complications even as adults, and as such it is necessary immediately after the disease to determine the initial coronary involvement which is graded in descending order of significance as giant aneurysms (>8mm), large aneurysms (6 to 8 mm), smaller aneurysms (persistent or regressed), transient coronary dilation, and those without any noticeable coronary involvement, giant aneurysms and large aneurysms are linked with a high risk for late complications including thrombosis, stenosis, and calcification, these may lead to myocardial infarction and compelling late mortality.

6.2.2 Interventions for KD patients with coronary artery aneurysm(s)

For the KD patient whose best therapy is a surgery, the anesthesiologist [or the nurse anaesthetist] perioperatively monitors his or her body temperature, heart rate, end-tidal oxygen, pulse oximetry, and blood pressure, ST segment analysis, leads II and V5, and invasive blood pressure (To et al. 2013, 212). The KD patients undergoing anaesthesia are more likely to die and as such the surgeon and the anesthesiologist [or the nurse anaesthetist] accurately examine the degree of the KD pathogenesis with regards to cardiac involvement and come up with a suitable intraoperative and postoperative monitoring and anaesthetic plan that lead to the best outcome (To et al. 2013, 211-212).

If KD patients have persistent or regressed aneurysms they are followed up at regular intervals, treatment regimens are tailored on basis of size of the aneurysm and flow characteristics, in patients with giant aneurysms in which blood flow is sluggish and risk for thrombosis is high, systemic anticoagulation with warfarin prove helpful, surgical approaches that use both venous and arterial grafts, and percutaneous catheter interventions are carried out on patients with narrowing vessel lumen leading to ischemia, KD patients with end-stage cardiomyopathy, severe ventricular arrhythmias, and inoperable multivessel stenotic coronary artery disease have Cardiac transplantation performed on them (Gordon, Kahn & Burns 2009, 1918).

7 Discussion

7.1 Discussion of findings

This literature review addressed the recommended procedures for doctors and nurses in the management of Kawasaki Disease. The outcome of the analysis of the seven articles helped understand that Kawasaki disease is a manageable disease, and as such, children diagnosed with it can be assisted and cured through the application of two main broad interventions: management of KD patients with no coronary artery aneurysm; and management of KD patients with coronary artery aneurysm(s).

The analysis of the seven articles indicated that Kawasaki disease can only be diagnosed based on clinical suspicion. Nurses suspect the presence of the disease when a child is reported to have had fever for more than five days. The child may also have four of the common features of Kawasaki disease which include: swollen neck area lymph nodes; skin rashes all over the body; peeling of skin in a child's toes or fingers; swollen feet and hands; strawberry red tongue; dry chapped lips; and bilateral non-purulent conjunctivitis (Paul, Paul & Mcallister 2016, 35).

Doctors and nurse working in emergency and primary care departments encounter febrile children daily and therefore it is suggested that they consider clinical criteria for Kawasaki disease particularly when a child has had a fever for more than five days. This should be done carefully as febrility in young kids may occur due to other common children sicknesses (Paul, Heaton & Routley 2013, 258). Nurses in such departments also play a critical role in raising awareness of Kawasaki disease in a child who has had fever for more than five days and visible signs suggestive of the disease. This is done to alter the progress of Kawasaki disease as it can result in severe cardiac abnormalities when left untreated (Paul et al. 2013, 258).

Nurses play an important role in the administration of timely medication. A timely administration of medication to children diagnosed with KD assists in altering or slowing down the progress of Kawasaki disease. Nursing professionals are specifically required to not only raise the awareness of the disease but also help in administering medication prescribed by the physician to children with Kawasaki disease (Newburger, Takahashi & Burns 2016, 1742). Golshevsky et al. (2013, 473) note that a timely treatment of KD reduces the likelihood of coronary artery damage in children to nearly seventy-five percent. A timely diagnosis of KD is possible within the first four days of fever according to the American Heart Association guidelines (To, Krazit & Kaye (2013, 211).

