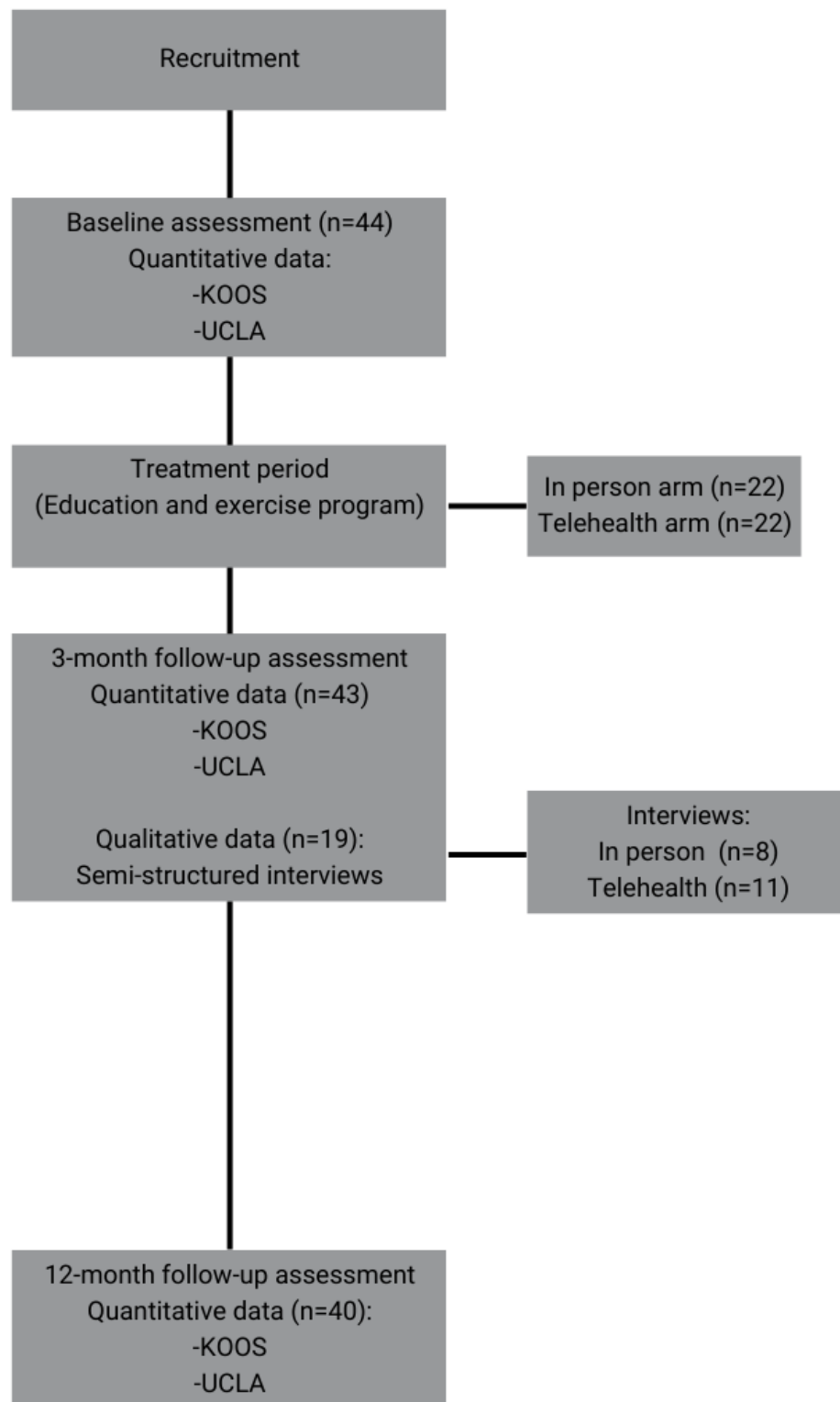


Supplementary material 1. Timeline for GLA:D® assessments and participant interviews.



Legend: n= number of participants, KOOS= Knee Osteoarthritis Outcome Score, UCLA= University of California Los Angeles Physical Activity Scale

Supplementary material 2. Topic guide

Themes & Questions:

Theme 1: Experiences

- i) What did you think about the education and exercise program you were involved in?
- ii) How would you describe your experience of completing the program?
- iii) How do you think completing the program via telerehabilitation/in person affected your experience compared to if it were done via telerehabilitation/face-to-face?

Theme 2: Engagement.

- i) What were your thoughts on having a physiotherapist guide you through the program? In what ways, if any, was it useful for you?
- ii) What are the main things you learnt from the program?
- iii) Which things are you still using? How are you using them?
- iv) How motivated are you to keep exercising on a scale of 0-10. Why did you choose that number?
- v) Which elements of the program did you find challenging, if any?

Theme 3: Condition education.

- i) How confident do you feel in your knowledge about how much exercise and physical activity you should be doing compared to before completing the program?
 - a. In what ways has the program influenced your exercise and physical activity levels?
- ii) How confident do you feel about how to do exercise for your knee pain on a scale from 0-10? Why did you choose that number?

- iii) How does the education you received in GLA:D® compare to previous advice you received from other health professionals (e.g. GP's, physios) and from online sources (e.g. online)? Which of these methods did you benefit from most and why?

Theme 4: Benefits.

- i) Did you think the program would help you prior to participating in the program? In what ways?
- ii) Did the program help you? If yes, what benefits have you noticed from the program?
- iii) How did you feel the program influenced your understanding of your knee pain?
- iv) In what ways did you change your physical activity behaviour as a result of the program (e.g. more or less physical active)? In what ways did your participation in the program help you make these changes?
 - a. (Sleep, work, relationships)
- v) What are the 3 things you liked the most about the program?

Theme 5: Physical activity and exercise

- i) How did you feel about exercise and physical activity before starting the GLA:D® program?
- ii) How physically active were you before the program and has this changed? In what ways? If you have changed how active you are, what do you think influenced this change?
- iii) What were your barriers to exercise before the program? Have these changed, in what ways?
- iv) What aspects of the GLA:D® exercise program do you continue to do and why? (Are you completing exercise for knee, walking, balance, sport, etc.?)
- v) Do you do any new (or previously stopped) forms of exercise or physical activity following the GLA:D® program and why?

- vi) What are your biggest barriers now to physical activity and exercise?
 - a. Physical health: e.g. pain, fatigue, stiffness, obesity, age, other health conditions
 - b. Personal factors: e.g. beliefs about exercise
 - c. Attitude: e.g. lack of motivation, feeling helpless, not prioritizing exercise, lack of confidence
 - d. Emotions: e.g. mental stress and extreme unhappiness
 - e. Social: e.g. health professionals, social support
 - f. Physical environment: e.g. cost, weather, accessibility, safety
- vii) What would help you be more active and participate more in exercise?
 - a. Physical health: motivation to improve pain, prevent total knee surgery, maintain fitness
 - b. Personal: Improved sleep, knowledge about importance of exercise
 - c. Attitude: determination, adjustments, prioritising exercise, increased confidence
 - d. Emotions: enjoyment of activity
 - e. Social: support from health professionals and family
 - f. Physical environment: technology, financial support/subsidized programs

Theme 6: Limitations and suggestions.

- i) What didn't you like about the program, please give as all suggestions you have to help us improve it?
- ii) In what ways could any element of the program be improved? What could we do better to help you be more active in the future?
- iii) Is there anything else you would like to add or discuss?

Supplementary material 3. UCLA physical activity scale cut-off point.

Question

Please indicate which level of activity applies to you

Answer options:

- 1 Wholly inactive: dependent on others: cannot leave residence
- 2 Mostly inactive: restricted to minimal activities of daily living
- 3 Sometimes participates in mild activities
- 4 Regularly participates in mild activities, such as walking, limited housework, and limited shopping
- 5 Sometimes participates in moderate activities
- 6 Regularly participates in moderate activities, such as swimming and unlimited housework or shopping
- 7 Regularly participates in active events, such as bicycling
- 8 Regularly participates in very active events such as bowling or golf
- 9 Sometimes participates in impact sports
- 10 Regularly participates in impact sports such as jogging, tennis, skiing, acrobatics, ballet, heavy labour, or backpacking

Legend: UCLA= University of California, Los Angeles, Yellow indicates 'less' active; Green indicates 'more' active.

