Chapter 5

Discussion and Conclusions

Introduction
In this chapter the results of this study will be discussed. The first paragraph (5.1) deals with the number of participants at baseline and an analysis of the drop-outs. Furthermore the demographic characteristics of the study population are discussed in this paragraph.

Paragraphs 5.2, 5.3 and 5.4 deals with the results of the intervention, enumerated in the aims of this study. In paragraph 5.2 the effects of the intervention on fitness, physical and mental wellbeing are discussed, in paragraph 5.3 these effects within the different ethnical groups and finally in 5.4 the effects of the programme on the lifestyle of the elderly.

In the last paragraph (5.5) we will formulate some final conclusions which can be drawn from this study.

5.1 Study population

5.1.1 Number of participants at baseline
The number of participants in this study was mentioned in Chapter 3 (see Flow chart 3.1). Several factors have caused the enormous difference between the initial total number of 830 residents and the final number of participants of both the baseline interview t-0 (N=317=38.2%) and the first fitness test t-0 (N=186=22.4%). The first reason for this difference was the exclusion of 375 persons (45.2%) by the staff of the homes. Only four hundred fifty five residents (455=54.8%) met the criteria.

Huize Ashiana had shown the largest decrease (66.0%) of its number of residents and Huize Margriet the smallest (15.8%). The ratio behind the variance of these percentages of exclusion can be related to the policy and structure differences between the homes. Huize Ashiana for instance is a governmental institution with a structure of a nursing home and accepts all elderly people even with health problems e.g. bedridden patients and persons with for instance a hemiplegia, with a focus on mostly social cases. As mentioned in Chapter 1 the objective of this institution is to provide accommodation and care to those, who have no relatives to take care of them. On the other hand Huize Margriet, a private home with the structure of a small
apartments unit, accepts only mobile and independent elderly, who can live on their own and who can take care of themselves. The three other homes (Huize Albertine, Huize Fatima Oord and Huize Majella) are also private institutions, but have more the structure of nursing homes. They accept preferable mobile elderly persons, and incidentally elderly who need more care. The social differences between the homes in part reflect the actual participation in this study (see Table 3.1) as is exemplified by Huize Margriet which had the highest participation rate of its residents.

5.1.2 Demographics characteristics
The range of ages of all interviewed participants in the five homes was between 60 and 98 years, with a mean age of 78.02 years (SD 7.816) and a median of 78.00 years. A comparison between the homes showed slight differences. Huize Majella had the oldest group, while Huize Ashiana had the youngest group of participants. The differences in age ranges between the homes could lie in the structure and policy of the homes. Huize Ashiana for instance accepts only people with a social or medical indication regardless the age, which also means younger persons.

The distribution of the ethnical groups in the homes is not representative for the Surinamese society\(^1\) (see Table 1.3). The largest ethnical groups in these five homes were Creole with 156 persons (49.2%) and Mixed with 91 (28.7%). The largest ethnical group in Suriname however is Hindustani (27.4%), while in this study only 7.6% of the number of participants belonged to this group. The reason for this difference could lie in the religion and the culture. The small numbers of residents of the ethnical groups originating from Asia (Hindustani, Javanese and Chinese) could probably be explained by the fact that in Suriname these groups mostly live together with different generations in one house. The need to live in a home for the elderly is therefore not urgent. Another reason for the small numbers in this study of persons from ethnical groups originated from Asia can probably be the fact that the preference of these groups is for a home with a management and residents from a certain (mostly their own) ethnicity or religion. As mentioned in Chapter 1 most of the homes for the elderly are managed by religion groups such as Roman Catholic, Protestant, Muslim, and Hindu. Religion is mostly related to some ethnicity. Therefore in these homes the residents and the management will be also from a certain ethnical group. Hindustani people for instance will prefer to stay in homes run by Hindustani management and also preferably where the residents are from the same ethnicity and religion, Hindu or Muslim. The five homes in this study are Christian oriented, and since the majority of the Creole population in Suriname is Christian, the large number of this group in the homes could be explained.

