



# How do prostate cancer patients navigate the active surveillance journey? A 3-year longitudinal study

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Received: 20 September 2019 / Accepted: 9 May 2020 / Published online: 18 May 2020  
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## Abstract

**Objective** To investigate whether prostate cancer (PCa) patients' coping strategies (i.e., fighting spirit, anxious preoccupation, fatalism, helplessness/hopelessness, and avoidance) significantly change during the first 3-year follow-up period of active surveillance (AS).

**Materials and methods** Altogether, 104 patients on AS completed the Mini-Mental Adjustment to Cancer (Mini-MAC) at baseline (T0), at 10 and 12 months after diagnostic biopsy (T1 and T2, respectively) and then at 24- (T3) and 36-month (T4) follow-up. Paired samples *T* test was used to detect statistically significant changes over time. Changes  $\geq 1$  point (or  $\leq -1$ ) were hypothesized to be clinically relevant.

**Results** During the first 3 years on AS, men experienced decreased anxiety, avoidance thoughts/behaviors, and fight-against-cancer attitudes, and these changes were found to be statistically significant. When considering clinically significant changes between inclusion in AS (T0) and 3-year follow-up (T4), avoidance decreased in 19% of patients.

**Conclusions** Most patients were observed to have adopted functional coping strategies at baseline, which were maintained through the first 3 years on AS. Overall, men on AS may perceive increasing control over their cancer and comfort with the AS protocol over time and experience slight decreases in anxious preoccupation, cancer-related avoidance thoughts and behaviors, and fight-against-cancer reactions. For those men who find it difficult to cope with AS, psychological monitoring and interventions could be helpful throughout the monitoring journey.

**Keywords** Active surveillance · Cancer · Coping strategy · Oncology · Prostate cancer

## Introduction

Prostate cancer (PCa) is a malignant disease that is often associated with challenging and complication-ridden therapies, pain

and death [1, 2]. A diagnosis of PCa can trigger consequences involving life adjustment, emotional baggage, and life-altering decisions [3]. In fact, patients diagnosed with PCa constantly navigate a complex journey while managing psychological suffering and overthinking [4, 2]. The constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands, such as the diagnosis of cancer, has been conceptualized as *coping* [5]. The most commonly used categorization of coping strategies used by cancer patients is as follows: (1) fighting spirit, i.e., the tendency to confront and actively face the illness; (2) anxious preoccupation, i.e., the inclination to experience the illness as an event causing marked anxiety; (3) fatalism, i.e., the propensity to have a resigned and passive acceptance attitude towards the illness; (4) hopelessness/helplessness, i.e., the tendency to adopt a pessimistic attitude about the illness; and (5) avoidance, i.e., the propensity to avoid direct confrontation with illness-related issues [6]. Each coping strategy may be adaptive or based on the context. That is, each coping strategy should be evaluated according to its impact on the relevant

**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00520-020-05524-8>) contains supplementary material, which is available to authorized users.

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outcomes [7] (for a complete meta-analytic review of coping in PCa, see [8]). However, it has been suggested that patients who adopt a fighting spirit in response to their cancer diagnosis may improve their odds of survival [9]; likewise, a fighting spirit strategy seems to be associated with an improvement in quality of life (QoL), while a hopeless/helpless coping strategy seems to be associated with increased distress [10]. Roesch et al. [8] showed that men with PCa with an avoidant coping style reported worse psychological adjustment and physical health.

Usually, men diagnosed with low volume, potentially indolent PCa are candidates for both radical treatments (radiation therapy and prostatectomy) or observational protocols (i.e., active surveillance (AS)). Radical treatments can have a lifelong impact on patients' quality of life (e.g., erectile, rectal, and urinary dysfunction) [11]. AS is considered to be a clinical option to limit the risk of overtreatment and of treatment-related impairment in QoL [12–23]. Men who choose AS may find it hard to adjust to living “with an untreated cancer” [24, 25]. Coping strategies may predict trajectories of psychological well-being and QoL during AS [25]. As previous publication suggests [25], the psychological adjustment of men on AS could be particularly complex given the potential “unpredictable” trajectory of PCa; some men may remain on AS for many years over a long life, and some may drop out of AS sooner or later during the AS journey. Consequently, individual coping strategies are important factors in AS management [26] since good adjustment to PCa has been shown to be related to higher QoL levels [12]. Nevertheless, few studies have investigated the role of coping during the AS protocol [12, 25, 27, 28].