Supplementary material 4. Full qualitative matrix

Theme 1: fear of knee joint damage, and scarcity exercise and physical activity information for osteoarthritis prior to GLA:D®

Subtheme	Illustrative quote
Participants report fear of pain and damage to the knee	"I wasn't attempting any exercise on my legs. I wasn't even going there because I was just too worried about I'm incurring more damage." – P8
	"I think I was a little bit more cautious with my knee before the program." – P7
	"...I never would have tried to run even if I could without pain, because I would have worried that I just be wearing my knee away..." – P13
	"I felt like I was on a search. So I knew that it was stuff that I could do. And I started swimming again and was doing an exercise bike and realising that I could still do those things. But I guess it's just given me a much bigger repertoire of what I know I can do and what I need to do on sort of like a daily, weekly basis to maintain my knee." – P15
	"I was cautious. My knee hurt, it was pretty stiff, and I was incapacitated but I was now used to it." – P18
	"Mainly walking once or twice a week. I've had membership in the gym and after operation on both knees, going to the gym, I was getting sore, I was getting the wrong programs. I did go to exercise therapist. My knees were all sore because I was using a machine, so I stopped going. I think the machine was painful because I was kneeling, it made it truly worse and I think I can't exercise if I'm in pain... In my first session, I'm in fear of the pain. I'm thinking of the fear." - P16
	"Well, the main barrier was the pain and the problems with movement. If you can barely walk, you don't really feel like you can do much. And I was having trouble just walking out of the car into a building and it was a lot of pain. And I was having a lot of pain just sleeping, so I was really fatigued." – P19
	"I was a bit hesitant and reluctant too because, of course, my pain I was worried, I'd cause myself an injury." – P12

Previous experience and beliefs about physical activity reduces willingness to participate in physical activity

“I’m a great believer in exercise... Well, not as active as I would’ve liked to have been. So I felt that doing aqua aerobics twice a week and also doing some swimming, was really the most exercise I could do where – I used to do a lot of bike riding, rode thousands of kilometre and whatnot but, unfortunately, the reason I gave that up more to do with safety and more accidents riding a bicycle than I have in my life and that’s disappointing but, anyway, that’s – so overall, my exercise has decreased. It’s now limited basically to aqua aerobics and short walks, 500 metres.” - P1

“I had no problem with doing any exercise and it – being – I was sort of physically active anyway that [GLA:D] was just an add-on to what I was already doing... Yeah, I play golf a couple times a week, and living where I do, I walk quite a bit.” – P10

“I was always a physically active person as a younger person like I played a lot of sport. I probably am aware that – as I said to you before, I need to do some more sort of strengthening stuff. So maybe I saw this as an opportunity to do that, concentrating on that one area. I mean, I’ve always enjoyed physical activity... No pain, no gain.” – P14

“I was always keen on exercise and physical activity. I just thought I would have to greatly reduce it because of my knees, now I know that I don’t necessarily have to... So I’d play two hockey games...and after that the knees really slowed up, and that restricted me.” – P17

“I wasn’t overly physical. I did do a bit gardening. Well, I was going to a physiology program once a week.” - P3

“I’ve always liked physical activity. I’ve always walked, still, always walked even before my knees were a problem.” – P8

“Mainly walking once or twice a week. I’ve had membership in the gym and after operation on both knees, going to the gym, I was getting sore, I was getting the wrong programs. I did go to exercise therapist. My knees were all sore because I was using a machine, so I stopped going. I think the machine was painful because I was kneeling, it made it truly worse and I think I can’t exercise if I’m in pain.” - P16

“I’d become lazy. I hadn’t done anything, and I wasn’t doing anything. I’d got into bad habits because I couldn’t play organised sport anymore because of pain. And so, my excuse was, ‘Well, I can’t play it.’ So that made me lazy. I didn’t do anything.” - P2

“I was always intending to do it. I never got round to it.” – P5 “I wouldn’t even have considered the daily exercise routine.” - P5

"I felt like I wanted to do it but couldn't. So I felt limited by my body rather than attitude or desire to do stuff. I felt a high degree of frustration, I guess with my inability to do things that I wanted to do." – P6

"I didn't hate it. I just didn't do it. I was lazy and I would prefer to sit on the couch and have a cup of coffee." – P9

"I didn't do a lot." - P4

Health professional
education and advice
rarely included
information about
exercise-therapy

"Well, it was very different because I was going to a GP and he, well as much as, said to me that I was looking down better for me a knee replacement in the next – he said I wouldn't last five years and that was about two-three years ago, and this has changed the whole thing around... One of the GP told me to get one of those nutrition bands around your knee, the ones with the hole, and I try that, and it was just so uncomfortable. It didn't work at all. None of them really said that I could improve. They said, "No, I was gonna be worse," so that's the huge difference, I think." – P12

"So I haven't had any advice from GPs or sort of sports people or anyone like that – just physios... One thing that was conflicting that I did get from the GP, I said, "Should I lose weight?" And he said no. And which went against everything I'd sort of – all my understanding of – if I'm carrying extra weight, it's gonna be load. It's definitely gonna be loading up my knee. But I mentioned that to him and he goes, "No, that's not a problem. That's not it. That's nothing." And he was quite a heavy guy, so I'm wondering if that was something to do with it..... I'd been icing and I don't know if it's he or the physio suggested that heat would probably be more beneficial than actually – than icing. This is a long-term sort of thing, so my memory on all this is a little bit sketchy." – P15

"Well, the GP, they've never given me advice [about exercise-therapy]... GP, they really don't know how to... Only with pain killers but only after the operation [knee arthroscopy], I used pain killers.....The physios that I had before does ultrasound– it's more to cope with the pain." – P16

“About the middle of late last year, I’d gone back to see my physio, back to see my doctor to get a referral to a specialist who I’d seen a couple of years ago to get advice about a knee replacement. At that stage, they told me I was too young... I remember a GP once saying, ‘Oh, a little bit of walking every day would be good.’” – P2

“The GP and they just tell you what the problem is and they give you exercises.” – P8

“[My GP is] studying fellowship at the moment. His focus is general management and he’s also a skin specialist. So, he does mole extractions and stuff like that. And so, that’s not his prime knowledge... My GP watched me walk down the hall and put me on Celebrex and said, ‘You need to do something about it.’ And then I went to him after I’d got into the program with you guys and told him what I was doing. And he went off and did his own research on it and said, ‘That’s a really good idea.’” – P9

“A GP that I went to just prescribed pain killers so I suppose lack of interest was the thing that I came across before that, a complete lack of interest. One [GP] said, ‘You’ve got osteoarthritis in your knees.’” – P1

“I had very little from GPs or any other professionals. I’d only had a GP do couple of scans or x-rays and said, “Yeah, you’ve got arthritis on your knee,” and that’s it. No treatment, no exercises, no referrals.” – P10

“I was just told, “Look, eventually – you’ll just – you take your anti-inflammatories and then at a certain point, you’ll get a knee replacement.” ... Most of the time, they say, “Take it easy. Don’t aggravate it. Maybe you should be scaling down what you’re doing.” All of which can make perfect sense when you’re going through all that. “Be a bit more patient. Take the tablets. And then we can look at some other things down the track.”The sports doctor. So it’s a GP in a sports clinic and I deliberately decided to go to that because if I just went to a general GP, they seem to just look at my age and just go either, “Well, you know, dear, this is the time of life, just suck it up,” or, “Have some pills.” And I was just feeling as though I didn’t have someone who was giving me the advice they would give an active person who wanted to continue to be active.” – P19

“No [exercises]. The GP sent me to the specialist... So it was a case of getting a MRI and stuff like that, having going to a specialist... The previous answer was do not run and try and build your strength through your cycling, yes, but you may have a

knee replacement in ten years. So that was the case left to go and maybe get stronger and maybe see maybe in February you might be able to think about hockey or running.” – P17

“... and the second thing was see a physio for some knee exercises and she said that’s really important, so she really stressed the knee, the physio part of it.” – P13

“I probably haven’t received any education [about exercises]. I mean the only thing the surgeon ever said to me was, “I’ll see you when you’re ready.” So I don’t think there’s any motivation for a surgeon to try not to do surgery. So I probably haven’t really invested in any education around my knee problems except for reading about the GLAD program and seeing something. So I guess that that’s what piqued my interest in it.....The only physio I’ve had was – I did have some after the previous – after the arthroscopic surgery. And I said I think that’s probably – I don’t know – ten, 12 years ago, maybe more.” – P14

“The knee surgeon I saw said not much. He said you can take a few pain killers, but that’s not gonna get rid all of the pain totally...Get a new knee.” – P18

“I was concerned I’ve been having knee issues for well over 12 months or probably longer than that but it was starting to really play up this year which then prompted me to go and seek advice from a knee surgeon, and he wanted to put an injection in my knee and I didn’t want an injection in my knee, so I thought I would try exercise first... He laid out the options and that [exercise] was one of them, and that was the one that I felt that I need to try first.....Luckily, he [GP] sent me to the right surgeon because a lot of the surgeon these days just wanted to give you a knee replacement and I certainly was not going to go down that path. That was one path that I had already made up my own mind that I wouldn’t go down..... I had already been to a knee surgeon. I was concerned I’ve been having knee issues for well over 12 months or probably longer than that but it was starting to really play up this year which then prompted me to go and seek advice from a knee surgeon, and he wanted to put an injection in my knee and I didn’t want an injection in my knee, so I thought I would try exercise first.” – P5

“Orthopaedic surgeon, he won’t operate. He said, “You’re too young. You’re still working full-time. It’s pointless.” And he said, “Keep doing it.” And I told him I was doing the GLAD program and he said, “That’s excellent. It’s a really good program

and that will help you get to later down the track. It's not if you have a knee replacement, it's when you have a knee replacement." I'm not gonna be able to avoid that forever, but if I can avoid it for as long as I possibly can, and he said that's a good idea..... My rheumatologist just put me on modified duties at work so that I don't do – 'cause I was having issues doing things like if I did [a shower of a patient] *0:10:36 – I wasn't allowed to them anymore because I've had a risk of fall. I've fallen so many times... I was seeing a chiro. I didn't go to the physio 'cause I was already going to the chiro and he recommended a physio." – P9