Compared with the other homes Huize Ashiana had the highest number (20) and the highest percentage (25%) of persons who did not complete the elementary school and also the highest number (40) and the highest percentage (50.1%) of persons with only a primary education. Huize Margriet had the lowest number (9) which is the lowest percentage (7.8%) of persons who did not complete the elementary school. The explanation for the difference in education level of the residents of both institutions is that Huize Ashiana, as a government related institution, the policy of
which is more focused on mostly social cases, which often lack formal education. The majority of the group with a higher education was found in Huize Majella and Huize Margriet, five persons in each. Explanation for this can be found in the fact that both homes are private institutions which have residents who can afford these homes.

If we look at the list of chronic diseases which occurred in the five homes with a high frequency (see Table 3.4) and compare this with the list of the ten most important causes of death in Suriname (see Figure 1.8 in Chapter 1) we can observe the same pattern of occurrence of chronic diseases. Heart and vascular diseases together with diabetes mellitus are the chronic diseases with the highest frequency, which could be the result of physical inactivity of the residents in these five homes. According to WHO (2005) a sedentary lifestyle is a major underlying cause of death, disease, and disability and physical inactivity increases all causes of mortality, doubles the risk of cardiovascular disease, type II diabetes, and obesity. King (2001) concluded that older adults are at particular risk for leading sedentary lives. She also stated that physical inactivity has been established to be an independent risk factor for a range of chronic diseases and conditions. Bungum and Morrow (2000) found that inactivity is associated with several chronic diseases, such as coronary heart disease, hypertension and Type II diabetes. Our findings support this view.

In our study the prevalence of physical inactivity (83.9%) was higher compared with the study of Hallal et al. (2003) who found 41.1%. This is probably influenced by several aspects. The environment, as stated by Nakanishi and Nethery (1998), could be one of the causes for this difference. Our study for instance is done in homes for the elderly, while Hallal et al. studied physical inactivity in Brazilian adults, who were not residing in special facilities. They found also in their study that inactivity was clearly associated with age. The influence of the age of the participants (elderly versus adults) is different in both studies. As mentioned earlier King (2001) concluded that older adults are at particular risk when leading a sedentary life. The characteristics of the homes for the elderly predict already the high percentage of physical inactivity. The main characteristics of a home for the elderly is that such an institution is a place to rest after a whole life hard working, and where the elderly will be served and nursed. Especially in Suriname where it is accepted and endorsed by the different cultures that children take care of their parents, a home for the elderly as a nursing home for which the children pay is an ‘ideal’ place to live.

In our analysis we found also differences in percentages of physical inactivity between the five homes. A comparison of the participants of the five homes shows that the participants of Huize Margriet were more physical active. One of the reasons of the differences could be explained by the mean ages. Huize Majella had the oldest group participants and the high percentage of physical inactivity was therefore already predictable. Other explainable reasons which are confirmed by Bungum and Morrow (2000) could be the educational level of the participants and the awareness of the benefit of physical activity. In their study they found that those persons who had 12 or more years of education and had discussed physical activity with a physician were more apt to have commenced exercise regiments. Ainsworth
et al. (2003) also found in their study that elderly with a higher educational level who were married or had a partner and who were in excellent or very good health, were physically more active.

In this study we found Huize Ashiana was, after Huize Majella, the home with the second highest percentage (93.0%) of physical inactivity, compared with Huize Margriet, which had the lowest percentage of 75.0%. This phenomenon could probably be attributed to the difference between the socioeconomic status of both homes. Huize Ashiana as a governmental institution is open for all kind of clients, while Huize Margriet as a private home has the luxury to select on the basis of financial status. Hallal et al. (2003) found after multivariate analyses that inactivity was positively associated besides with age, also with socioeconomic status.

The Hindustani group had in our study the highest percentage of inactive participants (88.9%). Since there were more female participants within the Hindustani group as well in the total group of participants, the cultural aspect could be probably the explanation for this result. Nakanishi and Nethery (1998) stated also that cultural aspects could influence particular characteristics of an ethnic group and, as such, could be partially responsible for distinguishing an ethnic group from others.