In treating Kawasaki disease, nurses administer intravenous immunoglobulin (IVIG) which are prescribed by the physician and which has been shown to lower the chances of KD-children developing cardiac complications from as high as 40% to 5%. This is however effective when the medication is administered as early as within ten days from the onset of the disease. When IVIG administered becomes refractory, nurses administer a further dose of IVIG along with immune-modulating therapy based on the directives of the physician (Paul et al. 2013, 257). Nurses also administer oral aspirin to children with KD, but they do so under the direction and close supervision of the physician (Paul, Heaton & Routley 2013, 257). This is because aspirin has antiplatelet effects.

Nursing professionals also monitor patients who undergo treatment, especially those receiving IVIG. Those who are diagnosed with KD are first managed as inpatients in the pediatric ward. In such wards, nurses are charged with the task of clinically observing patients. They monitor patients' temperature, blood pressure, respiratory rate, pulse rate, as well as completing the Paediatric Early Warning Scoring System which provides a forewarning time of 11 hours or less and alerts the clinical team of the need for early intervention (Paul et al. 2013, 255-258). Above all, a nurse makes sure that children undergoing treatment in the pediatric ward are as comfortable as possible by ensuring that they have the right temperature and that they take fluids as required (Paul et al. 2013, 258).

In some instances the progression of KD may be rapid and as such surgical intervention may be the best option for KD patient. A surgical intervention will involve a coronary artery bypass grafts for obstructive lesions. Because the KD patients undergoing anaesthesia are more likely to die, the surgeon and the anesthesiologist [or the nurse anaesthetist] come up with a suitable intraoperative and postoperative monitoring and anaesthetic plan that lead to the best outcome for the KD patient, this is done by accurately examining the degree of the KD pathogenesis with regards to cardiac involvement (To et al. 2013, 211-212), and the anaesthesiologist [or the nurse anaesthetist] preoperatively monitors their body temperature, heart rate, end-tidal oxygen, pulse oximetry, and blood pressure, ST segment analysis, leads II and V5, and invasive blood pressure (To et al. 2013, 212). This is done to secure the life of the patients and increase the likelihood of them recovering from the condition. Nurses also help those who have undergone surgery to recuperate in a comfortable and relaxed environment.

Parents and relatives of children diagnosed with KD suffer depression and anxiety occasioned by fear of losing their loved ones especially when the child undergoes surgery occasioned by KD. Siblings of the KD patients could also get uncomfortable when interacting with the sick child out of fear of contracting the disease. In such cases, nursing professionals play an encouraging role of reassuring family members or relatives of KD patient that KD is not contagious and that most children recover fully with no long-term cardiac or other severe diseases (Golshevsky, Cheung & Burgner 2013, 476). Nurses responsible for the KD patients should reach out to the patients' relatives and inform them of the expected changes after their patient is discharged from the hospital. Some of the changes expected from KD patients, which family members should be made aware of, include arthritis which only lasts few days, reduction in appetite, and skin abnormalities e.g. peeling of the palms and soles (Paul et al. 2013, 258).

When a KD patient is being discharged from the hospital, nurses provide a follow-up plan which to be carried out by the KD patients' family members, and as such the nurse elaborate to them need for and how to properly implement the plan. This is done because in some instances fever may persist or recur in nearly thirty percent of KD patients (Paul et al. 2013, 257- 258). Parents or relatives of KD patients are made aware of the signs of KD so that they can detect recurrences and seek treatment as early as possible. The nurses also teach the parents of the KD child how to monitor the temperature of their child at home after being discharged from hospital, and when the temperature begins to rise, they should report back to the hospital. This is done to keep KD in check and prevent it from advancing and resulting in coronary artery aneurysm, myocarditis, toxic shock, and sudden death (Paul et al. 2013, 257).

Nurses also play an important role in gathering information regarding Kawasaki disease. The information gathered is useful because most countries including the US do not have sufficient data on young adults who have had KD in their childhood, and as Gersony (2009, 1921) notes, children who survive Kawasaki disease may continue experiencing cardiovascular complications into their adulthood. It is therefore necessary that nurses gather information in order to determine the initial coronary involvement which they have to grade in descending order of significance as giant aneurysms (>8mm), large aneurysms (6 to 8 mm), smaller aneurysms (persistent or regressed), transient coronary dilation, and those without any noticeable coronary involvement, giant aneurysms and large aneurysms are linked with a high risk for late complications including thrombosis, stenosis, and calcification, these may lead to myocardial infarction and compelling late mortality. The

gathered information should also help nursing professionals in guiding parents of the KD child on how they should take care of their loved love even into adulthood. It is therefore noted that KD is a very critical condition that needs an all-inclusive approach when it comes to its management.