"I mean I went to see a knee surgeon and he was the one that suggested I did the GLA:D program." – P4

"He said, "Don't think that once you get the replacement done, you'll be able to sort of do what you were doing ten or 12 years ago or – you'll be healthier in one sense, but you still won't be able to sort of run marathons or anything like that." So, that got me worried...No, he sent me to see a physio –...and he said, "They'll give you specific exercises to try and strengthen your knee, have a look at it," etcetera.....I'd seen physios over the years and got fairly general advice. But I didn't know it was general advice until I started doing [GLA:D]... I remember... a physio saying, 'Look, you need to go for a swim.' Well, thanks very much. I hate the water. I'm not gonna go and swim. So, it was very general, vague, useless sort of information.....He said, "Look, you shouldn't be looking to get a knee replacement until you really can't climb your stairs or get in and out of your chair. Basically, that's the point at which you should get – if you can move to any extent, you can work on strengthening the muscles, etcetera." But the exercises, again, that he gave me, and mind you, this was costing me every time I went to see him, were still – I didn't feel they were specific enough. But I didn't know what else to do. I mean, I'm not an expert in the field." – P2

"The impression I have because when you talk to a surgeon, they've got a very sort of mechanical reductionist for your thing, so they don't really tell you very much. They'll tell you, "Okay, that's a little bit sore. That's not right, we need to clean that up." That's about as much as you get. And from surgeons in particular, you don't really get anything after the fact other than going through your physio or come see me again if you still have problems My physio, the one that – I've been seeing the same physio for probably ten years and he's good but half-hour session where he's treating we're not really talking about the

mechanics of joints and that sort of stuff very much. We're talking about what our kids are up to, other kinds of things. So I don't think I've heard a very comprehensive education out of healthcare professionals but whatever. So my physio, he will give me instruction on what to do and like a very, I guess, cursory explanation of why I'm doing it, but it's not a deep dive at all I've been encouraged to do things in unstable environment. So again physio noticed that I have been a paddle boarder in the past, so he encourages me to get back on it, not just for the knee stuff but for proprioception and everything else that feeds into. Bike riding too, at least without going silly with it, to keep joints lubricated and moving and that sort of thing. So like I've been encouraged to do that sorts of things, but I haven't had much I suppose deep instruction or very kind of technical instruction about why that's important to more things like it's good to keep your joints moving or your knees will be back if you use them that sort of thing.” – P6

“The physio that I saw after I had my knees done was more specific but he wasn't nearly as – his depth of knowledge – he was more treating the inflammation and the problem as opposed to getting me motivated and helping me do it myself, and that's the difference between the GLA:D program is that the physios encompassed you to do and then brought you along with the journey, I guess, and that's the difference because you don't feel that you have to book an appointment at the physio and you go once a week. This is something you have to do all the time and you can do it yourself.” – P8

“One other physio who'd said to me, “You cannot exercise if it hurts.”” – P1

“Well, because I've seen an exercise physiologist, I have to say it's about the same. And I genuinely believe probably if I adhered to her last program more than I did, I may have got the same, a similar outcome because the exercises aren't a lot different. They are different in some areas, but not – so about 50 percent are the same and about 50 percent were different.” – P11

Uncertainty of quality
of online information

“No, I didn't [look at the internet for exercise or physical activity information].” – P12

and bias towards
surgical intervention

“The only time I looked online was to try and find a physiotherapist who said that they specialised in working with people with osteoarthritic knees.” – P1 “Yeah, I’ve read up. We looked around. Not recently, so I don’t know if I remember... It was more about the symptoms and how the knee works. I think I always remember what reading about and bringing up on the surgery I suppose, yeah, a little bit. I can’t remember [exercise] stuff from the website. That’s all blended in together.” – P17

“Yeah. I’d looked up – haven’t looked up exercises. I’d looked up injections because I thought I can’t keep going like this... this is the use of it, and – which is what it will do. Come to this clinic. You can have these injections. They make a big difference. I got information on them because I thought that was gonna be my next line. I thought, “Well, I can’t keep going on the anti-inflammatories.” And I need to be able to walk. At that stage, I couldn’t walk comfortably at all. And it was just affecting everything in my body and my work. So I thought – they’re very expensive as well.” – P19

“I was looking for information about knee replacements. So I didn’t find a lot about exercise. However, on one Australian site – I can’t remember what so don’t ask me – there was stuff about general exercise being good to keep – especially if you suffer from osteoarthritis or rheumatoid arthritis, to keep the joints sort of moving. So, that I did find. But when I was looking at that stage, I was getting pain in my knee at times, and then what happens is, when I get pain in my knee, if it lasts for a length of time, the fluid builds up, so then my knee gets even less sort of flexible. But I wasn’t taking notice of the exercise suggestions. And there was nothing specific – was like walking, swimming, bike riding... Nothing with dosages, nothing to help explain..... I read a fair bit going back about a year, two – probably couple of years ago about joint replacement and knee replacement. But the problem is a lot of it is American stuff and it seems to be connected to a place or sponsored by people trying to get you to have knee replacements and encourage you to have knee replacements. They give you a lot of symptoms and they tell you why these symptoms are showing, and how you can fix it, and seems to be a knee replacement.” – P2

“Online is very confusing. There’s too much information.... Then you work out whether you trust what they say” – P18

“I probably don’t use a lot of online sources although sometimes I do use Dr Google. You’ve always got a certain amount of knowledge about what your body does and what you should be doing, but whether you actually go through and do something about it, I probably wasn’t doing anything about it and so now that I realised that I’ve got to do something.” – P5

“Yeah, I did look at online – that’s the other thing I was gonna say, when this became an issue a long time ago I was looking at exercises and online but, once again, you start doing these things and then you feel a niggling pain and then you don’t know whether you’re doing it properly. So I just think the confidence of doing up with a physio so that they show you what you should be doing and then you can just take it and do it as much as you like and that’s made a huge difference for me.” – P8

Theme 2: varied exercise-therapy and physical activity participation following GLA:D®

Subtheme	Illustrative quotes
Engagement varied in exercise-therapy following GLA:D®	<p>“I’ve gone back to the gym and hopefully talking to the physiologist so I can incorporate some of GLA:D into it.” - P3</p> <p>“I actually still do the whole set of the exercises that was started. I have had three added to the list... So this certainly changed my attitude on that one... I’ve really enjoyed it and [GLAD has] also given me better mobility.” – P5</p> <p>“I was sort of physically active anyway that it was just an add-on to what I was already doing.” - P10</p> <p>“I’m still trying to do the [GLAD] exercises that you gave me three times a week, but as well as that, I go to the gym probably three or four times a week and I swim once or twice a week, so I’m very active.” - P12</p> <p>“Well, it’s another dimension of exercise to do [GLAD]. So that’s some additional exercise because prior to that, I was pretty much – all I was doing is I walk – as I said, I walk every day. “ - P14</p> <p>“I would say that overall it’s gonna help to increase my level of activity. The GLAD program will just be one thing that I want to incorporate into my fitness regime, let’s call it. So I’d say – well, let’s say yeah. I mean, yes, I would say has increased my level of activity and given me more options.” - P15</p> <p>“I think it’s increased. I had a decrease in knee pain and probably more stability and balance. I walk a lot and I do strength training two to three times a week.” - P7</p> <p>“Well, certainly going for walks with my husband, the dogs, on the weekend. I can’t walk too fast. But now, we will walk a long way. My hip is still flaring up a little. I was also going back to the gym doing circuit classes, doing the weights.” - P13</p> <p>“And in doing the GLAD program, it made me more aware of what I might be doing in my Pilates and Barre classes and RPM classes and things like that. So there’s a greater awareness of what you’re doing, sort of generalisation, if you like.” – P19</p>

Varied in physical activity levels following GLA:D®

“I realise now, especially after doing a lot of walking when I was away, that I need a good half an hour a day sort of thing, which in some weeks will be possible. Some weeks it might be three or four times a week that I do that. But I appreciate I need a lot more than I thought I needed... It’s probably, more than anything else, made me realised I have to do more.” - P2

“Probably just doing more activity, not being sedentary so much, making sure that I get up and move more often than what I was doing...” - P3

“More active. Definitely, more active, yes. I can walk longer, I can walk up and down the stairs without me going down like a crap, I still can walk down, but I can – that’s just been amazing. I’ve been going for short walks on a night time... I was doing yoga and I stopped that because I couldn’t bend my knee. I think it I’ve nearly got back to it now.” - P4

“Well, it’s improved – I wasn’t doing anything prior to that, so now that I’m doing things and I’m now feeling fitter, I’m feeling better...” P5

“I think it’s increased. I had a decrease in knee pain and probably more stability and balance. I walk a lot and I do strength training two to three times a week.” - P7

“I now attempt stairs where I never used to. I used to avoid the stairs and use the lift. If I’m sore at the end of a shift at work, I will use the lift, but I try to use the stairs more frequently... It made me more active, made me much more active. “ - P9

“It’s just enforced or allowed me to do what I’ve always wanted to do, which was to do it more often.” – P11

“I’m more active. I can walk further. I’m totally pain free and the stiffness got a whole lot less.” – P18

“Not a lot, but I mentally should know that I should be doing more than I have been.” - P10

“Probably more – hasn’t changed a great deal. I’m still doing the same probably amount of daily activities, but probably more on the exercise program.” - P10

“It probably hasn’t changed a lot but I had a lot more pain when I was doing it before... So now I’m doing harder [gym] classes.” - P13

“It hasn’t changed my physical activity, unfortunately, I suppose. But maybe in my physical activity, I feel freer walking, etcetera.”