As a result of our analysis using only the data from the baseline interview t-0 we can determine an individual who is physical inactive and who can be distinguished as a member of the at risk group: a female, older than 75 years, who lives alone, of Hindustani ethnicity, who is not highly educated and who has a low social economic status. It would be interesting to know what effects an intervention will have on this individual.

5.2 Effects of the intervention on fitness, physical and mental wellbeing

In this study we have measured the effects of physical activity subjectively and objectively. As reported in Chapter 4 the scores of the subjective fitness indicators ‘fitness score’ and ‘balance problems’ in the experimental group showed a positive significant difference between t-0 and t-2. That means after eight months intervention physical activity in this study had a positive impact on the perceived fitness of the participants of the experimental group and furthermore they experienced less balance problems. Our experimental group confirmed the findings in the literature. In their study of a 12-month programme of group exercise Lord et al. (2003) also found that group exercise can prevent falls and maintain physical functioning in frail older people. Teel et al. (1999) developed a programme for older adults to improve spatial awareness and sense of balance. Participants reported benefits such as enhanced posture awareness, improved sense of balance, and increased social interaction. Falls are the leading cause of injury-related visits to emergency departments in the US and the primary etiology of accidental deaths in persons over the age of 65 years (Fuller, 2000). He found that one third of community-dwelling elderly persons and 60% of nursing homes residents fall each year. Falls can also be markers of poor
health and declining function and are often associated with significant morbidity. Risk factors responsible for falls in the elderly include increasing age, medication use, cognitive impairment and sensory deficits. Mazzeo et al. (1998)\textsuperscript{11} also found improvement of bone health and postural stability, which thereby reduced the risk of falling. McAuley et al. (1997)\textsuperscript{12} found that more physically active adults were less fearful of falling, had better balance, and had stronger perceptions of self-efficacy. They found also that those with better balance were less fearful of falling and that females were more fearful than males. Bohannon et al. (1984)\textsuperscript{13} investigated the influence of age on balance and he found subjects over 60 years of age were unable to balance on one leg, while Gauchard et al. (2003)\textsuperscript{14} stated that balance disorders increase considerably with age due to a decrease in posture regulation quality and are accompanied by a higher risk of falling.

Also the objective measurements on fitness done with the tests of the GFE and FFT showed in five parameters a significant difference of the results after eight months intervention: the ‘block transfer test’, the ‘balance test’, the ‘grip strength test’, the ‘sit-and-reach test’ and the ‘circumduction test’. The experimental group scored significantly better on parameters ‘block transfer test’, ‘sit-and-reach test’, and ‘circumduction test’ at t-2 compared with t-0. On parameters ‘balance test’ and ‘grip strength test’ however, the results were significantly lower meaning a worsening.

Adequate shoulder function is necessary for movements used in daily life such as reaching to the back of the neck in dressing or combing the hair, and in reaching above the head to shelves in the kitchen or in the supermarket. In our study the scores on ‘circumduction test’, which tells us about the function of the shoulders, were significantly better after the intervention. Also the scores of the subjective indicator ‘fitness score’, which relates to the experience of being fit, were significantly better after the intervention. In a study of Bassey et al. (1989)\textsuperscript{15} assessments have been made of flexibility measured as range of shoulder abduction in addition to health status, psychological well-being and reported customary activity. The effect of age was accounted for in part by health, strength and customary use and the effects of use were most marked in those with some disability. This suggests that maintained or increased use could offset some of the age-related loss of the range of shoulder movement.

The ‘sit-and-reach test’ as used by Lemmink (1996)\textsuperscript{16} seems worthwhile to mention here. The spine as well as the hip joint together with the hamstring muscles is tested while the shoulder mobility can be determined as well. The results of ‘circumduction test’ were significantly better after intervention and also the results of ‘sit-and-reach test’ were significantly higher meaning better. Shephard et al. (1990)\textsuperscript{17} had used also the ‘sit-and-reach test’ and studied with this test the head rotation, shoulder extension and rotation, ankle plantar and dorsal flexion, and flexion of the hip. They stated that although the ‘sit-and-reach test’ is the most reliable simple instrument, it provides only limited information about the function of other joints in an older population.