7.2   Ethical Considerations

For the current thesis to be ethical, the writers maintained the standards and instructions of literature research as identified by Laurea University of Applied Sciences. They discussed the research topic with the supervisor who helped to refine the topic and provide guidance on how to write the thesis. The research was guided by an understanding that plagiarism has far-reaching implications, in this respect, the researchers tried to avoid quoting other writers' work directly without referencing them in a proper way. The information gotten from secondary sources were mostly paraphrased and cited properly as required by Laurea University Referencing style.

 All emerging categories and sub-categories in the seven articles were not falsified but were presented in an honest way. Evidence-based concepts and ideas were not influenced by the writers' opinions and emotions but were presented objectively. Suitable approaches to gathering and analyzing data were observed to increase the credibility of the thesis.

7.3   Trustworthiness

In Polit & Cheryl (2010, 492-493), Lincoln and Guba (1985) Suggest that the trustworthiness of a qualitative research study is important in evaluating its worth, trustworthiness is developed when credibility, dependability, confirmability and transferability are taken into consideration, credibility is having confidence in the truth of the findings, dependability is data being stable over time and conditions, confirmability refers to the degree of impartiality which is a state of coming to agreement between two or more autonomous people about the data's relevance, meaning or accuracy, and transferability is when findings have applicability in other settings.

To ensure that the thesis findings are credible, the writers used only the most current articles from the years 2008-2017. The writers not only relied on scholarly sources but also ensured that the data contained in the reviewed articles are evidence-based before relying on it in answering the research question. The writers only used high and good quality articles to make the findings of the study more reliable. This thesis can be trusted because

the literature review followed a stringent process from planning to execution and the seven articles used for this study were appraised using Johns Hopkins Research Evidence Appraisal Tool which is highly rated. In a bid to achieve trustworthiness, the writers included pages in their referencing as this makes it faster for the referenced information to located in the work of the original writer. All these go to prove the reproducibility and and trustworthiness of this thesis.

The writers of this thesis avoided bias throughout the study because it influences the quality and dependability of thesis. The writers avoided bias during literature search and data analysis to increase the accuracy of the research findings. Each study article was independently reviewed while at the same time avoiding slanting of data towards a certain direction (Wager & Wiffen 2011). All the study findings were carefully reported with a view to avoiding errors through negligence. Finally, the study report was carefully and critically assessing for inaccuracies (Resnik 2015, 1).

Although the purpose of this thesis is achieved, there were some limitations which included that thesis only concentrated on the recommended procedures for doctors and nurses in the management of Kawasaki disease, other areas of concern were not properly dealt with such as the anatomy and pathophysiology of KD. Furthermore, the writers aimed to complete the thesis in a short period of time and as such time was a major constraint in the completion of the thesis.

Another limitation was the exclusion of journal articles published in languages other than English, this drawback negatively impacted on the thesis findings as some of the articles in the field of nursing are not in English languages, and as such, they were not used in this thesis.

8   Recommendations for future study

Although KD remains one of the leading cause of acquired heart disease, the disease can only manifest clinically or physically, the writers of this thesis then recommend that nurses should be thoroughly educated to quickly and accurately recognize its signs and symptoms for timely management.

Nurses should continously engage in self-education and attend seminars to stay updated with the latest developments in pediatric disease conditions so that they understand better the signs and symptoms of KD, and other diseases which imitate KD .

Referencing

Aveyard, H. 2014. Doing a Literature Review in Health and Social Care: a practical guide. 3rd edition. England: McGraw-Hill House.

Berman, A., Snyder, S., Kozier, B. & Erb, G. 2007. Fundamentals of Nursing: Concepts, Process, and Practice. 8th edition. USA: Pearson Prentice Hall.

Burns, N. and Grove, K. 2010. Understanding Nursing Research-eBook: Building an Evidence-Based Practice. Elsevier Health Sciences.