- P14

“My knees are less swollen. I can see there’s muscles along the knees – I mean I get tired but I don't get sore. When I go dancing, I'm not sore, I'm more tired. I was happy because sometimes I'm usually sore for about a week. So I'm less sore.” – P16

“I haven’t changed and I think cause I was already doing cycling and hockey... I plan to increase it and introduce running back in.”

- P17

“I’ve actually had to decrease because of my – I didn’t get the improvement from GLA:D that I thought I’d get. So there was one particular exercise I was doing which involved a lot of weeding I’m going down to the native bush land and I can’t do that anymore because I just can’t. I suppose I could do it for half an hour but I used to do it for a couple of rounds if I counted... I don’t get pain other than when I’m walking, I don’t lose sleep, no pain sitting or anything like that, but it hasn’t improved my ability to walk... The discomfort hasn’t changed.” – P1

Theme 3: physical activity participation facilitators following GLA:D® included reduced fear of knee damage, increased confidence, routine, strategies and support

Changes in knowledge and beliefs about physical activity during GLA:D®

“I think I’ve got a lot more knowledge [since completing GLA:D education]…… Well, it helped. Once again, you stop and think about I’ve done this that way or perhaps I’ve done it wrong, so if I do it this way, it’s not gonna be sore.” – P4

“I think those education sessions things are really good just to really make you understand more… they talked a lot about that how the mechanics of your knee working and why the exercising really benefit and it helped it…… With that exercise, it would be the information sessions and this is having a reinforce it, I knew that exercise was good for you, but it just haven’t explained why isn’t you might make more synovial fluid and <inaudible> *0:17:55 on your knee and you’re not gonna damage your knee more. And it’s really psychological about that, will it hurt more and things like that, so that was really good. That was the same exercise session that they talked a lot about that how the mechanics of your knee working and why the exercising really benefit and it helped it grow more cartilage…… So in the education sessions, a lot of I knew, a lot of things about diet and things, I knew but that was really good just to have it reinforced. One thing I was surprised about that they said I’d be able to start running again and I said, “Look, I can’t imagine that ever happens,” and I’m now starting to do some running. I’m not a runner but I do quite enjoy – and especially some of the classes I do at gym. We do these circuit classes and you have to into the <inaudible> *0:05:17 to walk and now I can run. Lots of little things, just keeping the alignment properly and how important it is to make sure your knee is tracking the right way and not wobbling to the side… don’t cross your legs ‘cause it may sore hip. No crossing legs. I didn’t know that before.” – P13

“I wouldn’t even been considered the daily exercise routine. So this certainly changed my attitude on that one…… I’m really pleased with the program. I certainly would recommend it because I think that it’s shown me that I’ve got – I was having issues prior to joining the program and it’s shown me that if I keep exercising, I get better results, so I’m far more mobile than when I was, say, even nine or ten months ago.” – P5

“And there was the education which was good, [vast] *0:19:32 experience and the education which is correcting your thinking.” – P19

“So maybe as I’m getting older, my ideas about where the best form of exercise can be attained is changing, it could be that……. That you can’t make the injury any worse and the fact that the exercise actually does provide more synovial fluid which even though you haven’t got cartilage which affects fluidly, that’s very important. So it really is a matter of use it or lose it and so that came across quite strongly.” – P1

“I realise now, especially after doing a lot of walking when I was away, that I need a good half an hour a day sort of thing, which in some weeks will be possible. Some weeks it might be three or four times a week that I do that. But I appreciate I need a lot more than I thought I needed……. Made me realise I have to be more active and more specifically active, not get up and try and run around the block five times but do things that are going to help strengthen the knee as well as improve my cardio activity……. The knowledge I gained from the program, but also realising – well, it’s not that bad. A year ago, if I had spoken to someone, I would have said, “No, I’m sick of this. I wanna get back to doing things. I want the knee replacement.” Now, I have a lot more information that tells me – well, a) that may not fix things anyway and b) I can actually strengthen the knee……. To a great deal, influenced me quite greatly. I actually understand now why certain things hurt and me sitting here just doesn’t hurt…….

Knowledge – most important thing is knowledge and the fact that I was doing exercise regularly because of the sessions, which I wasn’t doing without the sessions. And then, gradually, I got much more knowledge, specific knowledge, as I said, specific exercises. I was able to – that made me more determined to get through the session, to do the number of repetitions they asked me to do.” – P2

“Well, it probably explained what’s actually happened within the knee and that it is like degenerative type of thing, it’s not gonna get locks up and re-grow or anything like that but it just helped me to understand exactly what was going on... I think talking through things with them, physios and just basically them saying, “Look, you really can’t do it,” just bit by a bit, and build it up. And I think it just gives you that confidence to, “Yes, I can do this.”……. I think it was just realising that the more you move, the

better off you're going to be, long term..... Well, it probably explained what's actually happened within the knee and that it is like degenerative type of thing, it's not gonna get locks up and re-grow or anything like that but it just helped me to understand exactly what was going on. Probably just doing more activity, not being sedentary so much, making sure that I get up and move more often than what I was doing..... Probably more about the pain that I experienced when doing the activity and that was probably through inactivity that I was experiencing that pains. And now I think I've realised that if I do push through it, I'm going to be better off, so that's a big exchange." - P3

"And one thing that GLA:D taught me that I didn't realise is, if you do exercise the knee that you can actually improve the cartilage, the content in between the two bones rubbing together." – P5

"I also feel more confident that that's a way of – that exercising them in those particular ways is a way of dealing with symptoms as opposed to other things that I might do..... It's certainly more comprehensive particularly about knees and how those joints work and what arthritis looks like... Look, I think the two education sessions were really good. Like I said, they were a deeper discussion of the mechanics of what I was dealing with than anything that I've had before. And also just a bit of back and forth with the physios during the sessions as well about how to do exercises more correctly and that sort of thing was more instructive. I feel better educated about what causes and what the mechanical processes in my knee are that cause the irritation and also what I can do about those things. So why it's good to move, why it's good to do a bit of that movement on the load and that sort of thing." – P6

"Just that you can control it if you exercise more and do the – I mean it's just the same old stuff really. It's just it fixing, getting more flexible and then the pain goes away, doesn't it? You can't rely on tablets, you can't do that, so you just need to get going and get moving..... I think anything that gets people moving again is a good thing. The longer you can stay active, better for everybody..... Generally, I'm very anxious anyway. I'm always feeling hyper, but I'm calmer because I'm getting more exercise." – P8

“It showed me that I haven’t been doing anything and because I was avoiding doing, that made the pain worse because all I was doing was letting my knee get worse and using a stop gap like the knee brace as opposed to exercising it, strengthening it. The muscles above and below – I’m still swollen, but I think that’s a reaction to what’s going on in the knee as opposed to damage that I’ve done walking or something. It’s the damage that’s actually in the knee and I think in my head, I knew it, but I think that having you guys reiterate it, that’s really what’s done it..... It’s helped my mental health as well.....I’ve noticed a big difference, believe it or not, in my pelvic floor as well... Weight loss, stronger muscles, walking better, less pain – I can use stairs where I haven’t been able to use stairs properly for probably 12 months – less swelling in my knee, less pain in my knee, less pain in other joints. My mental health is better. I’m eating better because I’ve added the diabetes side of things so I’ve gotta make sure I control and don’t become a diabetic. I could keep going. They’re all linked. One has led to another, which has led to another, which has led to another, and it comes back to I’ve started exercising again and strengthening but focusing that exercise on the part that hurt the most, which was causing most of the other problems..... It’s proved to me that there are ways of managing it and exercise is an aid to managing it as opposed to a hindrance to managing it and that’s what most people think..... It made me realise my pain and being sedentary were part of – being sedentary and not being active made it worse. The pain came because I was sedentary and I’d let it go.” - P9

“I think it showed me why – what happens in your knee with the theoretical part of and then with the exercise program developing the “why” after learning about it in theory, the “why” and how it’s going to affect your knee and how it’s going to strengthen it and the benefits follow.” – P10

“It gave me a whole lot of understanding around what was happening with my body, obviously not just my knee but all the joints that my lower back and obviously all the stuff that was going on with my right side. And I guess too, it also highlighted that the discrepancy in my leg lengths as well... So it’s helped with my overall body health, I call it, so not just my right knee, the bad knee, but realising that need to look after everything else as well. So, it’s good.” – P15

