Hartfalen zorgprogramma's in de eerste lijn: een literatuuroverzicht

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ABSTRACT (ENGLISH)

CONTEXT

Heart failure is an increasing and complex problem for which the European Society of Cardiology (ESC) recommends disease management programs (DMP). Belgium does not have a national management program for heart failure, but has local initiatives. This research aims to evaluate the effect of a DMP with a first-line component on quality of life, amount of hospitalisations and mortality of heart failure patients. The DMP's in this research has to provide patient education and a role for a general practitioner (GP).

METHOD

Searching the literature in MEDLINE, EMBASE and CENTRAL resulted in 81 RCT's with a first-line component. We selected 13 articles in which a GP was involved.

RESULTS

We compared 13 articles, studying 2581 patients. Ten studies looked into the effect on quality of life." Six studies showed an insignificant effect. In four studies the intervention group showed a significant difference in

quality of life. Two studies revealed significant decrease in all-cause mortality. Hospitalization was investigated as an endpoint in six studies. Four studies showed less admissions: two studies for all-cause admissions, one study for heart failure admissions and one study for multiple hospitalisations only. One study failed to show a significant effect. Results from one study indicated that there were more hospitalisations in the intervention group.

CONCLUSION

We investigated the effect of a DMP with GP involvement. The studies found were heterogenous. GP have little or no role in DMP for patients with heart failure. The improvement in quality of life increases in the intervention group, but not significantly. The effect on mortality is cautiously positive. DMPs with a first-line component usually reduce the number of hospital admissions. The cautiously positive results of this study are an argument for a further expansion of the role of the general practitioner in heart failure care programs.

ABSTRACT (NEDERLANDS)

CONTEXT

Hartfalen is een toenemend en complex probleem waarvoor de European Society of Cardiology (ESC) multidisciplinaire zorgprogramma's of disease management programs (DMP) aanbeveelt. In België is er nog geen nationaal zorgprogramma voor hartfalen. Er zijn echter wel lokale initiatieven, zoals een extramuraal zorgpad hartfalen in Zuid- en Midden-West-Vlaanderen. Dit onderzoek heeft als doel het effect van een DMP met eerstelijnscomponent op levenskwaliteit, aantal hospitalisaties en mortaliteit van patiënten met hartfalen te evalueren. Het zorgprogramma moet minimaal patiënteneducatie voorzien en een rol moet weggelegd zijn voor de huisarts (GP).

METHODE

Een literatuurzoektocht in MEDLINE, EMBASE en CENTRAL resulteerde in 81 RCT's met een eerstelijnscomponent. We selecteerden 13 artikelen waarin een GP betrokken was.

RESULTATEN

We vergeleken 13 studies met in totaal 2581 patiënten. Het effect op levenskwaliteit werd in tien studies onderzocht. In zes studies was het effect niet-significant. Bij vier studies was er een significant verschil in levenskwaliteit in de interventiegroep. Twee studies toonden een significante daling van all-cause mortaliteit. Hospitalisatie werd in zes studies als eindpunt onderzocht. Daarbij toonden vier studies een daling in opnames: twee studies voor all-cause opnames, één studie enkel voor hartfalenhospitalisaties en één studie enkel voor multipele opnames. Eén studie kon geen significant effect aantonen. Eén studie toonde meer hospitalisatie bij de interventiegroep.

CONCLUSIE

We onderzochten het effect van een DMP waarin huisartsen werden betrokken. De gevonden studies waren heterogeen. Huisartsen krijgen vaak geen of een kleine rol in DMP's voor hartfalenpatiënten. De verbetering van de levenskwaliteit is meestal groter in de interventiegroep, maar niet-significant. Het effect op mortaliteit is voorzichtig positief. DMP's met een eerstelijnscomponent doen het aantal ziekenhuisopnames meestal dalen. De voorzichtig positieve resultaten van deze studie zijn een argument voor een verdere uitbouw van de rol van de huisarts in zorgprogramma's hartfalen.

INLEIDING

Hartfalen is een toenemend probleem, onder meer door de vergrijzing en de betere overleving na een acuut myocard infarct (1). De prevalentie van hartfalen bij 70-plussers loopt op tot 10% (2). De oudere leeftijd van de patiënten zorgt voor stijgende comorbiditeit wat de aanpak van hartfalen complex maakt (2). Er is vaak slechte sociale omkadering en cognitieve achteruitgang (3). Daarnaast gaat hartfalen, ook in stabiele ambulante patiënten, gepaard met een hoge mortaliteit (7% eenjaarsmortaliteit) en een hoog risico op (re)hospitalisatie (32% eenjaarsrisico) (2). Vooral dit laatste is een grote kost voor de gezondheidszorg. Naar schatting 1-2% van het budget van gezondheidszorg wordt uitgegeven aan hartfalen. Van deze kosten gaat twee derde naar ziekenhuisopnames (4).

De huidige richtlijnen van de European Society of Cardiology (ESC) bevelen multidisciplinaire zorgprogramma's voor hartfalen aan met de hoogste graad van bewijskracht (graad IA) (2). Dergelijke geïntegreerde zorgprogramma's toonden immers een significant positief effect op verschillende eindpunten: hartfunctie, hospitaalopnames, sterfte, gezondheidszorgcontacten en mentale levenskwaliteit (1, 5). Geïntegreerde zorgpaden hebben ook economisch hun nut al bewezen (6). Bovendien blijken in vergelijking met interventies in het ziekenhuis, thuisinterventies meer kosteneffectief bij oudere patiënten met hartfalen (7). Interventies die zich exclusief richten op patiënten in de eerste lijn tonen echter wisselende resultaten (1, 8). Mogelijk omdat hartfalen patiënten in de eerste lijn een lager risico hebben op (re)hospitalisatie en sterfte in vergelijking met patiënten die in het ziekenhuis belanden (1, 8).

In België is er momenteel geen nationaal zorgprogramma voor hartfalen. Er zijn echter wel lokale initiatieven zoals een extramuraal zorgpad hartfalen in Zuid- en Midden-West-Vlaanderen. Dit werd ontwikkeld door de diensten cardiologie van de regionale ziekenhuizen in Zuid- en Midden-West-Vlaanderen in overleg met de lokale huisartsenkringen. Het is een multidisciplinair zorgpad uitgewerkt voor cardiologen, huisartsen, hartfalenverpleegkundigen en thuiszorg (o.a. verpleegkundige aan huis). Patiënteneducatie en zelfmonitoring van de patiënten wordt nagestreefd met behulp van een patiëntenbrochure. Het wordt toegepast sinds maart 2018 (9).

- P: Patiënten met hartfalen
- I: Multidisciplinaire zorgprogramma's voor hartfalen, met een specifieke eerstelijnsoriëntatie
    - Inclusiecriteria
        - Zorgprogramma's met hartfalen als hoofdonderwerp die als deel van het zorgprogramma ten minste één contact vastleggen met een huisarts, huisapotheker of thuisverpleegkundige
    - Exclusiecriteria.
        - Zorgprogramma's zonder eerstelijnssetting
        - Zorgprogramma's zonder patiënteneducatie
        - Zorgprogramma's waar hartfalen niet het onderwerp is van de interventie, maar enkel een comorbiditeit
- C: Patiënten niet geïncludeerd in zorgprogramma's hartfalen
- O: Levenskwaliteit, mortaliteit en hospitalisaties.

Figuur 1: PICO

Dit literatuuroverzicht heeft als doel na te gaan of een multidisciplinair zorgprogramma met een eerstelijnscomponent en samenwerking met de huisarts een effect heeft op levenskwaliteit, aantal hospitalisaties en mortaliteit van patiënten met hartfalen (zie figuur 1).

METHODE

DESIGN

We voerden een literatuurnazicht uit van studies die een multidisciplinair zorgprogramma voor hartfalen implementeren in de eerste lijn en daarbij de huisarts betrekken.

BRONNEN

MEDLINE, EMBASE en CENTRAL werden doorzocht met de tijdslimiet 01/01/2001 tot 31/12/2018. Er werd gezocht vanaf 2001 omdat vanaf dan enkele belangrijke veranderingen in de diagnose en behandeling van hartfalen werden geïntroduceerd.

ZOEKMETHODE

We zochten op de termen “hartfalen” EN “zorgprogramma” OF “educatie” OF “verpleegkundige” EN “huisarts” zowel in MeSH terms, Emtree als in vrije tekst. De volledige zoekstrategie staat in Appendix 1.

SELECTIECRITERIA

De selectiecriteria zijn terug te vinden in Appendix 2. Inclusie- en exclusiecriteria werden vooraf vastgelegd. Er werden gerandomiseerde klinische studies (RCT’s) geïncludeerd, met als hoofdonderwerp een zorgprogramma hartfalen. De populatie bestond uit patiënten waarbij hartfalen het doelwit van de interventie was. De setting van de interventie moest ten minste gedeeltelijk in de eerste lijn zijn: er moest als deel van de interventie minstens één contact zijn met een zorgverlener uit de eerste lijn (huisarts, thuisverpleegkundige of huisapotheek). Hartfaleneducatie moest deel uitmaken van de interventie. We legden dit laatste criterium vast omwille van het belang van patiënteneducatie in het zorgpad hartfalen Zuid- en Midden-West-Vlaanderen waarbinnen deze thesis kadert. Tenslotte selecteerden we enkel Engelstalige artikels.

STUDIE SELECTIE

De eerste 50 artikels werden beoordeeld door de eerste lector (E.D.) en de tweede lector (W.R.) en verdeeld in drie categorieën: exclusie, inclusie en twijfel. Na bereiken van overeenstemming verdeelde E.D. de overige artikels. Bij twijfel werd overlegd met W.R. Bij onenigheid werd overlegd met een derde lector (M.S.). De geëxcludeerde artikels werden met de reden van exclusie vastgelegd in een logboek.