The present study aims to investigate whether coping strategies (i.e., fighting spirit, anxious preoccupation, fatalism, helplessness/hopelessness, and avoidance) of men on AS significantly change, both statistically and clinically, during the first 3-year follow-up period.

## Materials and methods

### Study sample

All patients included in the “Prostate Cancer Research International: Active Surveillance” (PRIAS) study were invited to participate in the “QoL Study,” an ancillary study approved by the local Independent Ethics Committee at Istituto Nazionale dei Tumori (Milan) (Approval number INT 46/07). The inclusion criteria for the PRIAS were as follows: prostate-specific antigen at diagnosis (iPSA)  $\leq 10$  ng/mL, PSA density (PSAD)  $\leq 0.2$  ng/mL/cc, clinical stage T1c or T2a at digital rectal exploration (DRE), Gleason Pattern Score (GPS) 3+3 or grade grouping 1 (GG1), age  $\leq 80$  years, and one or two biopsy cores invaded with prostate cancer (if an MRI, including targeted biopsies on positive lesions, was performed at inclusion, there was no limit on the number of positive cores). The

“QoL Study” aimed to investigate patients on AS' quality of life (such as sexual functioning, coping strategies, PCa-related anxiety, decisional conflict).

Patients who agreed to participate in the QoL study provided written informed consent after receiving detailed information from physicians. Patients filled up the questionnaire first at baseline when entering on AS. To safeguard patients' identity, an identification number was assigned at enrolment. Successively, the questionnaire was sent by mail at each time point follow-up. Patients hand back data and a data manager archived them.

Between September 2007 and September 2017, 597 patients were enrolled in PRIAS. A total of 449/597 (81%) patients agreed to participate in the QoL study. About 130/449 (29%) dropped out from the QoL study, while 117/450 (26%) did not reach T3 yet. A total of 104/449 (23%) completed the questionnaire at all time points between T0 and T4. Their median age was 63.9 years (range 42–76 year). Clinical data at diagnosis (T0) of patients who completed all time points were shown in Fig. B (Supplementary material), while Table B (Supplementary material) shows the comparison of diagnostic characteristics between patients who did and did not dropped out from QoL study.

### Coping strategies

The standard version of the Mini-Mental Adjustment to Cancer (Mini-MAC) [29] 29-item scale was administered to measure patients' styles of coping with cancer. Five coping strategies were listed: fighting spirit, helplessness-hopelessness, fatalism, anxious preoccupation, and avoidance. The raw scores ranged from 1 (“definitely does not apply to me”) to 4 (“definitely applies to me”), with a high score representing a higher level of the respective adjustment style. Originally, the five subscales showed acceptable levels of reliability (Cronbach's alpha coefficients ranging from 0.55 to 0.80) and acceptable validity [29]. The Mini-MAC was completed at enrolment in the QoL study (T0), 10 months after diagnostic biopsy (T1), immediately after the first re-biopsy (only patients still suitable for AS; T2), and then once a year after the first re-biopsy (T3, T4).

### Statistical analyses

Descriptive analyses were performed to identify the presence of specific coping strategies (i.e., fighting spirit, anxious preoccupation, fatalism, helplessness/hopelessness, and avoidance) using a cutoff  $> 2.5$  points. A paired samples *T* test was used to explore statistically significant differences between T0 and T4. In addition, subscales were successively tested for their possible clinical significance. The choice of threshold to be used to define changes in coping which are clinically significant was based on a conservative evaluation. Men who changed their score  $\geq 1$  or  $\leq -1$  point were likely to have switched Likert point categories (from