“That it’s recoverable and you can improve the condition through exercise rather than avoiding exercise.” – P17

“By realising that I need to treat it as something that’s not just about whatever state the joints in as a systemic thing. Strengthening what’s around the joint and the other muscles that sort of also support the joint, so more of a systemic way of thinking.” – P19

“I think having that information – having the information and knowledge, and I think facing my fears but as well as making it interesting and challenged. I’m not scared of the pain. I think I do understand the pain, so how would that culturally help me to understand..... I’ve lost weight which is good, so it’s encouraging..... Say to myself, I want to travel but with knees, I want to be able to walk and climb places that I want to see. My goal is I want to get there. And by doing the exercises or stretches, I will.” – P16

“Well, I’ve always been a physically active person. I suppose in the last four or five or six years, that’s reduced but I suppose and I know what’s it’s like to be physically fit. And what exercise does for you. So I think it’s just referring back to that..... I got sleep apnoea, so whatever improves my sleep is beneficial.” – P18

“I have discovered with my weight loss and my girth size, and the fact that other pain issues aren’t a problem as well. My back is a lot better. My knee is a lot better.” – P7

“I used to worry that I wouldn’t be able to do much, so I guess the way that – my husband is very keen on travelling as we get older. He’s very fit and able and I used to think, “Oh gosh, I just don’t wanna be the crippled wife or not going,” because he still wants to do this quite active tours and things like that.” – P13

Reduced fear of knee pain and damage and improved confidence to complete exercise- “It just reinforced the fact that exercise is strengthening the muscles that’s going to not cure but will certainly provide a bit of longevity, I think really, in terms of being able to use my knees..... Ten out of ten, really... What I did find was that over time, over the six weeks, the pain decreased with that lunging, for example. I’ve felt I was able to do that. I suppose it was slightly less pain. The stepping, that was improving. We’ve got steps at home, so I use steps at home as much as I can.” – P1
“Made me realise I have to be more active and more specifically active, not get up and try and run around the block five times but do things that are going to help strengthen the knee as well as improve my cardio activity..... I have much more specific

therapy and physical
activity

understanding of what's wrong and what to do. Just knowing that when a joint is stuffed and I need a knee replacement at some point is not – doesn't help me to work on exercise program, whereas now I know specifically what each of the exercises is doing, and what part of the knee it's strengthening, and which parts are really weak so that I need to work on them..... And that confidence has made a hell of a difference because it's not just someone telling me, it's – I've experienced how I can actually learn to strengthen it..... I'm confident now, probably **nine**... Because I know a lot more about specifically what will help. So, me going out and lifting weights is not gonna help my knee. It won't hurt it, but it's not gonna help it. Whereas me doing the band exercises, and maybe the ball exercises, definitely one – two of the slider movements will help it a lot more. So, it's that specific understanding I wasn't able to get before from anyone and I didn't know... I'm more confident about the cricket, but I don't – basically have to wait and see and try for indoor, the futsal, because that will take a lot more – I need to build up my stamina a little bit more and just I haven't done it for over two years now." – P2

"To make sure that I am doing physical activity, not just because it's painful, you stop doing it. So just make sure you work through it... And actually even the more exercise you do, the better off you are long term. And I find even now, if I have had a bad day, I'll come back and do through the exercise a little bit more and it does tend to help..... Probably more about the pain that I experienced when doing the activity and that was probably through inactivity that I was experiencing that pains. And now I think I've realised that if I do push through it, I'm going to be better off, so that's a big exchange..... The education sessions were great because it actually gave me a different insight as to what you can and can't do and why you're doing the exercises that you're doing. So that's really good... I think it was just realising that the more you move, the better off you're going to be, long term..... "So I've always known that exercise was good and maybe GLA:D has encouraged me to do more than what I have been doing to get the benefit..... And I think it just gives you that confidence to, 'Yes, I can do this.' I feel more confident, especially going up again the stairs. I mean there are days where I have worse days than other days but I just make sure that I push myself through it, so it has given me the extra confidence to just try things. And even the walking, I wasn't doing much

walking. I'm much more confident to doing more walking now..... I'm probably more confident now to have a go at doing things, even getting myself up and down off the floor, that type of thing than what I was before....Probably would be an **eight**. I think because I've just realised that, yeah, I can do that. It might cause a little bit of pain but I can still do it. I feel more confident, especially going up again the stairs. I mean there are days where I have worse days than other days but I just make sure that I push myself through it, so it has given me the extra confidence to just try things. And even the walking, I wasn't doing much walking. I'm much more confident to doing more walking now. I feel quite confident with it and just keep going. I mean I've got access to the videos too if I get a little bit stuck." – P3

"Exercise helps..... About **ten**. Because I know what I have to do and I just do it. And if you get pain, you stop... You do your two programs a week with someone there to guide you and ask questions if you have questions, and I think that's just gives you a bit more confidence to do stuff." – P4

"Certainly, the fear of the pain has changed. I don't have that anymore..... Made me realise I have to be more active and more specifically active, not get up and try and run around the block five times but do things that are going to help strengthen the knee as well as improve my cardio activity..... The knowledge I gained from the program, but also realising – well, it's not that bad. A year ago, if I had spoken to someone, I would have said, "No, I'm sick of this. I wanna get back to doing things. I want the knee replacement." Now, I have a lot more information that tells me – well, a) that may not fix things anyway and b) I can actually strengthen the knee. And that confidence has made a hell of a difference because it's not just someone telling me, it's – I've experienced how I can actually learn to strengthen it..... Well, number one, I've got to exercise, and I feel so much better by doing the exercising. So I think these particular exercises have obviously helped. At the back of your mind, you always know that exercise is the best way to go but this is really hit home when I had this issue with my knee. This really hit home that I really do have to apply exercising to my daily routine as well..... I'm very confident, completely. It made me focus on what I was doing. It really put the focus back onto – I'm in control of my own health, so I need to do it." – P5

“I learned – while I've read these things before, I haven't really taken them on board, I guess, as far as if your joint is giving you a bit of trouble, then moving it is a good thing rather than babying it and not using it. So it's brought that message home for me... it's a better outcome from doing the movement stuff and the strength-building stuff rather than other things that I might have otherwise done..... Yeah, it's changed my mind about that. Obviously not pushing you into pain or injury, but feeling a little bit of strain..... This has been really great because I now feel confident that I can do things through movement to improve my physical condition and I want to start getting up and doing the things that I used a lot doing..... It's helped me a lot. It's certainly help with reducing knee pain and improving the mobility in my knees and I feel a lot more confident in using them than before..... **Ten.** I've been shown, having gone through the protocol and having had someone skills with eyes on monitoring me and just correcting things that I wasn't doing right, I'm pretty confident that I can do them correctly and that I can continue to do them correctly because I sort of know how that feels now.” – P6

“I'm more confident of what I can do with it now, without damaging it..... if we continue on with that sort of exercise regime there is no need for surgery..... Well, the GLAD education is specifically directed at how to manage and the exercises to do with arthritis because arthritis, being a chronic condition that there's no cure for, but if you do it right, you can manage longer without having to have the surgery option. If you continue doing the exercises, it strengthens the bones, it strengthens the muscles. It's an endorphin, so it's good for your brain function too. So, it's an overall health thing..... **Nine** [out of 10 confidence].” – P7

“Very confident, so **nine**. Just because I feel that I know what I have to do to train my knees and to increase – I feel that that it's a risk assessment and I can make those decisions, really.” – P8

“That if you are continuing to do the exercises and developing strength and monitoring your eating habits, which I've had to do, that you can – I can do more. It'll probably extend my life span. It'll make me healthier and it will put off having to have a joint replacement and that is – my big issue is I don't want a joint replacement..... Once upon a time, I would've said, “No, I'm not

doing it 'cause it hurts." Now, even though it might hurt a little bit, I'm still – it'd be a ten. Happy to do the exercises because I know they work. I learned how to alter the load so that it doesn't affect me as much as it used to and doesn't stop me from doing the – I used to look at it and say, 'I can't do that.' And I stopped my family saying, 'I don't want you to do that 'cause you might hurt your knee.'..... I now attempt stairs where I never used to. I used to avoid the stairs and use the lift. If I'm sore at the end of a shift at work, I will use the lift, but I try to use the stairs more frequently. My friends will say, "Oh, go over here and <inaudible> *0:09:01 the lift." "No, no, no. I will actually use the stairs. I have to. It's part of retraining my knee and my rehab program for my knee. I need to keep doing this." So, I do use stairs..... And if I can aim – my aim is, in the next month, to be able to walk the dogs. I wanna be able to walk the dogs. That's one of my big things. If I can get there, I'll be happy." – P9

"Probably the exercise program was designed to strengthen areas of your body that would – may be helpful in the pain relief <inaudible> *0:03:35 in the knee by strengthening other areas of your legs and body..... **Ten**. Because it feels a lot stronger and I don't get the pain that I used to. So I think because I've built the strength around the knee and my whole body feels stronger." – P10

"That exercise always helps..... **Nine**, I don't think anything is ever perfect. But I think I've learnt all the exercises." – P11