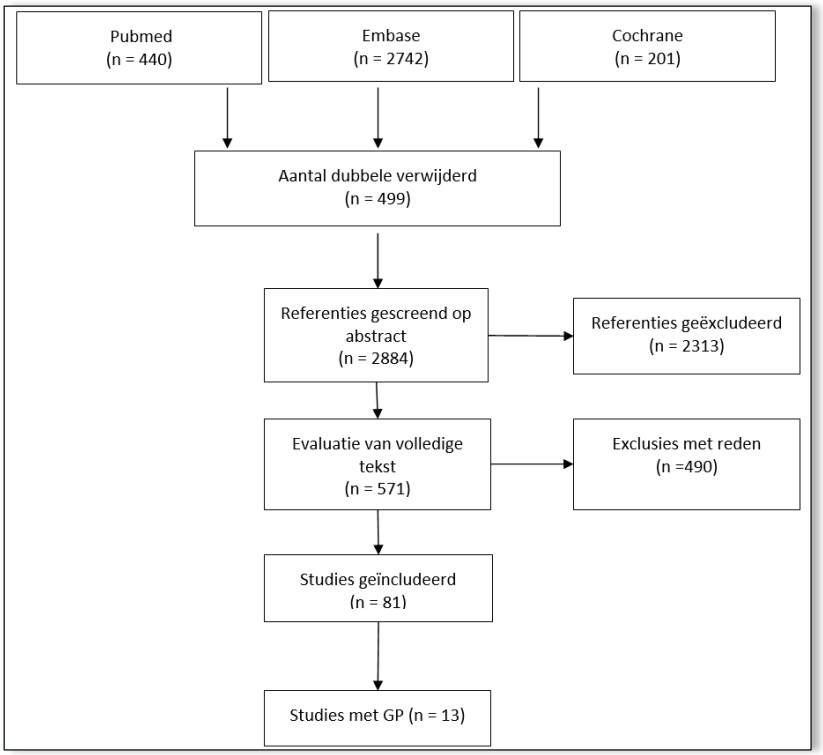
De zoekstrategie werd bewust breed opgesteld. Omdat deze thesis in het kader van een opleiding huisartsgeneeskunde werd gemaakt, werden enkel studies waarin de huisarts (GP) een actieve rol had verder besproken.

DATA-ITEMS EN DATA-ANALYSE

Per artikel werden auteur, jaar van publicatie, land, interventie van de studie met in het bijzonder de rol van de huisarts, het aantal patiënten en de belangrijkste resultaten vergeleken. Daarbij focusten we op de vooraf opgestelde eindpunten: levenskwaliteit, mortaliteit en hospitalisaties. De bijzondere kenmerken van de patiënten, hun New York Heart Association (NYHA)-klasse en linker ventrikel ejectiefractie (LVEF) werden ook samengevat. Al deze data werden tenslotte samengevat in tabel 2 en tabel 3 en met elkaar vergeleken.

RESULTATEN

De zoekstrategie en resultaten staan in figuur 2. De zoekstrategie gaf 3381 resultaten: 440 in Pubmed, in Embase 2742 en in Cochrane 201. Alle referenties werden ingevoerd in EndnoteWeb. Met behulp van EndnoteWeb en door de eerste onderzoeker (E.D) werden 499 dubbele artikels uitgefilterd. De selectieflowchart die we gebruikten, is te vinden in Appendix 2. Er werden 2884 artikels gescreend op titel en abstract. Na deze eerste screening selecteerden we 571 artikels die op volledige tekst werden bekeken. Tijdens deze stap werden 490 artikels uitgesloten. Een lijst van deze artikels kan gevonden worden in Appendix 3 (webappendix).



Figuur 2: Prisma flowdiagram van studieselectie

Uiteindelijk werden 81 artikels geselecteerd, terug te vinden in Appendix 4. In 13 studies speelde de GP een rol. In 68 studies kwam de GP niet aan bod, maar wel andere eerstelijnszorgverleners, bij meer dan de helft van deze artikels werd de interventie enkel door verpleegsters (eerstelijnsverpleegkundige of gespecialiseerde hartfalenverpleegkundige) uitgevoerd. Uiteindelijk selecteerden we enkel de studies waarbij een GP een rol speelde.

Een samenvatting van de resultaten is weergegeven in tabel 2 en tabel 3.

PATIËNTEN

De geselecteerde studies includeerden in totaal 2581 patiënten. Een overzicht van de patiëntenkenmerken is weergegeven in tabel 3.

In zes studies werden de patiënten gerekruteerd in de eerste lijn, bij zeven studies gebeurde dit in een ziekenhuispopulatie (zie tabel 2). De onderzochte patiëntenpopulaties waren ongeveer even oud (65-77jaar) (tabel 3). Als we de NYHA-klasses vergelijken waarin de patiënten zich bevinden, valt op dat bij enkele studies helemaal geen patiënten met NYHA IV werden geïncludeerd (1, 10-13). Doughty et al. includeerden enkel patiënten met NYHA III of hoger (14). Bij de studies van Del Sindaco et al., waren geen patiënten met NYHA-klasse I (15, 16). De LVEF van de patiënten wordt niet in elke studie vermeld. Meestal was de LVEF licht

verminderd (30%-39%). Enkel bij de patiëntenpopulatie van Vaillant-Roussel et al. ligt de LVEF opvallen hoger (12).

INTERVENTIE

De gevonden interventies waren heterogeen. De gemeenschappelijke factor is een eerstelijnscomponent, meer bepaald de samenwerking met een GP. De rol die de GP speelt, is uiteenlopend (zie tabel 2). In de meeste studies werkte de GP tijdens de interventie samen met andere zorgverstrekkers (1, 10, 11, 13-15, 17-21). Daarvan maakte één studie gebruik van doktersassistenten die de interventie uitvoerden onder supervisie van GP. Hier was de GP ook verantwoordelijk voor medicatieaanpassing (13). In drie studies werkte de GP samen met een verpleegster (1, 11, 20), in vijf studies gebeurde de interventie samen met de tweede lijn (bv. cardioloog) (14-19, 21). Daarbij werd de rol van de GP vaak beperkt tot enkel opvolging en indien nodig therapeutisch aanpassingen (14-17). Slechts in één studie voerde enkel de GP, die een workshop volgde, de interventie uit (12). In de studie van Azad et al. werd de interventie slecht omschreven en is de rol van de GP onduidelijk (10).

Een belangrijke opmerking is dat in drie studies, de GP niet uit het zorgteam kwam van de patiënt (18-20). Bij de studies van Bekelman et al. was er echter wel communicatie mogelijk met de GP van de patiënt (18, 19).

OUTCOMES

LEVENSKWALITEIT

Het meten van de levenskwaliteit gebeurde met verschillende meetschalen: KCCQ, NYHA-klasse, MLHFQ en SF-36. Studies die de Kansas City Cardiomyopathy Questionnaire (KCCQ) gebruikten, konden na interventie enkel niet-significante veranderingen vaststellen (13, 18, 19). Een studie maakte een schatting van de quality-adjusted life year (QALY) op basis van de NYHA-klassen, die toonde geen significant verschil (11). Verschillende studies gebruikten Minnesota Living with Heart Failure Questionnaire (MLHFQ), bij twee studies bleef het resultaat niet-significant (10, 12). Drie studies toonden wel een significant effect van de interventie op de levenskwaliteit op basis van deze schaal (14, 16, 21). Na de interventie door Atienza et al. scoorde de interventiegroep 23 punten minder dan voor de interventie, bij de controlegroep was dit 16,6 punten minder (p=0,01) (21). Bij de studie van Doughty et al. was er enkel effect op de fysieke component van de schaal: na de interventie toonde de interventiegroep 11,1 punten minder, terwijl dit bij de controle groep maar 5,8 was (2p=0,015) (14). Del Sindaco et al. konden een significante verandering van de levenskwaliteit aantonen na interventie, ten opzichte van de baseline, op zowel fysieke (14,9 ± 8,6 vs. 19,9 ± 8,8. p=0,0001), emotionele dimensie (5,6 ± 4,4 vs. 9,5 ± 5,6. p<0,001) als totaal (27,7 ± 16,6 vs. 39,5 ± 17,8. p<0,0001) (16). Short Form for Health Survey 36-item (SF-36) werd in verschillende studies gebruikt. Bij twee studies bleven de resultaten niet-significant (12, 13). Bij een studie van Agvall et al. was er een betere levenskwaliteit bij de interventiegroep in vergelijking met de controlegroep, maar enkel op de mentale component van de schaal. Het resultaat werd weergegeven in een samengesteld eindpunt op basis van de score op de SF-36. Bij de interventiegroep nam dit eindpunt 10 punten toe, terwijl het bij de interventiegroep 29 punten afnam (p=0,042) (1).

MORTALITEIT

Drie studies bekeken mortaliteit als secundair eindpunt (18, 19, 21). Bij twee studies was er een significante vermindering van de all-cause mortaliteit (18, 21). In de studie van Bekelman et al., was de eenjaarsmortaliteit bij de interventiegroep 4,3%, bij de controlegroep 9,6% (p=0,04) (18). Atienza et al., vergeleken sterfteratio per observatiejaar. Het absolute verschil tussen de interventiegroep en controlegroep lag op 0,10 overlijdens per jaar (0,02 – 0,18)(95%CI) (21). In een andere studie van Bekelman et al. bleef de all-cause mortaliteit gelijk

(interventie groep 10/157 overleden, controlegroep 13/157) maar dit resultaat was niet significant (p=0,52) (19).

HOSPITALISATIE

Agvall et al. toonden minder hospitalisaties aan bij de interventiegroep ten opzichte van de controlegroep (36 vs. 51, P=0,03) (1). In de studie van Atienza et al. waren er minder heropnames maar enkel voor hartfalen: relatieve reductie van 30% (18%-42%) (95%CI) (21). Doughty et al. noteerden enkel een significante daling bij multipele (de eerste opname niet meegerekend) hospitalisaties bij de interventiegroep ten opzichte van de controlegroep, zowel voor hartfalen (15 vs. 42, 2p<0,05) als voor andere oorzaken (56 vs. 95, 2p<0,05) (14). Tijdens de studie van Del Sindaco et al. waren minder patiënten gehospitaliseerd bij de interventiegroep in vergelijking met de controlegroep, zowel voor hartfalen (32,5% vs. 40,3%, p=0,0003) als voor andere redenen (55,8% vs. 74,7%, p=0,014) (16). Bij patiënten met een milde cognitieve stoornis was dit effect ook aanwezig, maar niet-significant en enkel voor hartfalenhospitalisaties (15). De Busk et al. konden in hun studies geen significante verandering in hospitalisaties aangetoond worden(20). Een studie van Azad et al. had meer hospitalisaties voor hartfalen bij de interventiegroep ten opzichte van de controlegroep (gemiddeld 0,477 vs. 0,083. p=0,019) (10).

KOST EN CONSUMPTIE VAN GEZONDHEIDSZORG

Drie studies toonden een significante kostenreductie van de gezondheidszorg bij de interventiegroep (11) (21) (16). Agvall et al. toonden 30% kostenreductie bij de interventiegroep (p=0,01) (11). Atienza et al. berekenden een kostvermindering van €2063 per patiënt in de interventiegroep (21). Del Sindaco et al. noteerden een gemiddelde kostenbesparing van €982,04 per patiënt (16).