The results of two subjective indicators on health the SF-36’s subscales ‘social functioning’ and ‘role limitation emotional causes’ showed significant differences
between t-0 and t-2. The experimental group scored significantly lower meaning worse on parameter ‘social functioning’ and significantly higher meaning better on ‘role limitation emotional causes’. We do not have an explanation for this divergence between the two. Many authors, Bouchard et al. (1990), Laukkannen et al. (1998), King et al. (2000), Takkinen et al. (2001), Mazzeo and Tanaka (2001), and others, have shown the benefits of physical activity on fitness and health. Chin A Paw et al. (2004) however found in their study a significant decline in perceived health and concluded neither strength training nor all-round, functional training of moderate intensity is effective in improving quality of life, vitality or depression of older people living in long-term care facilities. Mazzeo et al. (1998) found in their study that regular exercise also can provide a number of psychological benefits related to preserved cognitive function, alleviation of depression symptoms and behaviour and an improved concept of personal control and self-efficacy. As part of a study of the Evergreen project in Jyväskyla, Finland, Takkinen et al. (2001) examined the predictive value of physical activity for a sense of meaning in life and for self-rated health and functioning and found also that physical activity had a positive effect on both meaning in life and self-rated health and functioning. Spirduso and Cronin (2001) found that researchers consistently reported that measures of physical function in old adults are related to feelings of well-being, and that old adults who are physically active also report higher levels of well-being and physical function, but the results of randomized intervention studies of aerobic and/or resistive strength training do not always support this relationship. Even if changes in well-being and physical function were reported, no evidence was found that levels of intensity operated in a dose-response fashion to influence these changes.

Blood pressure was used as an objective health indicator. The median scores of both the diastolic and systolic blood pressures of the experimental group showed a decrease of the blood pressure generally and were significantly lower at t-2 compared with t-0. Wilmore (2001) summarized the literature on the influence of age, sex, and health status on the changes in systolic and diastolic blood pressure consequent to exercise training. The results however indicated that age has little or no influence on the changes in blood pressure in response to the exercise training and females appeared to have an attenuated response compared with males.

One of the effects of the eight months intervention we observed was the decrease of complaints of chronic diseases. More participants reported a lower number of complaints of chronic diseases from which they suffered at t-2 compared with t-0. The findings of Simonsick et al. (1993) suggested that physical activity offers benefits to physically capable older adults, primarily in reducing the risk of functional decline and mortality. Physical activity is a recognized component of healthy lifestyles (Bungum and Morrow, 2000) and the authors suggested that small, positive increases in physical activity would enable many people to reduce their risk of chronic diseases and could contribute to an enhanced quality of life. Mazzeo et al. (1998) delineates the importance of physical activity programmes for the elderly in the position stand of the American College of Sports Medicine.
on exercise and physical activity for older adults and stated that participation in a regular exercise programme is an effective intervention/modality to reduce/prevent a number of functional declines associated with ageing. Reductions in risk factors associated with disease improve health status and contribute to an increase in life expectancy. Spirduso and Cronin (2001)\textsuperscript{24} tried to determine from literature whether exercise operates in a dose-response fashion to influence well-being and to postpone dependency especially in elderly. The most consistent results in their study were that long-term physical activity is related to postponed disability and to independent living in the oldest-old subjects. Even in individuals with chronic disease, systematic participation in physical activities enhances physical function.