"I'm much more confident. Yeah, I'm much more confident. As I keep saying, a bit of pain is not gonna hurt you..... I just feel fitter and stronger and more confident in everything I do..... I think that probably would be the main thing, that a bit of pain is not going to hurt you and just to work your way through it and be confident." – P12

"Probably one of the most important things I think is gaining confidence, that it is okay if it hurts a little bit, but you'll feel okay later on or even learning to bend my knee, when I go downstairs, not to get my knee straight, bend your knee and that hurts a little bit, that's what you're meant to do..... A bit of confidence and not worrying if your knee does hurt a bit, that's okay, it will be all right, as long as it doesn't hurt <inaudible> *0:03:37 a day or two. How important it is to do the regular exercises and you

just have to do it, even if you don't want to do it and you think, "I'm a bit lazy today." I mean it doesn't matter if you don't do every single day but it's how important it is, that two to three times a week <inaudible> *0:03:59, and when you see yourself improving, then you're much more – your confidence goes up and you were great..... It gave me more confidence to go to some of the other classes at the gym that I wouldn't have gone to, 'cause at the gym I go and do that, I do the circuit classes and when I saw them, I thought there's no way I'll be able to go to those because I can't squat or I can't lunge. Lunge is not my best but they will get there. But you see a lot of from those classes, where now I have been known to them, so that's really improved my confidence to go to those other classes..... I would say **ten**... Just 'cause I know the exercise as well and I think can you do, especially in front of the mirror at home, so you can really make sure that you're not letting your knee wobble from side to side or, but keeping it and going this way rather than – I had a tendency for it to bend in and I know that <inaudible> *0:09:10 get back on to the exercises but hopefully <inaudible> *0:09:11 because I would just keep a good baseline of exercise going." - P13

"...it was really important to know that I wasn't going to do any more damage to my knee in doing this exercising..... Well, I guess, as I said to you before, the key was around I'm not doing any more damage. I did have a couple of episodes where I did have significant pain the next day in my knee, but that seemed to subside, quite okay with some medication. So I think that's probably the key, as I said to you before, that you're not actually doing any damage. So I guess the reassurance is when the physios supervise you that they're making sure that you aren't doing any damage..... I guess the main thing was that – the exercise that I was given, even though I found that I had to work hard and there was a certain amount of pain and effort in doing them, I wasn't doing damage to my already injured knee. So that was something really important. What was the other things I learned? I guess just understanding the – well, not that I do – but the different muscles involved in strengthening, so the different types of exercises that I did that were doing different areas..... I found it valuable. I did find that I did benefit from it. I definitely felt stronger and more confident..... I would probably say I'm fairly competent – **nine**... I'm talking about the exercises

that I was given to do. I'm confident that I can do those quite satisfactorily and I think the sessions that I've had with the physio showing – explaining things, etcetera, that I'm quite confident I can do those without supervision.” – P14

“Yeah, much more. I realised I can do a lot more than I thought... it's just locked in a lot of stuff that I knew that I should be doing and so, yes, a lot more confident..... And it was little things like after the 12-week – or during it, sort of towards end of the 12 weeks, people were saying, “Have you been working out? What's going on? Have you lost weight?” And it turned out that I had lost – not lost weight, but put on muscle, lost some size of my hips, but I was just – realised that I was just standing up straighter. I was just – that core strength and amazingly put a centimetre back on that I'd lost in height. So it felt great..... I'd say a **nine**. Yeah, I'm pretty confident. But also I know too that I've got support as well and I'm definitely the sort of person who will check in from time to time, make sure I am doing the things that I'm doing correctly. And so, I would say nine.” – P15

“It was a good experience, actually. I love the challenge, I like I have no more enough to have that fear. In my first session, I'm fear of the pain. I'm thinking of the fear..... I think I have more knowledge – I think some challenge that I don't want, I get more confident when I have less pain and I don't panic if I have those pains. So it's managing the pain and managing that fear actually..... I learnt to be mindful of my movements. I learn to slow down my press and not to rush and be mindful of the movements..... I was less fearful actually. I felt like too also, I was in control and I'm educated or have enough information about it. I know what happening in a way..... I love the exercises in the GLA:D because it wasn't making it painful. I think it was gentle. I wasn't put in a lot in pain. That's what I think I like about the program. It wasn't too painful on my knees..... I would say about **six**... If I now look at the exercises, I'm not gonna feel worse. I'm happy to keep doing it.” – P16

“That exercise is not bad. That it's a way of improving it. That surgery is not necessarily in your future which was a threat from the knee specialist... Crepitus. That's not damaging. It's just part of it. So that was a big thing..... I've got more knowledge. I can do a lot of exercise. I just have to go to the level and build up a level that you build them up..... I was told I have to stop running...

I suppose confidence in getting back into running I suppose..... **Ten**. Because I can't be able to do them without asking the <inaudible> *0:11:48 and there's less need for me to be modified or showing for each of the exercises." – P17

"So the hardest thing was getting my brain to trust my knee, and then once that began to happen and I could deal with it..... Well, more is better for exercise. So I can generally try and do a little bit more. A little bit more consciously..... Yes, the program did help me. It has helped me. The benefits are mobility, more confidence in trusting my leg, and as I said before, the understanding that exercise is not to be shied away from..... Well, that's a very good question because I was trying not do too much before the program. Now I can walk... something that I couldn't do before..... **Eight-and-a-half**... Yeah, I understand it. And I've always been active. I used to run and play rugby, all those things, but I got off them. In the last few years, that's dropped off." – P18

"It was quite corrective in terms of how you think about it. Try not to think about it in terms of your MRI and this is what it shows about your knees. So you got a stuffed knee and – but rather – that's quite a turnaround, thinking about when you have the pain, do exercise, particular exercises. That's a huge turnaround in thinking..... I'm more confident that I'm not actually damaging the knee and a bit more patient then with it. So I'm not gonna go to catastrophic thinking, "Oh, s***, I'm breaking down my knee." But it's more – "Okay. Well, this will pass and I'll do some exercises, different exercises." I have a look at my form. I'll get my bum muscles to work more or use my core better and guide it that way..... I found physio who runs – in my local area who runs a GLAD program. He's been helping me with my lower back. And I've asked him about building on what I've done in the GLAD program. So, at the end of my program, I started to do jumps, which I haven't ever been doing, because I've always thought that that would cause more damage to my knee, so I should be doing anything like that. So I started to do jumps and I'd like to see how far I can go with that. One of my goals is I'd like to be able to get back to dancing comfortably..... Well, it has in the sense that I have as my goal to get back to dancing and I want to do some stuff that will give me more spring. But I've never had that. I'd completely given that up..... Very confident – **nine or ten**... Because I know that it's healthy. I've really seen the difference

exercising the knee can make compared to before when I was limping around and trying to avoid using it and all that sort of thing.” – P19

Motivation: Routine
and support
facilitate
opportunities to
remain physically
active

“It’s much better to know that I’ve got to turn up somewhere and it’s directed and I’m doing for an hour and then it’s done..... It was fine because I was committed to it because initially I thought, “Twice a week for six weeks, no, but I wanna do this.” I want to improve the knee..... I just now fully believe that just do as much as I possibly can but once again I’m not a person who sits down and does exercises..... Look, I think I’m quite motivated but most of my exercising is done with aqua aerobics, that’s a group thing. I’m committed to it, I pay for it, rather than at home thinking, “I could do the squats and I could do this.” So I am committed to exercise... “ – P1

“Getting into – making sure I get into a routine. If I don’t, it’s very easy to fall back into the previous non-routine..... I’m a person who’s played organised sport all his life. So basically, there was a structure and context that you had to go to twice a week and then play on the weekend. So, I didn’t have to motivate myself except to get up and go, and everything else was basically organised when I got there..... The timing, even though it was excellent idea, because of my pace and lifestyle, which is something I have to change and just overcoming my own bad habits like just the laziness and the reluctance sometimes to get up and do things on my own.....Probably some sort of schedule, or program, or information about a program. I don’t mean reliant on that only but that would help because if there was one thing a week I could go to that was scheduled, that might help me then do the other two things on either side of it myself..... A year ago, if I had spoken to someone, I would have said, ‘No, I’m sick of this. I wanna get back to doing things. I want the knee replacement.’ Now, I have a lot more information that tells me – well, a) that may not fix things anyway and b) I can actually strengthen the knee..... A bit of extrinsic motivational inspiration..... Probably closer **to seven to eight** now... It’s probably, more than anything else, made me realised I have to do more.” – P2

“Preventing surgery and all that, so you keep up the exercises and muscle tone.” – P3

“Preventing surgery and all that, so you keep up the exercises..... I would say about an **eight**...I don’t know, because sometimes I get lazy...But otherwise, I’d be sitting around and think, “Oh, exercise time,” off we go and now I go and do them.” – P4