In twee artikels werd minder consumptie van gezondheidszorg aangetoond. Dit betekent een gedaald gebruik van gezondheidszorgfaciliteiten (spreekuurbezoek, spoedcontacten…) en dus minder kosten (1, 11). Agvall et al. noteerden in de interventiegroep 2 bezoeken op de spoedafdeling zonder opname, bij de controlegroep waren er 11 (p=0,001) (1). Het gemiddeld aantal bezoeken aan een dokter in het ziekenhuis per patiënt lag ook lager ten opzichte van de controlegroep (0,4 vs. 0,8, p=0,01). Dezelfde daling was aanwezig bij bezoeken aan een hartfalenverpleegkundige (0,1 vs. 0,6. P=0,004) en aan een GP (2,9 vs. 3,8. P=0,02) (11).

DISCUSSIE

BESCHRIJVING EN INTERPRETATIE VAN RESULTATEN

INTERVENTIE

De interventies zijn heterogeen. Hierbij rijst de vraag: ‘Welke elementen van de interventie zijn verantwoordelijk voor de resultaten? Is het de interventie zelf die effect heeft of zorgt een grotere motivatie van de zorgverleners voor resultaat?’ Op basis van de studies van Agvall et al. en Vaillant-Roussel et al. kan men suggereren dat intensieve opvolging en samenwerking tussen GP en hartfalenverpleegkundigen meer impact heeft dan wanneer de GP de enige hulpverlener is. Beide studies bekijken het effect op levenskwaliteit, maar met een andere schaal, wat vergelijken moeilijk maakt. Agvall et al. noteerden een significante toename in levenskwaliteit, terwijl bij Vaillant-Roussel et al. geen significant effect werd gezien. Waardoor kan dit effect veroorzaakt worden? Als we de twee studies vergelijken zien we gelijkaardige patiëntenkenmerken: leeftijd, NYHA-klasse, rekrutering in eerste lijn. Enkel de LVEF ligt bij Vaillant-Roussel hoger. De interventie toont wel een groot verschil. Vaillant-Roussel et al. laten educatie en opvolging van de patiënt gebeuren door een GP met aanvullende training in hartfalen. Er is een driemaandelijkse opvolging. Bij Agvall et al. is er samenwerking

tussen hartfalenverpleegkundigen en GP. Beiden geven educatie aan de patiënten en volgen de patiënten op. De opvolging gebeurt aan het begin intensiever: na 1 maand is er telefonisch contact met de hartfalenverpleegkundigen, na 2 maanden een consultatie met de hartfalenverpleegkundigen, na 6 maanden opnieuw telefonisch contact. Verdere contacten waren enkel op vraag (1, 11, 12). Kunnen we deze resultaten toeschrijven aan de intensievere opvolging in het begin of aan het inbrengen van een extra hulpverlener? Hierover is extra onderzoek nodig.

Het klein aantal gevonden studies doet ons vermoeden dat de GP vaak een kleine of helemaal geen rol speelt in hartfalen DMP's. Een belangrijke vraag is: 'Welke rol is weggelegd voor de GP en de eerste lijn binnen de zorg voor een patiënt met hartfalen?' Enkel in studies van Agvall et al. (1, 11), Vaillant-Roussel et al. (12) en Atienza et al. (21) heeft de GP een prominente rol. Vaak zorgt de GP enkel voor follow-up en supervisie van een verpleegster of doktersassistent of is de GP lid van een multidisciplinair team. Bij een studie waarbij de follow-up afwisselend door hartfalenkliniek en GP gebeurde, vond men na verdere analyse dat er geen toename was in het aantal consultaties bij de GP (17), ook al werd dit aangeraden. Dit maakt de betrokkenheid van de GP verdacht. De prevalentie van hartfalen in de huisartspraktijk is echter hoog. Patiënten met hartfalen zijn vaak ouder, sociaal geïsoleerd en hulpbehoevend (20) waardoor ze minder toegang tot gezondheidszorg hebben en de GP de enige of vlotst beschikbare hulpverlener is. In de studie van Del Sindaco et al. (16) was er een relatief grote drop-out in de hartfalenkliniek, maar de follow-up bij GP gebeurde wel. Een mogelijke oorzaak is de laagdrempeligheid van de eerstelijnszorg. De GP wordt dan de belangrijkste zorgverlener. Bovendien heeft iedere patiënt verschillende educatieve en medische noden. De aanpak van een patiënt met hartfalen moet flexibel, praktisch en op maat van de patiënt zijn, waarbij zijn individuele noden gerespecteerd worden. Ook continuïteit van zorg is belangrijk. Hierbij staat de GP op de eerste lijn. Door de grote prevalentie van hartfalen, de vergrijzing en de toename in chronische ziekten kan de GP dit echter niet alleen. Multidisciplinaire en geïntegreerde zorg (zoals aangeraden door ESC) lijkt in de toekomst het meest efficiënt, waarbij de GP een delegerende rol kan aannemen (22). Een goede manier van organisatie zou kunnen zijn: hartfalenverpleegkundigen die GP's en thuisverpleegsters opleiden en bijstaan. De chronische zorg heeft nood aan een protocol, dat flexibel moet zijn zonder extra administratie met een centrale rol voor de GP (23). Een belangrijke opmerking is dat een multidisciplinaire samenwerking niet noodzakelijk een goede samenwerking is. Zo wordt de GP vaak vergeten, terwijl hij/zij een belangrijke pion is voor optimale zorg van de patiënt met hartfalen (22).

OUTCOME

LEVENSKWALITEIT

In tien studies werd levenskwaliteit onderzocht. In de meeste studies was de interventie niet geassocieerd met een grotere verbetering van levenskwaliteit (10-13, 18, 19). Bij drie studies was de verbetering van levenskwaliteit na de interventie significant groter dan bij de controlegroep (1, 14, 21). Eén studie toonde een verbetering van levenskwaliteit na de interventie, zonder vergelijking met controlegroep (16).

Wanneer de patiënten gerekruteerd werden in het ziekenhuis na een hospitalisatie, had de interventie meer effect op de levenskwaliteit. Een mogelijke verklaring hiervoor is dat patiënten die net ontslagen werden uit het ziekenhuis een slechtere levenskwaliteit hebben. Op korte termijn is er daardoor meer ruimte voor verbetering bij die patiënten. In een eerstelijnspopulatie zijn patiënten over het algemeen stabieler en hebben ze een betere levenskwaliteit aan de start. Als we dit nagaan bij de gelezen studies, vergelijken we vier studies die dezelfde schaal gebruikten (zie tabel 1). We zien dat bij de studie van Vaillant-Roussel et al. de startscore op de MLHFQ-schaal lager ligt, wat overeenkomt met een betere levenskwaliteit (12). Dit kan de bovenstaande hypothese bevestigen.

Auteur	MLHFQ Baseline I/C		MLHFQ Na interventie I/C		
Vaillant-Roussel (12)	29,1/24,4		33,4/27,2		Niet-significant scoreverschil
Doughty (14)	Fysiek 25,6 Totaal 35,5	Emotioneel 10	Fysiek 14,5/19,8	Emotioneel 6,7/6,7	Significant scoreverschil enkel van fysieke component (2p=0,015)
Del Sindaco (16)	39,5 ± 17,8		27,7 ± 16,6		Significante verbetering (p<0,0001)
Atienza (21)	51,9/51,6		28,9/35,5		Significant scoreverschil (p=0,01)

Tabel 1 Vergelijking van MLHFQ

We besluiten dat de levenskwaliteit soms een grotere verbetering toont in de interventiegroep, maar meestal is het een niet-significant verschil. Ondanks de intensiteit van de interventies en de vereiste inzet van de patiënt en omgeving, heeft dit geen negatief effect op de levenskwaliteit en zijn patiënten ook tevreden over deze zorg (17). Bij een chronische ziekte waarbij op lange termijn de levenskwaliteit achteruitgaat, kan stabilisatie ook een streefpunt zijn. Studies op langere termijn en met een grotere patiëntenpopulatie zijn nodig.

MORTALITEIT

We zien een licht positief effect op mortaliteit. Het betreft hier echter weinig studies met kleine interventiegroepen (18, 21) en korte follow-up (12 maanden)(18). Een studie kon ook op langere termijn (72 maanden) een positief effect optekenen (21). Het kan zijn dat het effect op mortaliteit vertraagd is, omdat hartfalen een chronisch ziekte is. Om dit effect na te gaan zijn studies met langere follow-up en een grotere populatie nodig.

HOSPITALISATIES EN KOST

Het effect van de interventie op hospitalisaties werd vooral bekeken wanneer patiënten gerekruteerd werden in het ziekenhuis. De meeste studies toonden een gedaald aantal opnames (16, 21) of vermindering in heropnames (dus de eerste opname niet meegerekend) (14). Bij twee van deze studies werden voornamelijk patiënten met een NYHA-klasse III of hoger geïncludeerd, wat de kans op exacerbatie groter maakt (en ook de marge voor verbetering) (14, 16). In de patiëntenpopulatie van Atienza et al. bevond meer dan de helft van de patiënten zich in een NYHA-klasse II of lager. Zij noteerden wel een significante vermindering in aantal hospitalisaties en het interval tot eerste heropname was verlengd (21). In een andere studie met laagrisicopatiënten (meer dan de helft van de patiënten NYHA I of II) was er geen significant verschil in het aantal hospitalisaties (20). Azad et al. toonden in hun studie een onverwachte toename van het aantal hospitalisaties in de interventiegroep. In deze studie werd echter een heel kleine populatie onderzocht en de interventie werd ook slecht omschreven (10). Bij opstart van het DMP na een ziekenhuisopname kon dus zowel bij hogere als lagere NYHA-klassen vermindering van hospitalisaties worden aangetoond. Een meta-analyse van 33 studies uit 2005 toonden een vermindering van hospitalisaties bij patiënten met hartfalen opgevolgd in een DMP. De interventies hier waren heterogeen, de meerderheid echter tweede lijn en het betreft vooral patiënten met NYHA-klasse III of hoger(5). Een andere review die onder andere het effect van case management met verpleegsters in de eerste lijn evalueerde, toonde minder heropnames en opnames van kortere duur. Dit effect was enkel te zien bij de studies geïnitieerd in een ziekenhuis (24).