“it definitely does not apply to me” to “it does not apply to me,” from “it applies to me” to “it definitely applies to me,” or vice versa). Hence, we hypothesized that differences  $\geq 1$  or  $\leq -1$  point represent the cutoff that identifies a clear change in adjustment style. The relationship between change of 1 point is subscales of Mini-MAC and quality of life was also found in the analysis of a previous cohort of prostate cancer patients undergoing active surveillance (the population of the study Bellardita L, Rancati T, Alvisi MF, Villani D, Magnani T, Marengi C, Nicolai N, Procopio G, Villa S, Salvioni R, Valdagni R. “Predictors of health-related quality of life and adjustment to prostate cancer during active surveillance.” *Eur Urol.* 2013 Jul;64 (1):30–6.), where coping was significantly associated with quality of life. A summary of main results of that analysis (Spearman correlation test between subscales of Mini-MAC and subscales of Fact-P is reported in Table A and Fig. A in Supplementary Material). Analyses were performed using MedCalc software version 12.1.4 (MedCalc Software, Mariakerke, Belgium).

## Results

Figure 1 shows trends of subscales over time (T0, T1, T2, T3, and T4), while Table 1 summarizes means at each time point (T0, T1, T2, T3, and T4) and the results of the paired samples *T* test (T0–T4). Statistically significant differences were found for anxious preoccupation ( $P < 0.001$ ), avoidance ( $P < 0.001$ ), and fighting spirit ( $P = 0.02$ ).

The number and rate of patients reporting clinically significant changes for all the Mini-MAC subscales between T0 and T4 are highlighted in the distributions reported in Fig. 2 and summarized in Table 2. The highest rate of change was observed in the avoidance subscale, with 20/104 patients (19.2%) reporting a decrease in avoidance between inclusion in AS and 3-year follow-up. This result was also confirmed by the statistical significance analyses. Furthermore, 10/104 patients (9.6%) showed a decrease in fatalism coping between baseline and T4.

Furthermore, as showed in Table B (Supplementary materials), men who remained in the study had different clinical information at inclusion in AS (number of positive cores, number of total cores, % of positive cores at diagnostic biopsy, age at diagnostic biopsy) from those who dropped out from it.