“I need to do it early in the morning... It just made me more regimented in what I do and get back to exercise.....I'll talk to my physio, to find out what else would be a good program 'cause she knows me. She's been treating me for 20 odd years. She knows me pretty well and she knows my limitations..... Well, it's actually motivated for me to go into daily exercise again which is a good thing because since I've been retired... I really wasn't doing any particular exercise daily, so this is good and this has encouraged me to keep going on and doing it..... I think with the attitude that I've developed over these few months, I don't think what else would improve [physical activity] because I'm that stage where I wanna do things, so I don't think there's anything that would actually motivate me more than what I've got..... Because I don't want a knee replacement and I don't want the injection either, and I think if I keep exercising, I can put – I mean, eventually, I know – I'm 73, so I think eventually, I may need some additional intervention but if I keep exercising, it's just delaying it which is really good and I've not been considering having anything else happening other than doing exercises..... Well, it's actually motivated for me to go into daily exercise again... **Ten.**”

– P5

“I commuted by bike pretty much every day to work and I'm trying to start doing that again. I live a fair distance from the office, so it's like a 50K roundtrip, so it's going to take a little work to get back to that. And that's the first goal..... Maybe a little nudge every now and again... Something like a booster session or a follow-up session or a check-in and are you still doing things right kind of thing would be good probably... Maybe twice a year..... **Ten...**Well, up until the last couple of years for a couple of reasons, I haven't been all that well. I've been very active, physically active, and part of the restriction on that over the last couple of years has been injuries to my knees and the arthritis and stuff that grew out of that and ... the whole package of things that had slowed me down tremendously over the last three or four years. This has been really great because I now feel confident that I can do things through movement to improve my physical condition and I wanna start getting up and doing the things that I used a lot doing. “ – P6

“If it was possible, I suppose it would be great to have occasional check-ins, through the exercise program... just to make sure you're still doing everything okay or whether you should be increasing stuff..... **Ten.**” – P7

“Well, they do because I do a ten-hour day every day. So that if I ride at least, I get my exercise in the morning in the evening, and then at lunchtime I go up to the park and I do my stretching which is great.....once all the traffic comes back next week, it'll be really hard, so it's quicker to ride..... Well, I've definitely been more active and I've been more specific with the activities that I've done, and that is a direct result of the program because I was motivated because of my appointments..... Well, I've definitely been more active and I've been more specific with the activities that I've done, and that is a direct result of the program because I was motivated because of my appointments..... So I think my commitment to it, I would like to say that is an **eight**, but then I know I'm not backing that up, so I need to just get focused again.” – P8

“I loved it because it made me understand more what I need to do in order to get healthier and ensure that my knee is stronger so that I don't have to have surgery..... Continuing activity, being active, doing and knowing I've got an appointment. 'Oh, I have to keep that appointment...' it's motivated me..... Well, you know that you've got this two or three session a week and – it's a motivating factor, I think more than anything. That's what it did for me. And so it made me make more conscious decisions with regards to food, with regards to – I was stretching, instead of sitting on the couch, I sit on the floor and stretch.” - P8

“The fact that I feel better... I feel more motivated to do because my mindset's better. My knee feels better and that in itself says, “You need to keep going to do this to feel better. If you stop, you'll go back where you came from six months ago.” And I don't want to be wallowing on the couch like I was six months ago..... It's about the same. I think I knew I needed to do it, but it hurt so I didn't, whereas now, I know – maybe a little bit extra because now I know that the exercises actually helped pain as opposed to hindered it..... I think the people who are doing – just making the step to come and seeing you was a big step for me and I'm glad I did it because it's made me more proactive. And I think if people just can take the step, they'll become more proactive if they've got the right mindset. And once I was in that mindset, it was much easier..... **Ten**. The fact that I feel better.” – P9

“Well, I would say that somewhere around three-quarters of what exercise program – or – and outside of doing 100 percent, I would say, I would probably only be doing three-quarters, so **seven** out of ten.” – P10

“About the same. I think I’ve always known what I should do. It’s just I haven’t done it..... **Eight**... it’s up to the individual to apply yourself.” – P11

“Well, I felt the physios were extremely helpful and it’s motivated me to do even more, and I was very happy..... Ten, especially I noticed when I don’t exercise for a few days, I really get stiff, incredibly stiff...” – P12

“If it’s a program that I can continue and that can avoid me having to have surgery, then that’s fantastic.....because I just do not want to have a knee replacement in the future..... Well, I would even say **ten**, but and I just want to be – look, I just want to be able to get out of a chair when I’m 80 years old and even in the next – so I’m nearly 60, but next ten years, still be able to travel without any problem and just to be independent are so important too, and knowing that by keeping exercising, the exercising reduces the amount of pain you have.” – P13

“...Look, if I did have more time, I would. So that’s why I have to start – I’m going to start booking – I’ll book myself in to do things and so that means I’m going to have to leave work to go and do it and say, ‘I’m actually going to finish my work and I’m going to go and do these things’..... It’s time. It’s time for me. And I guess that’s still a barrier for me, but I’m just going to have to make the time, particularly if I’m wanting to do some more – some further type of exercise, I’m going to have to make that time and book it in. So I’m committed. It’s that accountability stuff..... I certainly don’t want to have surgery..... I wasn’t doing enough strengthening and I’m actually probably motivated to go and do it a little bit, maybe under a supervision of a physio to do some more strengthening exercises, not just of my knee..... Well, I’d have to say probably a **ten** because I certainly don’t want to go backwards and I don’t want my knee to become more of a problem. So anything I can do in order to keep myself mobile is going to work for me..... I don’t know whether the program told me any more – I did know before I was doing the program that I wasn’t doing enough strengthening...” – P14

“But that’s why again, I’m gonna be happy to pay to do another 12 sessions just to try and create that habit. I mean, ideally, I’ll be doing it at home. I think it’s definitely stuff that I can do at home. But again, I’d probably like to go back from time to time just to change it up and that’s one thing I did like about – where I was doing the program – is that they were sort of looking a little

bit outside the GLAD guidelines to tailor it specifically for me..... Well, I guess once I go back to a set class time, so a set session, doing that to get me back into the routine. And then the rest is really just up to me. It's just making a time..... I think making the time but something I have to work out, is creating the time to do it..... Just that belief that I can get better, that I can live an active life, that I don't necessarily need to have a knee replacement anytime soon, just that I can get back to a level of activity that I'd really like to..... I'm gonna make this happen and I'm gonna go back [to being physically active]. I've already spoken – I've been in contact with the physio. So, it's not just a gunner. It's a must. So, I'm gonna do it..... I'm an **eight**. I feel like it's life-changing like it's just given me hope to – that I can just keep going, and still be active... I'm gonna try and get back to where I can run and jump. I haven't done that for – gosh, how long – it'd be ten-plus years... just to be able to have a run around and do those things I loved, but also do it to maintain fitness would be fantastic, so hugely motivated... At the moment, an eight, but I'll definitely want to be ten.” – P15

“It becomes a habit..... I would say **eight**... Because I want to travel and travel involves walking and I want to be able to walk and see the places I want to see. I love dancing, so when I went dancing, I wasn't <inaudible> *0:04:23 for a long time. So that's how I see the benefits of having – I would say, in my mind, it's a strong wins that would help me to do that.” – P16

“I'm gonna try and incorporate many as I can into a gym program 'cause I've joined the gym. I've been a member of the gym for many years. I've just signed up in January and it's across the road from work..... **Ten**... Because I wanna get back into hockey. I have to finish in July halfway through the season. I've got a couple of mountain biking events coming up. I've got – the other thing I wanna do is Reef to Reef in Queensland in August, and things like that. I wanna play hockey this season. So they're my goals.” – P17

“Well, I went in to it on the basis that it might be – provided you with an alternative to having surgery. I didn't wanna have surgery. I don't wanna have surgery..... Well, for me the support is <inaudible> *0:21:42 I keep doing it. I'm motivated enough to know that I need do, I can. So the support is there just to make sure I'm part of the game..... **Nine**. Just the way of having surgery. If I can get moving back and I can walk and go...” – P18

"I'm motivated anyway. I had quite a strong and regular exercise program before I came in to GLAD. They've been completely stuffed by the fact that I had so much pain in my knee..... Probably about at **six to seven**... I also think of myself, yes, I'm definitely going to do it but then by the time I've got a chance to do it, I'm thinking I don't really feel like it now...I should just get up in the morning and do it but I won't."