Agvall et al. onderzochten het aantal hospitalisaties bij patiënten gerekruteerd in eerste lijn. Ondanks de relatief lage NYHA klasse van deze patiënten (voornamelijk NYHA I en II), werd toch een significante daling van opnames op de spoedgevallen en hospitalisaties gezien bij de interventiegroep (1). In het algemeen werd ook minder consumptie van gezondheidszorg vastgesteld (11). Dit is een veelbelovend resultaat, wat een belangrijk argument kan zijn voor implementatie van dergelijke DMP's in de eerstelijnspraktijk. In een review van Huntley et al. uit 2016 werd echter geen effect op hospitalisaties gezien bij casemanagement geïnitieerd in de eerste lijn. De review includeerde slechts 5 artikels met initiatie in de eerste lijn, waarvan 3 RCT en 2 non-RCT (24).

Het effect op hospitalisaties is voorzichtig positief. Wanneer laagrisicopatiënten geselecteerd worden, is er minder risico op exacerbatie en minder ruimte voor verbetering. Toch konden twee van de drie studies met laagrisicopatiënten een positief effect op hospitalisaties aantonen (11, 21).

In de kostenberekening zijn hospitalisaties de belangrijkste slokop (11). Een ziekenhuisopname vermijden is dus een belangrijke doelstelling. Door het verminderen van het aantal heropnames kan de kost verminderd worden (11, 16, 21). McAlister et al. toonden in een review uit 2001 aan dat DMP's kostenbesparend zijn (25). In een kostenanalyse uitgevoerd door Inglis et al. bleek een interventie in de thuissituatie meer kosteneffectief dan een interventie in het ziekenhuis. De interventie ging uit van het ziekenhuis en werd uitgevoerd door een verpleegster en een multidisciplinair team, zonder samenwerking met de GP (26). Ook Maru et al. vonden dat thuisinterventies kosteneffectiever waren dan interventies in het ziekenhuis (7). Eén review kon echter geen verschil in kostprijs aantonen tussen de interventie- en controlegroep. De studies die kosten analyseerden in deze review waren enkel met een ziekenhuisgeïnitieerde interventie (24)

STERKTES EN ZWAKTES VAN ONDERZOEK

De thesis heeft verschillende sterke en zwakke punten. Er werd gezocht op een systematische manier en met een brede zoekstrategie over verschillende databases. De verwerking van de resultaten gebeurde op een niet-systematische manier. Door de brede zoekstrategie waren er initieel veel studies in de resultaten. Deze konden binnen het bestek van de thesis niet allemaal systematisch besproken en verwerkt worden. Daarom werd besloten de inclusiecriteria aan te passen: enkel studies waarbij een GP een rol speelde werden gebruikt. Hierdoor werden weinig studies overgehouden. Er is wel een database beschikbaar voor verder onderzoek met daarin alle studies die een eerstelijnscomponent hadden (bv. eerstelijnsverpleegkundige of apotheker).

De bestudeerde studies hadden een kleine interventiegroep en korte follow-up. De gevonden resultaten waren heterogeen: verschillende interventies, verschillende uitkomstschalen…. Dit maakte het moeilijk de resultaten te vergelijken.

CONCLUSIE

In de thesis werd op een systematische manier gezocht naar artikels met een DMP waarin huisartsen werden betrokken. Het beperkte aantal geselecteerde studies doet ons vermoeden dat de GP vaak geen rol krijgt in multidisciplinaire zorgprogramma's. Bovendien was de rol van de GP in de gevonden studies heterogeen en vaak klein, ook al is de GP een laagdrempelige en centrale zorgverlener. Op de onderzochte eindpunten is er op de verbetering van levenskwaliteit meestal groter bij de interventiegroep, maar niet-significant. Nooit was er significant slechtere levenskwaliteit. De enkele studies die het effect op mortaliteit nagingen, konden een voorzichtig positief effect besluiten. DMP's met een eerstelijnscomponent doen het aantal ziekenhuisopnames meestal dalen, wat gepaard ging met een mindere kost. De voorzichtige positieve resultaten zijn veelbelovend en motiverend om DMP met huisartsen verder uit te bouwen. Verder onderzoek is echter noodzakelijk. Al deze resultaten moeten echter voorzichtig worden geïnterpreteerd vanwege de heterogeniteit, beknoptheid en het lage aantal van de onderzochte studies.

Auteur publicatiedatum Land	**Interventie**			**Effect**
	Door wie?	Hoe?	Follow-up (maanden)	
Agvall (1) **29/10/2012** **Zweden**	- GP (van de patiënt) - HF-n	- Informatie (HF-n) - Medicatie optimalisering (GP en HF-n) - Follow-up (telefonisch en huisbezoek) (HF-n en GP)	12	- Verbetering QoL: enkel MCS (SF-36) na 12 maanden *Composite endpoint (zie tekst)* (p=0,042) o I: 10 o Co: -29 - Lagere serumspiegels NT-proBNP *Gemiddelde NT-proBNP (ng/L)* (p=0,012) - Minder patiënten met EF <40% na de interventie *Aantal patiënten EF<40%/totaal aantal patiënten (p=0,03)* o I: 31/71 o Co: 45/70 - Minder consumptie van gezondheidszorg o Vooral minder SEH en hospitalisaties (all-cause) ▪ Aantal bezoeken SEH zonder opname (p=0,001) • I: 2 • Co: 11 ▪ Hospitalisatie (p=0,03) • I: 36 • Co: 51
Agvall (11) **2/08/2014** **Zweden**		**ROL GP: medicatie optimaliseren en follow-up**		- Minder kost geassocieerd met behandeling van patiënten met HF o 30% kostreductie bij interventie (p=0,01) - Minder consumptie van gezondheidszorg *Gemiddeld aantal per patiënt* o bezoeken aan dokter in ziekenhuis (p=0,01) ▪ I: 0,4 ▪ Co: 0,8 o bezoeken aan HF-n (p=0,004) ▪ I: 0,1 ▪ Co: 0,6 o bezoeken aan GP (p=0,02) ▪ I: 2,9 ▪ Co: 3,8 - Geen significante verandering QoL (QALY obv NYHA)

Atienza (21)
 	
6/08/2004
 	
Spanje
	- GP (van de patiënt)
	- HF-kliniek
	  o C
	  o N
		- Educatie patiënt + familie (N)
		- Educatie en medicatiemonitoring (GP)
		- Follow-up: HF-kliniek (C en N)
		
		ROL GP: educatie en initiële follow-up
			12 (+ 72)	- Verlengde tijd tot 1e event (all-cause en HF-heropname en dood) (p<0,001)
				- Secundair
				  o Minder ziekenhuisopnames (voor HF) (p<0,001)
				  ▪ 30% (18-42)95%CI reductie in verhouding HF heropnames per observatiejaar in de interventiegroep
				  o Kans om niet heropgenomen te worden voor hartfalen hoger in de interventie groep
				  ▪ I: 0,76 (0,70-0,83) 95%CI
				  ▪ Co: 0,55 (0,48-0,63) 95%CI
				  o Minder mortaliteit (p=0,0006) *(deathrate per observatiejaar)*
				  ▪ I: 0,14
				  ▪ Co: 0,24
				  ▪ Verschil: 0,10 (0,02 – 0,18) (95% CI)
				  o Verbetering QoL (MLHFQ) (p=0,01) *(n=verandering in punten)*
				  ▪ I: -23
				  ▪ Co: -16,6
				  o Minder kosten voor zorg
				  ▪ Reductie van algemene kost van €2063 per patiënt in de interventiegroep.

Azad (10)
 	
18/02/2008
 	
Canada
	- Physician (C+GP)
	- N
	- Diëtiste
	- Kinesist
	- Apotheek
	- Sociaal assistent
	- Gedragstherapeut
		- Huisbezoeken
		  o Oefenprogramma (Kinesist)
		  o Dieet (diëtist)
		  o Dagelijkse activiteiten (gedragstherapeut)
		  o Psychosociale (sociaal assistent)
		  o Educatie (coördinator)
		
		ROL GP: onduidelijk.
			6	- Verandering ten opzichte van baselinescore niet significant (MLHFQ)
				- Secundair
				  o Stabiel blijven PSMS
				  o Meer consulten cardiologie tijdens 6 weken interventie *Aantal consulten bij C eerste 6 weken* (p<0,0001)
				  ▪ I: 38
				  ▪ Co: 17
				  o Meer hospitalisaties voor HF *Gemiddelde aantal hospitalisaties voor CHF* (p=0,019)
				  ▪ I: 0,477
				  ▪ Co: 0,083

Bekelman (18)
 	
30/03/2015
 	
USA
	- GP (niet van de patiënt)
	- N
	- C
	- Psychiater
		- Collaborative care: wekelijks teammeeting
		- Telemonitoring (oa bloeddruk, pols, gewicht): wekelijks nazicht door team
		- Self-care programma: oa educatie (N)
		- Screening depressie + indien nodig depressie care component (psychiater)
		
		ROL GP: lid van CC (communicatie
			12	- Verandering in scores op KCCQ na interventie niet significant tussen interventie- en controlegroep (KCCQ)
				- Verbetering van depressie score (PHQ-9) *na 1 jaar bij interventiegroep* (p=0,01)
				  o 2,1 punten lager (0,43-3,78)(95%CI)
				- Secundair eindpunt
				  o Minder mortaliteit na 1 jaar *Doden na 12 maanden (%)* (p=0,04)
				  ▪ I: 4,3%
				  ▪ Co: 9,6%

<table>
<tr><td></td><td></td><td>mogelijk met GP van de patiënt)</td><td></td><td></td></tr>
<tr><td>Bekelman (19)

26/02/2018

USA

CASA</td><td>- GP (niet van de patiënt)
- N
- C
- Sociaal assistent
- Palliatief arts</td><td>- Collaborative care: wekelijks teammeeting + case review en supervisie
- Symptoombegeleiding en educatie (N)
- Psychosociale interventie (sociaal assistent)

ROL GP: lid van CC (communicatie mogelijk met GP van de patiënt)</td><td>6-12</td><td>- Verandering in scores op KCCQ na interventie niet significant tussen interventie- en controlegroep (KCCQ)
- Secundair
o Depressieve symptomen beter (p=0,02) effectgrootte
▪ -0,29 (-0,53;-0,04) (95%CI)
o Na 6 maanden vermoeidheidsymptomen beter (p=0,02) effectgrootte
▪ -0,30 (-0,55;-0,06) (95% CI)</td></tr>
<tr><td>DeBusk (20)

19/10/2004

USA</td><td>- N overleg met GP (niet van de patiënt)</td><td>- Educatie (N)
- Telefonisch follow-up (N)
- Overleg met GP

ROL GP: Supervisie en overleg met N</td><td>12</td><td>- Geen significante vermindering van heropnames (zowel HF al all-cause)</td></tr>
<tr><td>Del Sindaco (15)