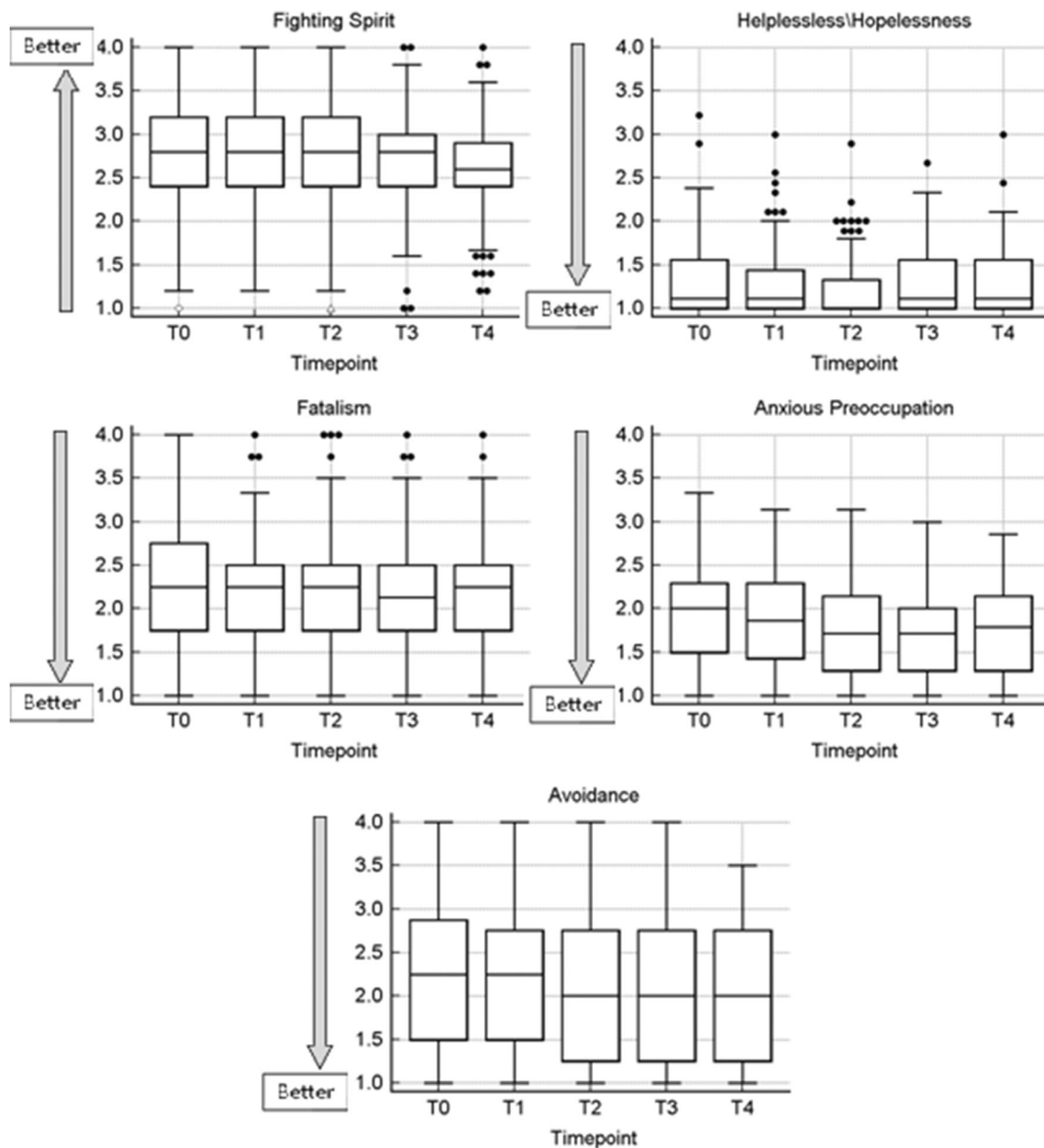
## Discussion

This study presents for the first time a comprehensive psychological assessment of the coping strategies of PCa patients on AS. Our findings provide a scenario of *how* PCa patients cope with cancer, showing how they adapt during the AS period and *how* they further cope during 3 years of “living with an untreated cancer.” Overall, our findings show that men enter AS with

adaptive coping strategies and tend to maintain these strategies during the first 3 years of follow-up, with a decrease in anxious preoccupation about the disease, avoidance, and fighting spirit attitude. Our results suggest that assessment of patients’ coping strategies at the beginning of the observational protocol may be helpful to better understand how patients will cope during the AS period. When relevant, psychological interventions could be offered to help patients better face “living with an untreated cancer,” thus improving adherence to the AS protocol.

In detail, very limited changes were noted for fighting spirit, fatalism, anxious preoccupation, and helplessness/hopelessness style, while approximately 20% of patients reported a clinically significant decrease in avoidance scores over time, suggesting a positive adjustment during the observational protocol. Patients tend to slightly reduce cancer-related thoughts and behaviors (i.e., distracting themselves when they start to think about their illness; deliberately clearing their mind of all thoughts about cancer) during the first 3-year period. This could be considered as a functional adaptation to “life on AS” (i.e., living with an untreated cancer). In fact, men on AS may try to reduce the focus on cancer (cancer-related thoughts) and try to live life as it was before the diagnosis. As time goes by, men then may start perceiving increasing control over cancer and a sense of confidence in the AS protocol. Hence, when perceiving cancer to be more controllable, patients may shift from emotion-focused to problem-focused coping. Individuals usually use “problem-focused coping” in situations that are controllable, while “emotion-focused coping” is more frequent in situations in which nothing can be done. Altering the person–environment relationship causing the distress by modifying or eliminating the stressful situation (so called problem-focused coping) and regulating stressful emotions stimulated by situations (so called emotion-focused coping) are the two major functions of coping strategies [7, 30]. Usually, the “emotion-focused coping” is less effective and more likely to be associated with psychological distress [31–33]. However, an array of coping strategies work in real-life situations, where people switch among different coping strategies when the one they are using does not have the desired effect [7, 30, 34]. That is, understanding how patients drive their coping strategies after diagnosis might have the potential to help them better handle the whole cancer experience. Finally, these results may account for men on AS reporting good QoL levels and limited psychological distress [12]. In fact, good psychological health is associated with the adoption of a problem-focused coping strategy [31–33].