5.3 Effects of the intervention on physical and mental wellbeing of the ethnical groups

Although we found significant benefits of our physical activity intervention, there were differences in the results between the different ethnical groups (see Table 4.13). Not all significant results of the components of the GFE (the objective fitness indicators) for instance were similar between the groups. The Creole and the Mixed groups had the greatest numbers of parameters with a significant difference between t-0 and t-2. After eight months intervention the scores of the ‘balance test’ of all ethnical groups were lower compared with the baseline scores, from which the Creole, Chinese and Mixed groups had a significant change. All ethnical groups scored better with the ‘circumduction test’, however only the Creole and the Mixed groups showed a significant improvement. The Creole and the Chinese groups showed a significant improvement in the ‘block transfer test’. In the ‘sit-and-reach test’ only the Mixed group had a significant improvement, while the Hindustani group was the only group which scored significant better in the ‘get-up and go test’. The Creole and the Mixed groups scored significant better in the ‘systolic blood pressure’, while the ‘diastolic blood pressure’ was significant lower (meaning better) in the Hindustani and the Mixed group. We have no explanation for this phenomenon. Nakanishi and Nethery (1998)\textsuperscript{6} and Capranica et al. (2001)\textsuperscript{27} showed in their studies also differences in fitness scores between persons of different ethnicity with respect to physical fitness. The first mentioned authors stated that environmental and cultural aspects are known to influence particular characteristics of an ethnic group and, as such, are partially responsible for distinguishing an ethnic group from others. Due to the low number of the participants in this study we could not compare all ethnical groups with each other to determine the differences between the groups and to distinguish the groups from each other. The only conclusion we can draw is that in our study we found also differences in fitness and health scores between the ethnical groups. Similar effects were noted by Hallal et al. (2003)\textsuperscript{5} who found those with a white skin were more likely to be physically inactive. However, Fitzgerald et al. (1994)\textsuperscript{28} who examined self-reported activity and measured fitness status of African American and white females, found a higher level of fitness among the latter.
5.4 Effects of the programme on the lifestyle of the elderly

After eight months intervention the results of the objective as well the subjective fitness and health tests of both the experimental and the control group showed significant differences in change of the parameter ‘grip strength test’ and in the activity behaviour indicator ‘leisure time physical activity’. The mean change of the ‘grip strength test’ of the experimental group was significantly lower meaning worse compared to the mean change of the control group. The mean change of parameter ‘leisure time physical activity’ of the experimental group however was significantly higher meaning better compared to the mean change of the control group. That means after eight months physical activity the participants of the experimental group had a significant increase of their physical activities in their leisure time compared with the participants of the control group and the intervention had changed their behaviour positively. We do not know and actually did not experimentally try to acquire the knowledge whether the results as we found were due to or significantly influenced by the group process. Many authors have recommended exercising within a group. Deforche and De Bourdeaudhuij (2000) found that group programmes may be more effective in changing exercise behaviour of elderly than non-supervised physical activity. Subjects involved in a group exercise programme had higher levels of activity and reported more social influences and higher self-efficacy compared to the respondents practicing on an individual basis. Exercising in a group programme gives the opportunity to accumulate some extra physical activity and positively affects the level of activity outside the programme. Lord et al. (2003) found in their study that group exercise can prevent falls and maintain physical functioning in frail older people. Rose (2002) presented a model group-based fall-risk-reduction programme suitable for implementation in community-based and residential care facilities. With this programme declining balance and mobility among older adults can be reversed or at least slowed down. Group exercise promotes person-environment interaction, increases the social interaction, increases the self-efficacy and enhances the quality of life of the individuals.

In our study not only the experimental group performed better. Also the control group had a significantly better score in the ‘perceived physical fitness score’ at t-2 compared with t-0. One explanation for this better score could be the ‘overestimation’ of the control group by comparing themselves with the active experimental group or the ‘underestimation’ of the active participants by comparing themselves with more active persons in their group or comparing themselves with a while ago when they were less active. Also in the control group the objective measurements on fitness done with the tests of the GFE showed in two parameters significantly better results after eight months: the ‘block transfer test’ and the ‘circumduction test’ and in one parameter ‘balance test’ a significantly lower meaning worsening result. At t-2 the control group had also one subjective indicator on health the SF-36’s subscale ‘vitality’, which was significantly lower meaning worsening compared with t-0.