03/2012

Italië</td><td rowspan="2">- GP (van de patiënt)
- HF-N
- C</td><td rowspan="2">- Ontslagplanning (C en N)
- Educatie (C en N)
- Therapie (C en GP)
- Telefonische follow-up (N)
- Follow-up Huisbezoek (GP)

ROL GP: follow-up</td><td rowspan="2">24</td><td>- Milde cognitieve stoornis (MCI) komt vaak voor bij HF en is geassocieerd met slechtere prognose
o 41,6% van patiënten had MMSE <= 24</td></tr>
<tr><td>Del Sindaco (16)

8/05/2007

Italië</td><td>- Verbetering QoL (MLHFQ) (zowel fysieke als emotionele dimensie)
<table>
<tr><th>Score MLHFQ</th><th>Voor I</th><th>Na I</th><th>p-waarde</th></tr>
<tr><td>Totaal</td><td>39,5 ± 17,8</td><td>27,7 ± 16,6</td><td><0,0001</td></tr>
<tr><td>Fysieke component</td><td>19,9 ± 8,8</td><td>14,9 ± 8,6</td><td>0,0001</td></tr>
<tr><td>Emotionele component</td><td>9,5 ± 5,6</td><td>5,6 ± 4,4</td><td><0,001</td></tr>
</table>
- Minder hospitalisatie (zowel all-cause als HF) %patiënten gehospitaliseerd
o voor HF. I: 32,5 – Co: 40,3 (p=0,0003)
o All-cause. I: 55,8 – Co: 74,7 (p=0,014)
- Minder kost voor zorg
o Gemiddelde van kosten besparing per patiënt: €982,04</td></tr>
</table>

Doughty (14)
 	
3/08/2001
 	
Nieuw-Zeeland
 	
AHFMS
	- GP (van de patiënt)
	- HF-kliniek
	  ○ N
	  ○ C
		- Educatie: Dagboek en informatieboekje (N)
		- Groepssessie (C+N)
		- 6-wekelijks follow-up (GP + HF-kliniek)
		- Medicatie optimalisatie (GP en C)
		
		ROL GP: follow-up
			12	- Verbetering van QoL: PC (MLHFQ) (2p=0,015) *(n=verandering in punten)*
				  ○ I: -11,1
				  ○ Co: -5,8
				- Minder multipele hospitalisaties, geassocieerd met minder ligdagen *aantal multipele opnames* (2p<0,05)
				  ○ All-cause. I: 56 – Co: 95
				  ○ HF. I:15 – Co: 42

Pearl (17) **14/07/2003** **Nieuw-Zeeland** **AHFMS**				- Gelijk aantal GP-consultaties - GP- en patiënten tevredenheid hoger

Peters-Klimm (13)
 	
17/05/2010
 	
Duitsland
	- DA olv GP (van de patiënt)	- Volgens Chronic Care Model
		- Follow-up telefonisch en huisbezoeken (DA)
		- Overleg tussen DA en GP
		- Informatie: Dagboek en informatieboekje (DA)
		- Feedback over medicatie (GP)
		
		ROL GP: supervisie DA en nazicht medicatie
			12	- Geen significant effect op QoL (interventie vs. control) (SF-36, KCCQ)
				- Verbetering zelfzorg (EHFScBS) (p=0,001) *Gemiddelde effect verschil (95% CI)*
				  ○ -3,6 [-5,7;-1,6] voordeel van interventiegroep
				- Verbetering van kwaliteit van chronische zorg *Gemiddelde effect verschil (95% CI)*
				  ○ PACICA (p=0,000) 0,5 [0,3;0,7] voordeel van interventiegroep
				  ○ PACICA 5A (p=0,000) 0,5 [0,3;0,8] voordeel van interventiegroep

Vaillant-Roussel (12)
 	
19/07/2016
 	
Frankrijk
 	
ETIC
	- GP (workshop gekregen) (GP van de patiënt)	- Educatie: sessies en informatieboekje (GP)
		- Follow-up: huisbezoeken (GP)
		
		ROL GP: educatiesessies en follow-up
			19	- Geen significant effect op QoL (interventie vs. control) (SF-36, MLHFQ)
				- Secundair
				  ○ Meer GP bezoeken (p=0,02) (*n= aantal bezoeken per patiënt)*
				  ▪ Interventie 8,1 (±5,3)
				  ▪ Control 6,4 (±4,5)

Tabel 2 Resultaten. ***Legende C: Cardioloog, Co: control, DA: doktersassistent, DNF: did not finish, EHFScBS: heart failure self-care behaviour score, HF: hartfalen, I: interventie, MCS: mental component scale, N: Nurse, PACIC – 5A : Patient Assessment of chronic illness care (5 A assess, avise, agree, assist, arrange), PC: physical component, PHQ-9: Patient Health Questionnaire 9, PSMS: physical self-maintenance scale, SEH: spoed eisende hulp***

Auteur	Patiënten							NYHA klasse: I/Co (n) Voor de interventie				LVEF: I/Co (n) Voor de interventie			
	Bijzondere eigenschappen	Gerekruteerd	Leeftijd: I/Co (jaar)				Sample size: I/Co (n)	I	II	III	IV	>=50%	40-49%	30-39%	<30%
Agvall (1)	/	Eerste lijn	Gemiddelde 75/75				160: 74/73 (14DNF)	3/6	51/43	25/32	/	0/0	32/27	37/35	10/19
Agvall (11)															
Atienza (21)	/	Ziekenhuis	Gemiddelde 69/67				338: 164/174	11/10	39/40	40/40	10/10	Niet vermeld			
Azad (10)	Vrouwen	Ziekenhuis	Gemiddelde 74,20/75,79				91: 45/46	11/12	19/22	14/11	/ (2 NYHA niet gekend)	Niet vermeld			
Bekelman (18)	Veteranen	Eerste lijn	Gemiddelde 67,3/67,9				392: 187/197	16/16	77/85	82/82	5/6	78/84	34/34	46/32	13/27
Bekelman (19) CASA	/	Eerste lijn	Gemiddelde 64,5/66,5				317: 157/157	5/12	55/46	75/75	20/24	57/64	28/18	30/22	35/45
DeBusk	/	Ziekenhuis	<6	60-70	70-80	>80	462: 199/191	103/112		103/113		Niet vermeld			

(20)			0 35/32		52/55	92/86	49/61	(72DNF)				
Del Sindaco (15) **Del Sindaco (16)**	/	Ziekenhuis	77,4/77,5					184: 86/87 (11DNF)	/	32/34	44/49	10/4	Gemiddelde 33,5% ±11 / 32,5% ±10
Doughty (14) **AHFMS** **Pearl (17)** **AHFMS**	/	Ziekenhuis	72,5/73,5					197: 100/97	/	/	24/24	76/73	Gemiddeld 30,6% (sd12,7) / 33,8% (sd12,7)
Peters-Klimm (13)	/	Eerste lijn	Gemiddelde 70,4/68,9					199: 87/93 (19DNF)	1/5	63/67	33/27	0/1	Gemiddelde 35,7% (sd7,5) / 37,6% (sd6,7)
Vaillant-Roussel (12) **ETIC**	/	Eerste lijn	Gemiddelde 74,7/73,5					241: 115/126	14/25	69/67	32/34	/	Gemiddelde 50,9% (sd13,2) / 47,7% (sd15,2)

Tabel 3: Kenmerken van de patiënten ***Legende. Co: controle, DNF: did not finish, I: interventi***

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Via deze weg had ik graag de mensen die meehielpen aan de totstandkoming van deze masterproef bedankt. Ik wil mijn promotor, prof. Dr. Bert Vaes en co-promotoren, Prof. Dr. Bert Aertgeerts, Dr. Willem Raat en Dr. Miek Smeets bedanken voor de goede begeleiding gedurende het gehele proces.

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APPENDIX 1 – ZOEKSTRATEGIE

PUBMED

Concept 1: heart failure

"Heart Failure"[Mesh:NoExp] OR "Heart Failure, Diastolic"[Mesh] OR "Heart Failure, Systolic"[Mesh]OR heart-fail*[tiab] OR cardiac-fail*[tiab] OR myocardial-fail*[tiab] OR cardial-fail*[tiab] OR diastolic-fail*[tiab] OR systolic-fail*[tiab] OR heart-decompensation*[tiab] OR cardiac-decompensation*[tiab] OR cardial-decompensation*[tiab] OR myocardial-decompensation*[tiab] OR diastolic-decompensation*[tiab] OR systolic-decompensation*[tiab] OR cardial-insufficienc*[tiab] OR heart-insufficienc*[tiab] OR myocardial-insufficienc*[tiab] OR cardiac-insufficienc*[tiab] OR diastolic-insufficienc*[tiab] OR systolic-insufficienc*[tiab] OR cardiac-incompetence*[tiab] OR heart-incompetence*[tiab] OR cardial-incompetence*[tiab] OR myocardial-incompetence*[tiab] OR systolic-incompetence*[tiab] OR diastolic-incompetence*[tiab] OR decompensatio-cordis[tiab] OR congestive-heart-fail*[tiab] OR diastolic-dysfunction*[tiab] OR systolic-dysfunction*[tiab] OR heart-dysfunction*[tiab] OR cardiac-dysfunction*[tiab] OR myocardial-dysfunction*[tiab] OR cardial-dysfunction*[tiab] OR heart-ventricle-fail*[tiab]

Concept 2: disease management programme

"Patient Care Management"[Mesh:NoExp] OR patient –management[tiab] OR care-management[tiab] OR "Disease Management"[Mesh:NoExp] OR disease-management[tiab] OR disorder-management[tiab] OR illness-management[tiab] OR medical-management[tiab] OR "Program Development"[Mesh:NoExp] OR Program-develop*[tiab] OR Programme-develop*[tiab] OR program-plan*[tiab] OR programme-plan*[tiab] OR multidisciplinary-care-program*[tiab] OR

"Patient Education as Topic"[Mesh:NoExp] OR Patient-education [tiab] OR education-of-patient* [tiab] OR “Health education”[Mesh:NoExp] OR health-education [tiab] OR “education”[Mesh:NoExp] OR education* [tiab] OR

“nurses”[Mesh:NoExp] OR nurse*[tiab] OR "Nurse Specialists"[Mesh:NoExp] OR “Nurse practitioners”[Mesh:NoExp]

OR "Critical Pathways"[Mesh] OR critical-pathway*[tiab] OR clinical-pathway*[tiab]