Coughlan, M. & Cronin, P. 2017. Doing a Literature Review in Nursing, Health and Social Care. 2nd edition. London: Sage Publications Ltd.

Dearholt, S. & Dang, D. 2012. Johns Hopkins Nursing Evidence-Based Practice: Models and Guidelines. 2nd edition. Indianapolis: Sigma Theta Tau International

Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. Journal of Advanced Nursing 62 (1) 107-115.

Gerding, R. 2011. Kawasaki Disease: A Review. Journal of Pediatric Health Care 25 (6) 379-387

Gersony, W. 2009. The Adult After Kawasaki Disease. Journal of the American College of Cardiology, 54 (21) 1921-1923

Golshevsky, D., Cheung, M. & Burgner, D. 2013. Kawasaki disease: The importance of prompt recognition and early referral. Australian Family Physician 42 (6) 473-376

Gordon, J., Kahn, A. & Burns, J. 2009. When children with Kawasaki disease grow up: Myocardial and vascular complications in adulthood. Journal of the American College of Cardiology, 54 (21) 1911-1920

Jesson, J., Matheson, L. & Lacey, F. 2012. Doing Your Literature Review Traditional and Systematic Techniques. London: Sage Publications Ltd.

Kato, H. 2004. Cardiovascular complications in Kawasaki disease: coronary artery lumen and long-term consequences. Progress in Pediatric Cardiology, 19:137-145

Khan, K., Kunz, R., Kleijnen, J., & Antes, G. 2011. Systematic reviews To Support Evidence-Based Medicine. 2nd edition. London: Hodder Arnold.

Luca, N. & Yeung, R. 2012. Epidemiology and Management of Kawasaki Disease. Drugs, 72 (8) 1029-1038.

Miller, M. & Miller, A. 2013. Incomplete Kawasaki disease. American Journal of Emergency Medicine 31:894.

Moher, D., Liberati, A., Tetzlaff, J., Altman, DG. & The PRISMA Group. 2009. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. Accessed 10 December 2017. http://prisma-statement.org/documents/PRISMA%202009%20flow%20diagram.pdf

Munn, Z., Tufanaru, C. & Aromataris, E. 2014. Data Extraction and Synthesis: the steps following study selection in a systematic review. The American Journal of Nursing, 114 (7) 49-53.

Newburger, J., Takahashi, M. & Burns, J. 2016. Kawasaki Disease. Journal of the American College of Cardiology, 67 (14) 1738-1749

O'Connor, M. & Saulsbury, F. 2007. Incomplete and Atypical Kawasaki Disease in Young Infant: Severe, Recalcitrant Disease Responsive to Infliximab. Clinical Pediatrics 46 (4) 345-348

Paul, S., Heaton, P., & Routley, C. 2013. A child with high fever: Kawasaki disease. British Journal of Nursing 22 (5) 255-258

Paul, S., Paul, P. & Mcallister, T. 2016. Clinical update: Common cardiovascular conditions in children. Community Practitioner 89(7), 33-35,37

Polit, D., Cheryl, B. 2010. Essentials of nursing research: appraising evidence for nursing practice. 7th edition. China:

Resnik, D.B. 2015. What is Ethics in Research and Why is it Important? Available at http://www.niehs.nih.gov/research/resources/bioethics/whatis/ accessed on February 6, 2018

Salo, E., Griffiths, E., Farstad, T., Schiller, B., Nakamura, Y., Yashiro, M., Uehara, R., Best, B. & Burns, J. 2012. The incidence of Kawasaki disease in Northern European Countries. Paediatrics International, 54(6) 770–772

Schmidt, F.L. & Hunter, J.E., 2014. Methods of meta-analysis: Correcting error and bias in research findings. Sage publications.

Singh, S., Vignesh, P. & Burgner, D. 2015. The epidemiology of Kawasaki disease: a global update. Arch Dis Child, 100: 1084-1088).