If we take into consideration the results of both perceived and objective parameters of the control group, which were significantly better at t-2 compared with t-0, in
spite of the fact that they did not participate in the physical activity programme, we can assume that in one or the other way the participants of the control group could be influenced by other mechanisms or probably even the experimental group. Ainsworth et al. (2003) have studied the correlations between the different aspects which possible can affect physical activity and gender. They found that one of the factors could be the influence of seeing people exercise in the neighbourhood. De Jong et al. (2006) found in their study not only significant results in the intervention group, but contrary to their expectations also the same increases in the control group. Several possible reasons for this phenomenon were mentioned. Amongst others the intensive door-to-door recruitment strategy and other forms of attention could have primed participants of the control group to make changes across the 6-month period. Similar mechanisms may also have influenced our control group. The baseline assessments may have increased participants’ knowledge of healthy behaviour and artificially influenced behaviour, thus confounding the results.

5.5 Conclusions

This study was conducted in five homes for the elderly in Paramaribo, Suriname. If we look at baseline at the residents with respect to age, gender, ethnicity, education level, and even the health and fitness status there were practically no differences between the homes and their residents.

According to the results of the intervention of eight months physical activity we can conclude that the three questions stated in Chapter 1 as the ‘Aims of this thesis’ are in part confirmed by this study.

The first question ‘Will such programmes as applied in a structured setting have an influence on the health of the population of the homes for the elderly in Suriname and lead to an enhanced sense of physical and mental wellbeing?’ is confirmed to a certain extent by the results of this study and the findings of many authors. However we also have a positive effect in the control group which we cannot fully explain. Although the study was not set up to prove influences on health parameters, we certainly found indications, for example less complaints of chronic diseases and a lower blood pressure after the experiment, that the participants were healthier after the experiment than at the onset.

In answering the second question ‘Will there be differences in results between the different ethnical groups?’ we can conclude that in our study we found also differences in fitness and health scores between the ethnical groups. However, we have to take also in consideration the small numbers of some groups and that the distribution of the ethnical groups in the homes is not representing the Surinamese society (see Table 1.3).

Also the last question ‘Will the application of such programmes lead to a more active lifestyle of the elderly in such homes in Suriname?’ is confirmed by the result of the behaviour indicator ‘leisure time physical activity’ (see paragraph 4.5 and Table 4.10).
5.5.1 Implications for the Surinamese society

In a developing country as Suriname, with a diversity of many cultures, and where the number of elderly is increasing tremendously annually there is definitely a place for such a physical activity programme. The traditional interpretation of how to become old in Suriname is well meant, however it stimulates a sedentary lifestyle of the elderly. The trend of growing number of nursing homes and homes for the elderly in Suriname the last couple of years is a sign that this traditional way of thinking is maintained. Eventually this will result in a large number of physically inactive elderly with the risk of getting health and fitness problems, which next will result in a financial burden for the society.

Physical activity is a recognized component of healthy lifestyles\(^4\). Inactivity is associated with several chronic diseases. Small, positive increases in physical activity would enable many people to reduce their risk of chronic diseases\(^{26,11,24}\), improve their sense of balance, minimizing the fear of falling and increasing their self-efficacy\(^{12,11,9,8}\) and could contribute to an enhanced quality of life\(^{11,9,21,24}\).

The results from our study have shown significant improvement in health, fitness and leisure time indicators. Not only the participants had benefits of this physical activity programme, but also the non participants (control group) seem to be influenced positively. Minor differences between the results of both groups could be explained by the cultural, educational, social and/or gender aspects. The majority of the participants in this study were female. This phenomenon can be explained by the fact that women in general are more apt to participate in such programmes. It would be worthwhile and interesting to know how men would perform in such programmes. A study in the future about this matter would probably give us the answer. Increased physical activity is a desired public health behaviour, which we have to promote, especially in the group of the elderly. Conn et al. (2003)\(^{32}\) found significant numbers of ageing adults increased their physical activity in response to experimental interventions. The amount of increased activity rarely equaled accepted behaviour standards to achieve positive health outcomes. Therefore we have to bring more awareness of the need of physical activity in this special group of the society.