Concept 3: general practitioner

"General Practice"[Mesh] OR General-Practice*[tiab] OR familypractice*[tiab] OR gp[tiab] OR "primary health care"[MeSH:noexp] OR primary-health-care[tiab] OR primary-care [tiab] OR health-care-primary[tiab] OR healthcare-primary[tiab] OR primary-healthcare[tiab] OR "general practitioners"[Mesh] OR general-practitioner*[tiab] OR generalist*[tiab] OR "physicians, family"[Mesh] OR physician-family[tiab] OR physicians-family[tiab] OR family-physician*[tiab] OR general-physician*[tiab] OR general-doctor*[tiab] OR family-doctor*[tiab] OR physicians, primary care[MeSH Terms]

Concept 4: enkel trials

randomized controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR clinical trials as topic [mesh: noexp] OR randomly [tiab] OR trial [ti]

EMBASE

Concept 1: heart failure

‘Heart Failure’/de OR ‘heart fail*’:ti,ab,kw OR ‘cardiac fail*’:ti,ab,kw OR ‘myocardial fail*’:ti,ab,kw OR ‘cardial fail*’:ti,ab,kw OR ‘systolic fail*’:ti,ab,kw OR ‘diastolic fail*’:ti,ab,kw OR ‘heart decompensation*’:ti,ab,kw OR ‘cardiac decompensation*’:ti,ab,kw OR ‘cardial decompensation*’:ti,ab,kw OR ‘myocardial decompensation*’:ti,ab,kw OR ‘systolic decompensation*’:ti,ab,kw OR ‘diastolic decompensation*’:ti,ab,kw OR ‘cardial insufficienc*’:ti,ab,kw OR ‘heart insufficienc*’:ti,ab,kw OR ‘myocardial insufficienc*’:ti,ab,kw OR ‘cardiac insufficienc*’:ti,ab,kw OR ‘diastolic insufficienc*’:ti,ab,kw OR ‘systolic insufficienc*’:ti,ab,kw OR ‘cardiac incompetence*’:ti,ab,kw OR ‘heart incompetence*’:ti,ab,kw OR ‘cardial incompetence*’:ti,ab,kw OR ‘myocardial incompetence*’:ti,ab,kw OR ‘diastolic incompetence*’:ti,ab,kw OR ‘systolic incompetence*’:ti,ab,kw OR ‘decompensatio cordis’:ti,ab,kw OR ‘congestive heart failure’/de OR ‘congestive heart fail*’:ti,ab,kw OR ‘diastolic heart failure’/exp OR ‘systolic heart failure’/exp OR ‘diastolic dysfunction’/exp OR ‘diastolic dysfunction*’:ti,ab,kw OR ‘Systolic dysfunction’/exp OR ‘Systolic dysfunction*’:ti,ab,kw OR ‘heart dysfunction*’:ti,ab,kw OR ‘cardiac dysfunction*’:ti,ab,kw OR ‘myocardial dysfunction*’:ti,ab,kw OR ‘cardial dysfunction*’:ti,ab,kw OR ‘Heart ventricle failure’/exp OR ‘Heart ventricle fail*’:ti,ab,kw

Concept 2: disease management programme

'patient management':ti,ab,kw OR 'care management':ti,ab,kw OR 'disease management'/de OR 'disease management':ti,ab,kw OR 'disorder management':ti,ab,kw OR 'illness management':ti,ab,kw OR 'medical management':ti,ab,kw OR 'program development'/de OR 'program develop*':ti,ab,kw OR 'programme develop*':ti,ab,kw OR 'program plan*':ti,ab,kw OR 'programme plan*':ti,ab,kw OR 'multidisciplinary care program*':ti,ab,kw OR 'advanced practice nurse'/de OR 'advanced practice nurse*':ti,ab,kw OR 'nurse'/de OR 'nurse*':ti,ab,kw OR 'nurse specialist'/de OR 'clinical nurse specialist'/exp OR 'nurse practitioner'/de OR (patient* NEAR/10 education) OR (Management NEAR/5 program*) OR 'clinical pathway'/de OR ‘clinical pathway*’:ti,ab,kw OR ‘critical pathway*’:ti,ab,kw

Concept 3: general

‘general practice’/exp OR ‘general practice*’:ti,ab,kw OR ‘family practice*’:ti,ab,kw OR ‘gp*’:ti,ab,kw OR ‘primary health care’/exp OR ‘primary health care’:ti,ab,kw OR ‘primary care’:ti,ab,kw OR ‘primary healthcare’:ti,ab,kw OR 'general practitioner'/exp OR ‘general practioner*’:ti,ab,kw OR ‘general practice physician*’:ti,ab,kw OR ‘generalist*’:ti,ab,kw OR ‘family doctor*’:ti,ab,kw OR ‘family physician*’:ti,ab,kw OR ‘general physician*’:ti,ab,kw OR ‘general doctor*’:ti,ab,kw OR ‘general medical practice*’:ti,ab,kw OR ‘general medicine’:ti,ab,kw

concept 4: enkel trials

'crossover procedure':de OR 'double-blind procedure':de OR 'randomized controlled trial':de OR 'single-blind procedure':de OR (random* OR factorial* OR crossover* OR cross NEXT/1 over* OR placebo* OR doubl* NEAR/1 blind* OR singl* NEAR/1 blind* OR assign* OR allocat* OR volunteer*):de,ab,ti

COCHRANE

Concept 1: heart failure

[mh ^"Heart Failure"] OR [mh ^"Heart Failure, Diastolic"] OR [mh ^"Heart Failure, Systolic"] OR (heart NEXT fail* OR cardiac NEXT fail* OR myocardial NEXT fail* OR cardial NEXT fail* OR diastolic NEXT fail* OR systolic NEXT fail* OR heart NEXT decompensation* OR cardiac NEXT decompensation* OR cardial NEXT decompensation* OR myocardial NEXT decompensation* OR diastolic NEXT decompensation* OR systolic NEXT decompensation* OR cardial NEXT insufficienc* OR heart NEXT insufficienc* OR myocardial NEXT insufficienc* OR cardiac NEXT insufficienc* OR diastolic NEXT insufficienc* OR systolic NEXT insufficienc* OR cardiac NEXT incompetence* OR heart NEXT incompetence* OR cardial NEXT incompetence* OR myocardial NEXT incompetence* OR systolic NEXT incompetence* OR diastolic NEXT incompetence* OR decompensatio NEXT

cordis OR congestive NEXT heart NEXT fail* OR diastolic NEXT dysfunction* OR systolic NEXT dysfunction* OR heart NEXT dysfunction* OR cardiac NEXT dysfunction* OR myocardial NEXT dysfunction* OR cardial NEXT dysfunction* OR heart NEXT ventricle NEXT fail*):ti,ab,kw

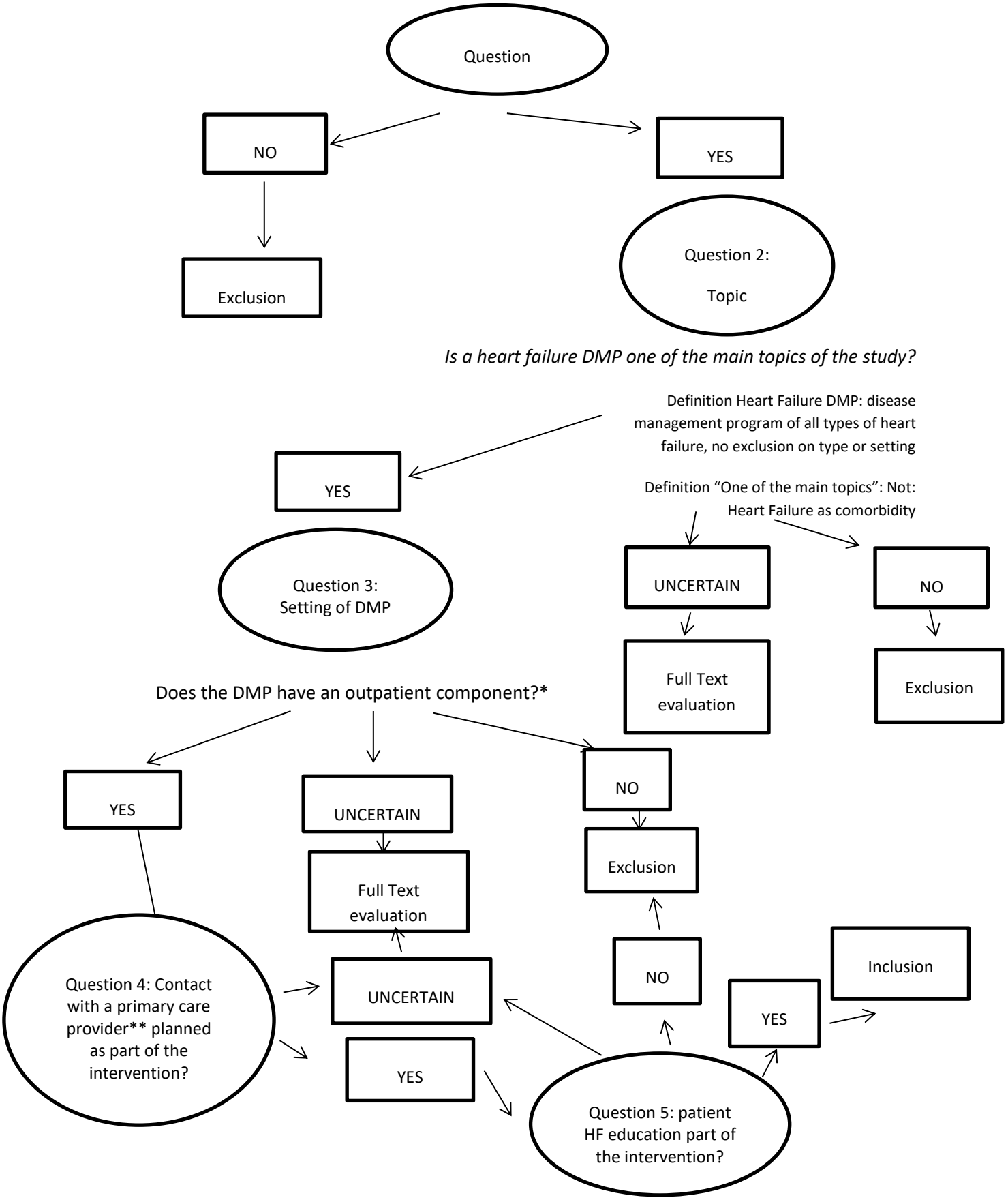
Concept 2: disease management programme

([mh ^"Patient Care Management"]) OR ([mh ^"Disease Management"]) OR ([mh ^"Program Development"]) OR ([mh ^"Health education"]) OR ([mh ^"Patient Education as Topic"]) OR ([mh ^"education”]) OR ([mh ^"nurse"]) OR ([mh ^"Nurse Specialists"]) OR ([mh ^"Nurse practitioners"]) OR ([mh ^"Critical Pathways”]) OR (patient NEXT management OR care NEXT management OR disease NEXT management OR disorder NEXT management OR illness NEXT management OR medical NEXT management OR Program NEXT develop* OR Programme NEXT develop* OR Management NEXT program* OR program NEXT plan* OR programme NEXT plan* OR multidisciplinary NEXT care NEXT program* OR Patient NEXT education OR education NEXT of NEXT patient* OR health NEXT education OR educational NEXT activit* OR nurse* OR critical NEXT pathway* OR clinical NEXT pathway*):ti,ab,kw