Our findings are consistent with Lazarus and Folkman’s [5] statements suggesting that the use of coping is motivated by how people appraise a situation. It is plausible that men on AS cognitively appraise PCa diagnosis in a more stressful way immediately after diagnosis (so that they react with a fighting spirit and slight avoidance behaviors) in comparison with the first 3-year follow-up period during which time they may become more comfortable with the observational protocol and with the idea of having a cancer.

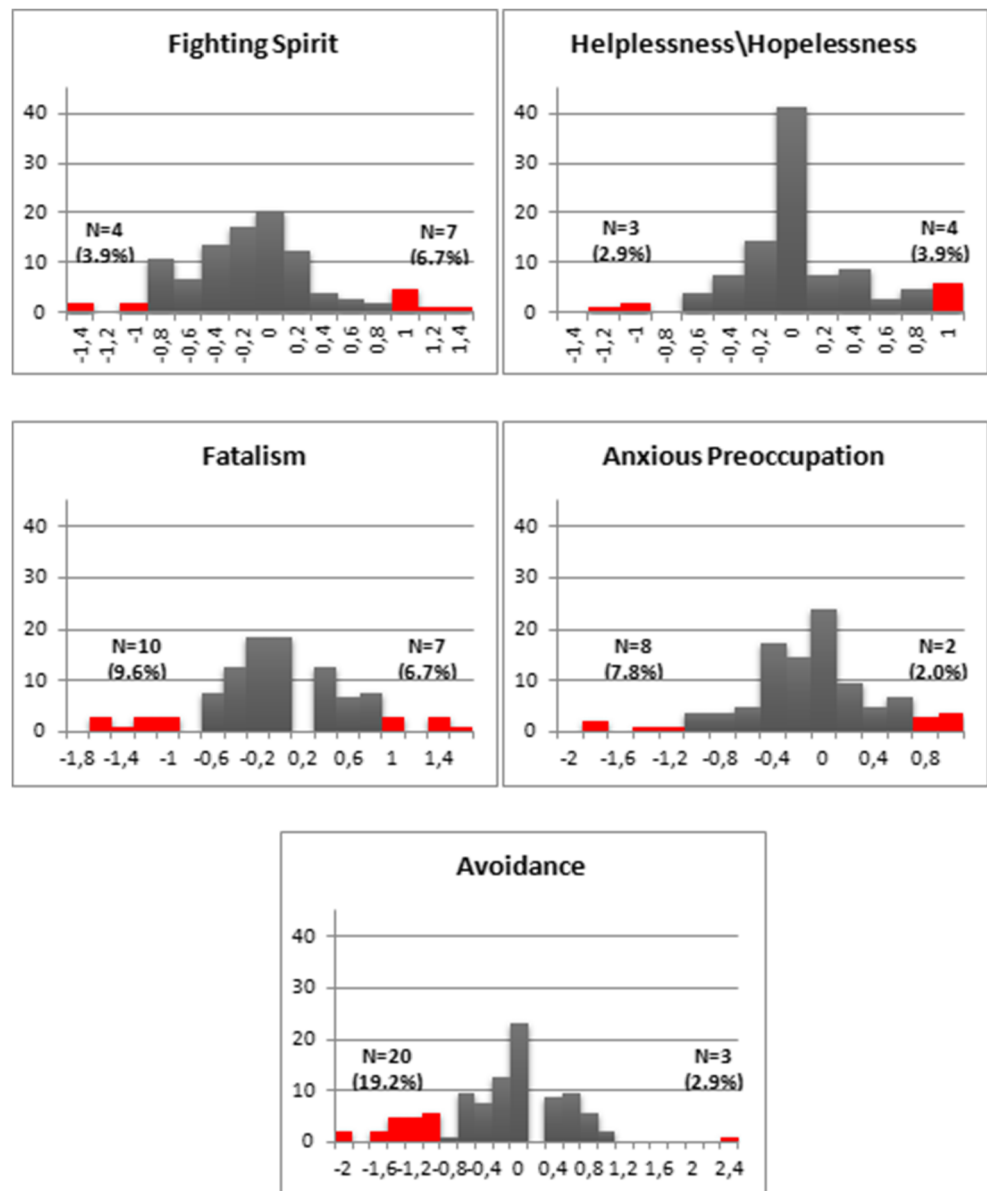


**Fig. 1** Trend over time for the Mini-Mental Adjustment to Cancer subscales. Box-whisker plots are reported showing inter-quartile ranges and median values