Impact of external supports (including technology, subsidised activities and social interaction) on engaging in physical activities

"I mean I've got access to the videos too if I get a little bit stuck..... A phone application, probably, [would be helpful] because I was actually trying to find them on my online, they'd send me a link of the exercises, so I could just watch again..... Maybe someone to do it with sometimes, a companion to walk with." – P3

"I guess the ease of having a physio, supervising in your own home – that's a big positive for me, if you're time-poor. I guess having it evaluated is important too, not that my results were significant except that there was a 30 percent improvement in that getting up out of a chair. You know what I mean? That's significant." – P14

"A little text to remind you every now and again doesn't hurt." – P6

"There was one exercise I always used get confused on where to put my back but you can go back to the video and check.....if the government, if it could be subsidised, the money is saved in knee replacements and lack of productivity, and people being on disability pensions and all of those things would be enormous..." – P13

"Yeah, being able to track [physical activity]..... Mostly once you're subsidised." – P18

"They were free sessions. I got equipment given to me, lent to me, and some of the equipment given to me for nothing. It was a no-brainer." – P2

"I'm not a group person but I'm beginning to think that there could be some activities whereby – so cost and group. So for example with aqua aerobics, I pay \$13 a week to go to WaterMarc at Greensborough and I can do as much exercise there as I want to, here is a gym, do anything, but I choose to do aqua aerobics 'cause I met up a nice group of people. So that's motivation. The other thing is I'm on committee of U3A <inaudible> *0:21:14 and we're organising this curriculum. We're talking

to somebody from phys ed person from Ivanhoe pool who's going to use exercise equipment that's in power plant in Macleod. And when he came along and he showed us how that equipment could be used and I thought, 'I think I'd even do that.'There's also a social aspect to it so then we go and have a cup of coffee after and I think that's quite nice." – P1
"Well, that is just a social thing, really, but it's a group of people that are very sports-centric" – P8

Theme 4: physical activity participation barriers following GLA:D® included persistent knee pain, comorbidities, cost, lack of opportunity, and lack of motivation

Subthemes:

Illustrative quotes:

Impact of ongoing knee pain and comorbidities on physical activity participation

“Discomfort, pain, and probably laziness, lack of routine with exercise.” – P2

“Pain and discomfort.” – P4

“I felt like I wanted to do it but couldn't. So I felt limited by my body rather than attitude or desire to do stuff. I felt a high degree of frustration, I guess with my inability to do things that I wanted to do..... Well again, because of injury, I was less physically active for a period, probably a little bit more than half with the protocol period. So on balance, it didn't improve or increase my level of physical activity, but I had other stuff going on. So I wouldn't say that the program is the problem, it was of course obviously other things..... The inflammatory conditions that I've had with hyperthyroid, the whole package of things that had slowed me down tremendously over the last three or four years..... It's an ankle have been a bit iffy, but the knees have been fine, they're not crumbling at all, so I'm happy with that.....hopefully if my hip settles down and I can get back into the hospital, that's the limiting factor. That's the limiting factor with that now, not my knees... I felt like I wanted to do it but couldn't. So I felt limited by my body rather than attitude or desire to do stuff. I felt a high degree of frustration, I guess with my inability to do things that I wanted to do.” – P6

“...still just knee pain.” – P7

“Being overweight and my knee pain. And – yes, they have. I've had two ankle reconstructions 20-something years ago and I still get foot pain now and I probably need that looked at, but I try not to make it a barrier to me doing the – put my proper footwear on.” – P9

“So I can walk further without the same pain that – I used to get a particular pain when I walked a distance. I don't get that pain anymore, but I still have difficulty. But I think that's more related to my feet and not my knees.” – P11

“Well, I’ll just have to sort out the hip... I haven’t done anything for the last month ‘cause I had my back and things, but I’ll get back to things” – P13

“So the barrier was I was injured from crushing, injured from hockey...” – P17

Lack of motivation as a barrier to ongoing physical activity “I’ve never been a person just to do specific exercises like that on my own. I’m a shocker when it comes to self motivation..... I’ve never been a person just to do specific exercises like that on my own.” – P1

“[The barrier is] basically my motivation – my starting, my doing something. There’s no physical barrier as such.” – P2

“Laziness, but – yeah, motivation, I suppose.” – P4

“I was always intending to do it. I never got round to it.” - P5

“Just my motivation.” – P8

“Part of it is other commitments and part of it’s being lazy.” – P11

“I probably don’t want to do more... and I’ll go to the gym where I quite like the three different sorts of classes I would do. And I would like to try and do the Zumba class a bit more but that’s a really full-on for me.” – P13

“I just haven’t had the time. We had – I mean I went back to work on the – what date was it? Was it only last Monday? Must’ve been last Monday and then I had two grandsons here all week, so it was just – wasn’t doable, I guess. I guess I could have made time.” – P14

“So that’s my biggest barrier is myself and just creating the habit of exercise, breaking through those excuses that – when patterns that I’ve been running since my knee problems started, I guess, which is – so, just breaking through those habits. That’s really – I reckon it’s the only thing that’s stopping me.” – P15

Impact of cost of exercise-therapy and “I guess what would hold a lot of people back is the cost. A lot of people just don’t see that as an important thing. I mean they might spend money going out to the pictures every week but a lot of people have a lot of trouble spending on their health,

physical activity programs on opportunity to participate

whether it would be buying good healthy food or preventative things and so you try and educate people that, yes, it might cost \$500 for the program but the benefits you'll get." – P13
"And I thought once you get going and you know what you're doing, maybe they don't have to pay for a double session because, really, they're only using the equipment. They don't have to have the physio onsite the whole time. So I thought there's got to be some sort of other way that they could package it because, otherwise, that will be too financially – my sister got plenty of money, so it's no problem, but I don't, so if I was paying for it, I would say, I can't do that." – P8

Impact of social and physical environment on opportunity for physical activity participation

"...There's a whole lot of stuff going on at work, which makes it really difficult and you could be there forever if you wanted to be or if you needed to.....It's time. It's time for me. And I guess that's still a barrier for me, but I'm just going to have to make the time, particularly if I'm wanting to do some more – some further type of exercise...– I have elderly parents. I have an elderly aunt that I look after as well." – P14
"...It's really only that we're moving house and it's massive..... Just busy life, really. That was all. There's no reason why I didn't – wasn't that I didn't want to go. Really just when they were being run, didn't fit with – I was already sort of leaving work an hour early to get to the physio sessions and it didn't align. That's really it – was just more work commitments." – P15
"...You get a bit busy doing other things and you don't actually do specific physical exercise, and because I do nana duty, I stopped playing tennis..... It just hasn't occurred yet and with Christmas, it's chaotic at the moment..... I found I don't want to exercise late at night, that's not a good time for me." - P5
"Well, sometimes it was difficult to [meet] *0:02:56 at times when the exercises were, just because of what my lifestyle was at that time, but that's okay....Yeah, because it was a rush home, quickly get the exercise stuff, get changed. Sometimes I only just got there." – P7
"Just because I'm tired because I've been working long hours, and I feel that everyone has had a break. And when I've had time off, there's always something on, there's a party, it's such a social time, so you go and you have a couple of drinks, then you can't

be bothered, and then you wake up the next morning and you can't be bothered because you've been out late and still getting up. So I'm gonna start pushing it again for next week..... As I said, I haven't done a whole lot since just before Christmas but I'm still walking, still riding and I'll start just doing the stretching and the bending and those exercises I need to get straight back into that..... I want to be really motivated, that's my plan, but because it's been Christmas and New Year's, you let things go a bit and I had all these good intentions of exercising every day but I haven't had any time off on the main days, and I thought work would be quite, but it wasn't because they have skeleton staff, so everybody gets busy.” – P8

“I think talking through things with them, physios and just basically them saying, “Look, you really can't do it,” just bit by a bit, and build it up. And I think it just gives you that confidence to, “Yes, I can do this.”” - P3

“...it's now up to me what I do particularly in the next two weeks to continue that routine and trying to do some of the specific exercises. I haven't done the band exercises yet since I've come back. So I've got to get on to it. So it's my own – again, it's my own – it's made me much more aware that I need to do something.” - P2

“...because I've been away for three weeks, I've only really done a limited amount of exercise...” – P11

“I just haven't had the time. We had – I mean I went back to work on the – what date was it? Was it only last Monday? Must've been last Monday and then I had two grandsons here all week, so it was just – wasn't doable, I guess. I guess I could have made time...” – P14

“I guess it's just that with that Christmas period where I was pretty inactive...And also, it's been an extremely busy run up to Christmas. Through Christmas, I was sort of away for most of it and then back into work and so, again, excuses..... Things like they only had bands up to a certain strength.” – P15

“I went out on a beach and find it a bit difficult on the soft sand, the wet soft sand, with my knees before..... Sometimes when it's a bit chilly or it's a bit windy or something particularly where I live... historically, I'm troubled by things like weather and that sort of thing.” – P6

“I used to do a lot of bike riding, rode thousands of kilometre and whatnot but, unfortunately, the reason I gave that up more to do with safety and more accidents riding a bicycle than I have in my life and that’s disappointing...” – P1

“The weather, yeah, that’s very formidable.” – P4

“The hill on my driveway. My driveway’s like this. It’s like a 45-degree angle. I hate walking up and down it...” – P9

Supplementary material 5. KOOS results relative to normative values

Outcome	Normative value	Cut-off for below normal limit+	Baseline Below normal limit (BNL)/ within normal limit (WNL)	3-month Below normal limit (BNL)/ within normal limit (WNL)	12-month Below normal limit (BNL)/ within normal limit (WNL)
KOOS function sport and recreation	67	34	WNL*	WNL	WNL
KOOS pain	83	62	WNL*	WNL	WNL
KOOS symptoms	83	62	BNL*	WNL*	WNL
KOOS function daily activities	82	60	WNL	WNL	WNL
KOOS quality of life	74	50	BNL*	WNL*	WNL*

Legend: KOOS, Knee Osteoarthritis Outcome Score; MIC, minimal important change; *, MIC below normative value; +, normal limit defined as one standard deviation below the normative value.