Concept 3: general practitioner

([mh ^”General Practice”]) OR ([mh ^”primary health care”]) OR ([mh ^”general practitioners”]) OR ([mh ^”Physicians, Family”]) OR ([mh ^”Physicians, Primary care”]) OR (General NEXT Practice* OR family NEXT practice* OR gp OR primary NEXT health NEXT care OR primary NEXT care OR care NEXT primary OR health NEXT care NEXT primary OR healthcare NEXT primary OR primary NEXT healthcare OR general NEXT practitioner* OR physician NEXT generalist OR general NEXT practice NEXT physician* OR generalist* OR physician NEXT family OR physicians NEXT family OR family NEXT physician* OR general NEXT physician* OR general NEXT doctor* OR family NEXT doctor* OR physicians NEXT primary NEXT care OR primary NEXT care NEXT physician* OR primary NEXT care NEXT doctor*):ti,ab,kw

APPENDIX 2 – SELECTIEFLOWCHART



*Outpatient=a patient who is not hospitalized overnight but who visits a hospital, clinic, or other health care facility for diagnosis, treatment or follow-up. Examples of outpatient settings: primary care physicians, community health clinics, urgent care clinics, specialized outpatient clinics, pharmacies,… Outpatient component=the patient included in the DMP has at least one contact with a care provider in an outpatient setting *or at home* (includes transmural follow-up).

**Primary care provider=primary care physician (GP), home care nurse or home care pharmacist

APPENDIX 3: WEBAPPENDIX – EXCLUSIEARTIKELS MET EXCLUSIEREDEN

Legende exclusie redenen			
1	No RCT	**6**	Interventie geen DMP: telemonitoring
2	Interventie of setting niet in primary care (geen thuiszorgteam betrokken)	**7**	Interventie geen DMP: ander
3	Studieprotocol	**8**	Interventie: geen educatie
4	Populatie: niet uitsluitend HF patiënten	**9**	Interventie geen DMP: enkel exercise/cardiac rehabilitation
5	Populatie: specifieke subpopulatie HF	**10**	Geen Engelstalige full-tekst beschikbaar

Referentie	Exclusie-reden
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Yu DSF, Li P, Choi KC, Yue S, Tsang KK. The effects of an empowerment-based program on self-care and health-related quality of life of patients with chronic heart failure: A randomized controlled trial. European Journal of Cardiovascular Nursing. 2018;17(1):9.	1
Zhang, H., Shen, Y., Zhang, Z., Feng, F., Zhao, W., Yin, Y., & Zhang, L. (2009). Twenty-four hours nurse telephone service improves clinical outcomes in patients with chronic heart failure. Journal of the American College of Cardiology, 53(10), A368.	1
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APPENDIX 4 – EERSTELIJNSSTUDIES

Referentie	Geselecteerd/ Eerstelijnscomponent
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Agvall B, Paulsson T, Foldevi M, DahlstrÃ¶m U, Alehagen U. A Resource use and cost implications of implementing a heart failure program for patients with systolic heart failure in Swedish primary health care. International journal of cardiology [Internet]. 2014; 176(3):[731â€8 pp.].	Geselecteerd
Andryukhin A, Frolova E, Vaes B, Degryse J. The impact of a nurse-led care programme on events and physical and psychosocial parameters in patients with heart failure with preserved ejection fraction: a randomized clinical trial in primary care in Russia. European journal of general practice [Internet]. 2010; 16(4):[205â€14 pp.].	I: Verpleegkundigen
Arcand JAL, Brazel S, Joliffe C, Choleva M, Berkoff F, Allard JP, et al. Education by a dietitian in patients with heart failure results in improved adherence with a sodium-restricted diet: A randomized trial. American Heart Journal. 2005;150(4):716.e1-.e5.	I: Diëtiste
Atienza F, Anguita M, Martinez-Alzamora N, Osca J, Ojeda S, Almenar L, et al. A Multicenter randomized trial of a comprehensive hospital discharge and outpatient heart failure management program. European Journal of Heart Failure. 2004;6(5):643-52.	Geselecteerd
Azad N, Molnar F, Byszewski A. A Lessons learned from a multidisciplinary heart failure clinic for older women: A randomised controlled trial. Age and Ageing. 2008;37(3):282-7.	Geselecteerd
Baker DW, Dewalt DA, Schillinger D, Hawk V, Ruo B, Bibbins-Domingo K, et al. The effect of progressive, reinforcing telephone education and counseling versus brief educational intervention on knowledge, self-care behaviors and heart failure symptoms. Journal of Cardiac Failure. 2011;17(10):789-96.	I: Educator
Bekelman DB, Allen LA, McBryde CF, Hattler B, Fairclough DL, Havranek EP, et al. A Effect of a Collaborative Care Intervention vs Usual Care on Health Status of Patients With Chronic Heart Failure: The CASA Randomized Clinical Trial. JAMA Intern Med. 2018;178(4):511-9.	Geselecteerd
Bekelman DB, Plomondon ME, Carey EP, Sullivan MD, Nelson KM, Hattler B, et al. A Primary Results of the Patient-Centered Disease Management (PCDM) for Heart Failure Study: A Randomized Clinical Trial. JAMA Intern Med. 2015;175(5):725-32.	Geselecteerd
Benatar D, Bondmass M, Ghitelman J, Avitall B. Outcomes of chronic heart failure. Archives of Internal Medicine. 2003;163(3):347-52.	I: Verpleegkundige
Bendelac H, Pathak A, Molinier L, Ruidavets JB, MayÃ¨re A, Berry M, et al. Optimization of ambulatory monitoring of patients with heart failure using telecardiology (OSICAT). European Research in Telemedicine. 2014.	I: Verpleegkundige, verwijst naar GP indien nodig
Bocchi EA, Cruz F, GuimarÃ£es G, Pinho Moreira LF, Issa VS, Ayub Ferreira SM, et al. Long-term prospective, randomized, controlled study using repetitive education at six-month intervals and monitoring for adherence in heart failure outpatients: the REMADHE trial. Circulation Heart failure. 2008;1(2):115-24.	I: Geen GP
Bocchi EA, da Cruz FDD, BrandÃfo SM, Issa V, Ayub-Ferreira SM, la Rocca HPB, et al. Cost-Effectiveness Benefits of a Disease Management Program:The REMADHE Trial Results. Journal of Cardiac Failure. 2018;24(10):627-37.	I: Geen GP
Cajanding RJ. The Effectiveness of a Nurse-Led Cognitive-Behavioral Therapy on the Quality of Life, Self-Esteem and Mood Among Filipino Patients Living With Heart Failure: a Randomized Controlled Trial. Applied nursing research : ANR. 2016;31:86-93.	I: Verpleegkundige
Caldwell MA, Peters KJ, Dracup KA. A simplified education program improves knowledge, self-care behavior, and disease severity in heart failure patients in rural settings. American Heart Journal. 2005;150(5):983.e7-.e12.	I: Verpleegkundige
Clark AP, McDougall G, Riegel B, Joiner-Rogers G, Innerarity S, Meraviglia M, et al. Health Status and Self-care Outcomes After an Education-Support Intervention for People With Chronic Heart Failure. The Journal of cardiovascular nursing. 2015;30(4):S3-S13.	I: Verpleegkundige