Teing, L. 2007. Systematic Review Made Simple for Nurses. SGH Proceedings, 16 (2) 105. Accessed 12 December 2017.
http://www.utc.edu/nursing/pdfs/classes/4410/systematic-review-made-simple.pdf

To, L., Krazit, S. & Kaye, A. 2013. Perioperative Considerations of Kawasaki Disease. The Ochsner Journal, 13 (2) 208- 213

Turner, M., Kitchenham, B., Brereton, P., Charters, S. and Budgen, D., 2010. Does the technology acceptance model predict actual use? A systematic literature review. Information and Software Technology, 52(5), 463-479.

Uehara, R. & Belay, E. 2012. Epidemiology of Kawasaki disease in Asia, Europe, and the United States. Journal of Epidemiology, 22 (2) 79-85.

Wager, E. & Wiffen, J. 2011. Ethical Issues in Preparing and Publishing Systematic Reviews. Journal of Evidence Based Medicine, 4 (2), 130-134.

Wood, L. & Tulloh, R. 2009. Kawasaki disease in children. Bristol Congenital Heart Centre,95:787-792.

Tables

Figures

Appendices

Appendix 1

Data Extraction form.				
Authors, Year	Tittle	Level of evidence, John Hopkins	Aim	Conclusions
Paul, S., Heaton, P., & Routley, C. (2013)	A Child with high fever: Kawasaki disease	Non-experimental study (Level III, Quality B)	To describe a child with Kawasaki disease and the significance of early recognition.	Primary health professionals play a major role in detecting cases early, diagnosing and timely administration of IV Immunoglobulin. This is because there is a risk of up to 40% severe cardiac abnormalities if left untreated
Golshevsky, D., Cheung, M. & Burgner, D. (2013)	Kawasaki disease: The importance of prompt recognition and early referral	Non-experimental study (Level III, Quality B)	To provide evidence based review that will guide timely recognition and management of Kawasaki disease	Suspicion and early treatment of Kawasaki disease significantly reduce the chance of a long term cardiac artery damage
Gersony, W. (2009)	The Adult After Kawasaki Disease	Non-experimental study (Level III, Quality B)	To explain the circumstances under which a transient childhood illness pose a long term cardiac risk factor and the importance of special follow up measures to patients with a history of KD	It is probable for patients with known aneurysms during the acute phase of Kawasaki disease to develop cardiovascular morbidity as young adults

Appendix 1

To, L., Krazit, S. & Kaye, A. (2013)	Perioperative Considerations of Kawasaki Disease	Non-experimental study (Level III, Quality B)	To discuss the diagnosis, clinical features and the treatment of Kawasaki disease. It focuses on developing strategies for the successful surgical management of patients with a history of Kawasaki disease, thus focusing on the preoperative assessment and the operative period.	Even though the etiology of Kawasaki disease is unclear, this rare condition needs particular physical examination and laboratory findings. On many cases, diagnosed or undiagnosed patients require surgical procedures. The surgeon and the anesthesiologist must determine the level of pathogenesis, specifically with cardiac involvement, this is to ensure proper operative and postoperative monitoring.
Paul, S., Paul, P. & Mcallister, T. (2016)	Clinical update: Common cardiovascular conditions in children.	Non-experimental study (Level III, Quality B)	To describe the common cardiovascular conditions in children.	-Children with suspected cardiovascular conditions should be identified and referred early. -Children with heart conditions or who suddenly died of cardiac arrest, their siblings must be referred to hospital for firther examinations also. -Pre and post-cardiac surgery appointments should be ensured attended that children attend -Growth and development of children be monitored -Parents be guided towards available financial support -Immunization should be arranged after discharge from the ward.

Appendix 1

Newburger, J., Takahashi, M. & Burns, J. (2016)	Kawasaki Disease	Non-experimental study (Level III, Quality B)	To define Kawasaki disease and explain the treatment and management of the disease.	The etiology of Kawasaki disease still remains hard to define, and what triggers the disease is less likely to be a traditional pathogen.
Gordon, J., Kahn, A. & Burns, J. (2009)	When children with Kawasaki disease grow up: myocardial and vascular complication in adulthood	Experimental study Level I, Quality A	To review current literature that maybe useful to health care professionals who give care to adults with a history of Kawasaki disease.	Acute Kawasaki disease causes inflammatory insult which has a potential of affecting components of cardiovascular system. A systematic study of adults who have had Kawasaki disease during childhood is required to define the natural history of the disease