Increased awareness is recommended for all policy makers at all levels. The government as the most important policy maker has to take the lead in this matter. Not only the ministries which are responsible for the care of elderly and have this special group in their portfolio as their primary task, such as the Ministry of Social Affairs and the Ministry of Health, but because of the complexity of this matter the whole government has to define a policy how to deal with ageing of the population. The annual increase of the number (and percentage of the total population in Suriname) of the group older than 60 years requires a vision and a policy with an immediate action plan for the whole government.

The government can promote an active lifestyle by creating a safe environment where people can be physically active. In the public domain which invites to walk on safe sidewalks where it is forbidden to park, well paved and well lit paths and well maintained public parks.

Well-known proverbs as ‘who has the youth will have the future’ and ‘the youth
is the people of tomorrow’ are used often in Suriname because of the size of the young population. However, the group of persons older than 60 years is increasing annually and is therefore becoming more important every year. This group needs to be stimulated with regard to physical activity and the ‘active living’ approach including mental and social activity. Widespread implementation of the physical activity programme as described in this study could increase physical activity among the elderly in the homes (Chin A Paw et al., 2001)33.

Financing such physical activity programmes for the elderly by the government will stimulate a healthy lifestyle and more physical activity of this group of citizens. On the long run this will benefit the entire society.

The health insurance companies can also play an important role in promoting a healthy lifestyle and so reducing the medical costs. Health care is cheaper compared with medical care. If physical activity can prevent or delay in time the development of chronic diseases, the health insurance companies have to consider the possibility to finance such activity instead of paying the medical costs later. Incentives for instance can also be given to elderly who are in a certified physical activity programme.

Finally we can conclude that a physical activity programme as conducted in this study is meaningful and important for the homes for the elderly in Suriname. The results of such a physical activity programme have shown that not only the participants benefitted with respect to their health and wellbeing, but also the people in the neighbourhood who can be influenced positively by seeing people exercise (Ainsworth et al., 2003)7. Furthermore this study has also shown that their lifestyle became more active and their leisure time is also used more actively. Two aspects of such a physical activity programme can be recommended:

1. group exercises will stimulate not only physical, but also mental and social activity. This will increase also the wellbeing of the persons. Furthermore exercising in a group programme gives the opportunity to accumulate some extra physical activity and positively affects the level of activity outside the programme.
2. the environment (Eyler et al., 200234; Ainsworth et al., 20037) is an important tool in stimulating physical activity. A nice garden with flowers, safe paths and benches where people can rest will stimulate and facilitate the residents to walk and enjoy nature. Also a well working elevator and obviously a cooperative and stimulating nursing staff in such a home can be important and will influence the physical activity behaviour of the residents.

5.5.2 Implication for research
Our results show that it is possible to conduct a controlled trial in a multi-site setting among different cultural groups, although a very committed staff is needed. We agree with Reijneveld et al.35 that a methodological barrier may be the lack of measurement tools that are both cross culturally valid and sensitive to change in cultural setting, and background. As such, there is still a long way to go in this area and this type of research.
The study of the effects of such a physical activity programme for the elderly has, to our knowledge, never been done before in a developing country. Literature was only found of studies executed in countries of the Western developed world. Even search in literature from the Caribbean resulted only in other kind of studies. Many multi-cultural studies are described; however a study of a physical activity programme in an environment where cultures from the different wind directions meet is never done before. We agree with Conn et al. (2003) that further work is essential to identify successful strategies to increase activity by larger numbers of elderly and to accelerate the increase in activity by those who change activity behaviours, and that there is a vital need for rigorously designed studies to contribute to this science.

Finally, it is encouraging to know that special emphasis is given to research by appointing a special professor for physical activity and health in elderly by the VU Medical Centre with the assignment to study how to promote physical activity.
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