Cockayne S, Pattenden J, Worthy G, Richardson G, Lewin R. Nurse facilitated Self-management support for people with heart failure and their family carers (SEMAPHFOR): a randomised controlled trial. International journal of nursing studies [Internet]. 2014; 51(9):[1207â€13 pp.].	I: Verpleegkundige
Cruz FDD, Issa VS, Ayub-Ferreira SM, Chizzola PR, Souza GEC, Moreira LFP, et al. Effect of a sequential education and monitoring programme on quality-of-life components in heart failure. European Journal of Heart Failure. 2010;12(9):1009-15.	I: Geen GP
Davidson P, Cockburn J, Newton P, Webster J, Betihavas V, Howes L, et al. Can a heart failure-specific cardiac rehabilitation program decrease hospitalizations and improve outcomes in high-risk patients? European journal of cardiovascular prevention and rehabilitation [Internet]. 2010; 17(4):[393â€402 pp.].	I: Verpleegkundige
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Del Sindaco D, Pulignano G, Di Lenarda A, Tarantini L, Cioffi G, Tolone S, et al. A Role of a multidisciplinary program in improving outcomes in cognitively impaired heart failure older patients. Monaldi Archives for Chest Disease - Cardiac Series. 2012;78(1):20-8.	Geselecteerd
Del SD, Pulignano G, Minardi G, Apostoli A, Guerrieri L, Rotoloni M, et al. A Two-year outcome of a prospective, controlled study of a disease management programme for elderly patients with heart failure. Journal of cardiovascular medicine (hagerstown, md) [Internet]. 2007; 8(5):[324â€9 pp.].	Geselecteerd
DeWalt DA, Malone RM, Bryant ME, Kosnar MC, Corr KE, Rothman RL, et al. A heart failure self-management program for patients of all literacy levels: A randomized, controlled trial [ISRCTN11535170]. BMC Health Services Research. 2006;6.	I: Educator + apotheek (GP bepaalt enkel gewicht)
Dickson VV, Melkus GD, Katz S, Levine-Wong A, Dillworth J, Cleland CM, et al. Building skill in heart failure self-care among community dwelling older adults: Results of a pilot study. Patient Education and Counseling. 2014;96(2):188-96.	I: gezondheidseducator
Doughty R, Wright S, Pearl A, Walsh H, Muncaster S, Whalley G, et al. A Randomized, controlled trial of integrated heart failure management: the Auckland Heart Failure Management Study. European heart journal [Internet]. 2002; 23(2):[139â€46 pp.].	Geselecteerd
Dracup K, Moser DK, Pelter MM, Nesbitt TS, Southard J, Paul SM, et al. Randomized, controlled trial to improve self-care in patients with heart failure living in rural areas. Circulation. 2014;130(3):256-64.	I: Verpleegkundige
Dunbar SB, Clark PC, Deaton C, Smith AL, De AK, O'Brien MC. Family education and support interventions in heart failure: A pilot study. Nursing Research. 2005;54(3):158-66.	I: Verpleegkundige
Dunbar SB, Clark PC, Reilly CM, Gary RA, Smith A, McCarty F, et al. A trial of family partnership and education interventions in heart failure. Journal of Cardiac Failure. 2013;19(12):829-41.	I: Verpleegkundige
Ekman I, Fagerberg B, Andersson B, Matejka G, Persson B. Can treatment with angiotensin-converting enzyme inhibitors in elderly patients with moderate to severe chronic heart failure be improved by a nurse-monitored structured care program? A randomized controlled trial. Heart and Lung: Journal of Acute and Critical Care. 2003;32(1):3-9.	I: Verpleegkundige
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Graven LJ, Gordon G, Keltner JG, Abbott L, Bahorski J. Efficacy of a social support and problem-solving intervention on heart failure self-care: A pilot study. Patient Education and Counseling. 2018;101(2):266-75.	I:Verpleegkundige
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Holland R, Brooksby I, Lenaghan E, Ashton K, Hay L, Smith R, et al. Effectiveness of visits from community pharmacists for patients with heart failure: HeartMed randomised controlled trial. British Medical Journal. 2007;334(7603):1098-101.	I: Apotheek
Holst DP, Kaye D, Richardson M, Krum H, Prior D, Aggarwal A, et al. Improved outcomes from a comprehensive management system for heart failure. European Journal of Heart Failure. 2001;3(5):619-25.	I:Verpleegkundige, cardioloog, kinesist
Holst M, Willen HR, MÃƒÂ¥rtensson J, Lindholm M, StrÃƒÂ¶mberg A. Telephone follow-up of self-care behaviour after a single session education of patients with heart failure in primary health care. European journal of cardiovascular nursing [Internet]. 2007; 6:[153â€9 pp.].	I: Verpleegkundige
Hua CY, Huang Y, Su YH, Bu JY, Tao HM. Collaborative care model improves self-care ability, quality of life and cardiac function of patients with chronic heart failure. Brazilian Journal of Medical and Biological Research. 2017;50(11).	I: Geen GP
Inglis SC, Pearson S, Treen S, Gallasch T, Horowitz JD, Stewart S. Extending the horizon in chronic heart failure: Effects of multidisciplinary, home-based intervention relative to usual care. Circulation. 2006;114(23):2466-73.	I:Verpleegkundige, verwijst naar de GP indien nodig
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KrumHolz et al. Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. Congestive Heart Failure. 2002;8(1):58.	I: Verpleegkundige, verwijst naar GP indien nodig
LaFramboise LM, Todero CM, Zimmerman L, Agrawal S. Comparison of Health Buddy with traditional approaches to heart failure management. Family & community health. 2003;26(4):275-88.	I: telehealth
Lang CC, Smith K, Wingham J, Eyre V, Greaves CJ, Warren FC, et al. A randomised controlled trial of a facilitated home-based rehabilitation intervention in patients with heart failure with preserved ejection fraction and their caregivers: The REACH-HFpEF Pilot Study. BMJ Open. 2018;8(4).	I: Verpleegkundige
Liu MH, Wang CH, Tung TH, Kuo LT, Chiou AF. Effects of a multidisciplinary disease management programme with or without exercise training for heart failure patients: Secondary analysis of a randomized controlled trial. International journal of nursing studies. 2018;87:94-102.	I: Geen GP
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Moertl D, Berger R, Hammer A, Huelsmann M, Hutuleac R, Pacher R. B-Type Natriuretic Peptide Predicts Benefit From a Home-Based Nurse Care in Chronic Heart Failure. Journal of Cardiac Failure. 2009;15(3):233-40.	I: Verpleegkundige
Murray MD, Young J, Hoke S, Tu W, Weiner M, Morrow D, et al. Pharmacist intervention to improve medication adherence in heart failure: a randomized trial. Ann Intern Med. 2007;146(10):714-25.	I: Apotheek
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Otsu H, Moriyama M. Effectiveness of an educational self-management program for outpatients with chronic heart failure. Japan journal of nursing science : JJNS. 2011;8(2):140-52.	I: Verpleegkundige
Padula CA, Yeaw E, Mistry S. A home-based nurse-coached inspiratory muscle training intervention in heart failure. Applied Nursing Research. 2009;22(1):18-25.	I: Verpleegkundige
Pearl A, Wright S, Gamble G, Muncaster S, Walsh H, Sharpe N, et al. A The effect of an integrated care approach for heart failure on general practice. Family practice [Internet]. 2003; 20(6):[642â€5 pp.].	Geselecteerd
Peters-Klimm F, Campbell S, Hermann K, Kunz CU, Muller-Tasch T, Szecsenyi J. A Case management for patients with chronic systolic heart failure in primary care: the HICMan exploratory randomised controlled trial. Trials. 2010;11:56.	Geselecteerd
Piamjariyakul U, Thompson NC, Russell C, Smith CE. The effect of nurse-led group discussions by race on depressive symptoms in patients with heart failure. Heart and Lung. 2018;47(3):211-5.	I: Verpleegkundige
Smith B, Forkner E, Zaslow B, Krasuski RA, Stajduhar K, Kwan M, et al. Disease management produces limited quality-of-life improvements in patients with congestive heart failure: Evidence from a randomized trial in community-dwelling patients. American Journal of Managed Care. 2005;11(11):701-13.	I: Verpleegkundige
Smith B, Hughes-Cromwick PF, Forkner E, Galbreath AD. Cost-effectiveness of telephonic disease management in heart failure. American Journal of Managed Care. 2008;14(2):106-15.	I: Verpleegkundige
Srisuk N, Cameron J, Ski CF, Thompson DR. Randomized controlled trial of family-based education for patients with heart failure and their carers. Journal of advanced nursing. 2017;73(4):857-70.	I: Verpleegkundige
Stewart S, Carrington MJ, Marwick TH, Davidson PM, MacDonald P, Horowitz JD, et al. Impact of home versus clinic-based management of chronic heart failure: The WHICH? (Which heart failure intervention is most cost-effective & consumer friendly in reducing hospital care) multicenter, randomized trial. Journal of the American College of Cardiology. 2012;60(14):1239-48.	I: Verpleegkundige contacteert de GP indien nodig
Thompson DR, Roebuck A, Stewart S. Effects of a nurse-led, clinic and home-based intervention on recurrent hospital use in chronic heart failure.	I: Verpleegkundige

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Triller DM, Hamilton RA. Effect of pharmaceutical care services on outcomes for home care patients with heart failure. American Journal of Health-System Pharmacy. 2007;64(21):2244-9.	I: Apotheek
Vaillant-Roussel H, Laporte C, Pereira B, De RM, Eschalier B, Vorilhon C, et al. A Impact of patient education on chronic heart failure in primary care (ETIC): a cluster randomised trial. BMC family practice [Internet]. 2016; 17:[80 p	Geselecteerd
Vinluan CM, Wittman D, Morisky D. Effect of pharmacist discharge counselling on medication adherence in elderly heart failure patients: A pilot study. Journal of Pharmaceutical Health Services Research. 2015;6(2):103-10.	I: Apotheek
Wagenaar KP, Broekhuizen BDL, Jaarsma T, Kok I, Mosterd A, Willems FF, et al. Effectiveness of the European Society of Cardiology/Heart Failure Association website â€˜heartfailurematters.orgâ€™ and an e-health adjusted care pathway in patients with stable heart failure: results of the â€˜e-Vita HFâ€™ randomized controlled trial. European Journal of Heart Failure. 2018.	I: Geen GP
Wang XH, Qiu JB, Ju Y, Chen GC, Yang JH, Pang JH, et al. Reduction of heart failure rehospitalization using a weight management education intervention. The Journal of cardiovascular nursing. 2014;29(6):528-34.	I: Verpleegkundige
Weintraub A, Gregory D, Patel AR, Levine D, Venesy D, Perry K, et al. A Multicenter Randomized Controlled Evaluation of Automated Home Monitoring and Telephonic Disease Management inÂ Patients Recently Hospitalized for Congestive Heart Failure: The SPAN-CHF II Trial. Journal of Cardiac Failure. 2010;16(4):285-92.	I: Verpleegkundige
Wright SP, Walsh H, Ingley KM, Muncaster SA, Gamble GD, Pearl A, et al. Uptake of self-management strategies in a heart failure management programme. European Journal of Heart Failure. 2003;5(3):371-80.	I: Geen GP
Yehle KS, Sands LP, Rhynders PA, Newton GD. The effect of shared medical visits on knowledge and self-care in patients with heart failure: A pilot study. Heart and Lung: Journal of Acute and Critical Care. 2009;38(1):25-33.	I: Verpleegkundige

APPENDIX 5 - PRISMA CHECKLIST

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	/
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	12-17
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4-5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5, 20-22
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5, 23-24
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5-6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	/
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	12-15
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	12-15

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	/
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	/
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	12-17
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	/
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	12-15
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	/
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	/
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	/
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	8-11
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	11

Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	11
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	/

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

APPENDIX 6 - ETHISCHE GOEKEURING

SCONE <no-reply@gbiomed.kuleuven.be>

ma 26/02/2018 12:18

Aan:
Evelyne Denaghel;

U hebt dit bericht doorgestuurd op 1/03/2018 8:38.

KU LEUVEN SCONE

Geachte professor,
Beste student,

De verstrekte informatie toont aan dat voor het onderzoek in het kader van de masterproef geen beroep wordt gedaan op patiënten als proefpersoon en dat er geen gebruik wordt gemaakt van menselijk lichaamsmateriaal of persoonsgegevens.
Dit type onderzoek vereist geen goedkeuring van een gemachtigde commissie voor medische ethiek. Wel dient u zich te verzekeren dat de privacy van de proefpersonen wordt gerespecteerd.

Onder voorbehoud van de volledigheid en correctheid van de door u verstrekte gegevens, krijgt u hierbij het akkoord om het onderzoek in het kader van de masterproef te starten. Deze mail dient als bewijs van goedkeuring mocht u uw onderzoek wensen te publiceren.
Wij willen u erop attent maken dat u zelf verantwoordelijk blijft voor uw onderzoek. Bovendien doet elke wijziging aan de door u verstrekte gegevens omtrent de onderzoeksopzet deze goedkeuring vervallen. U dient in dat geval een amendement te maken aan uw huidig dossier.
Veel succes!

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