**Table 1** Mean at each time point and results of paired samples *T* test between T0 (enrollment in the PRIAS “QoL study”) and T4 (3 years after diagnosis of PCa) for the different coping adjustment styles included in the Mini-Mental Adjustment to Cancer questionnaire ( $n = 104$ )

	Mean values (SD) per time point					Mean differences (values at T4- values at T0)	95% CI for the mean difference	Standard error of the mean difference	<i>p</i> value
	T0	T1	T2	T3	T4				
Fighting spirit	2.8 (0.6)	2.8 (0.5)	2.7 (0.6)	2.9 (0.6)	2.6 (0.5)	-0.1	-0.23 to -0.02	0.052	0.02
Helplessness/hopelessness	1.3 (0.4)	1.3 (0.4)	1.2 (0.4)	1.3 (0.4)	1.3 (0.4)	-0.01	-0.09 to 0.07	0.042	0.79
Fatalism	2.2 (0.6)	2.1 (0.7)	2.2 (0.7)	2.1 (0.7)	2.1 (0.6)	-0.1	-0.22 to 0.03	0.064	0.14
Anxious preoccupation	1.9 (0.6)	1.9 (0.6)	1.8 (0.5)	1.7 (0.5)	1.7 (0.5)	-0.2	-0.30 to -0.09	0.053	0.0004
Avoidance	2.2 (0.8)	2.2 (0.8)	2.1 (0.8)	2.1 (0.8)	2.0 (0.7)	-0.3	-0.40 to -0.12	0.072	0.0004

**Fig. 2** Trends of distribution of differences in scoring between T0 (enrolment in the PRIAS “QoL study”) and T4 (3 years after diagnosis of PCa) for all Mini-Mental Adjustment to Cancer subscales. Clinically significant differences ( $\geq 1$  point or  $\leq -1$  point) are highlighted in the tails of distributions



**Table 2** Proportion of patients reporting clinically significant changes in Mini-Mental Adjustment to Cancer subscales between T0 (enrollment in the PRIAS “QoL study”) and T4 (3 years after diagnosis of PCa)

	Difference $\leq -1$ point (decreased presence of the specific adjustment style)		Difference $\geq 1$ point (increased presence of the specific adjustment style)	
	N	%	N	%
Fighting spirit	4	3.9	7	6.7
Helplessness/hopelessness	3	2.9	4	3.9
Fatalism	10	9.6	7	6.7
Anxious preoccupation	8	7.8	2	2.0
Avoidance	20	19.2	3	2.9

Additionally, our results also highlighted that a scarce portion of patients changed coping strategies during the first 3-year follow-up period of Active Surveillance. Future tailored psychological interventions are recommended in order to target patients who are at risks for increasing the use of negative coping.

Further longitudinal research should investigate the changes in adjustment responses in men who have discontinued AS since it could be expected they will face further stressful events after the stress of diagnosis.

### Study limitation

The present study has some limitations in terms of generalizability due to the lack of a control group and a single institution study design. In fact, it would be possible that patients not

included in the QoL study might have different coping strategies. In a similar vein, patients who remained in the study are different from those who dropped out from it. That may suggest that those men may be more likely to show coping strategies. Further research is necessary to compare results within different datasets, e.g., including patients undergoing AS in different centers, patients undergoing radical treatments or focal therapy, and patients not included in the QoL study. Due to the fact that a limited portion of our baseline data have been collected in the past, further researches are recommended in order to update our findings.

## Clinical implications

Although our findings reveal that good coping strategies are already present at the beginning of AS, longitudinal psychological assessment should be recommended to promptly detect changes in coping strategies needing intervention. We suggest applying follow-up monitoring on a routine basis to support all men, particularly during the first year after diagnosis [24]. Interventions aimed at promoting and increasing good coping strategies could be effective in different circumstances during AS follow-up. For instance, psycho-educational focus groups or self-help groups could be helpful for patients both in terms of receiving information about how to “surf over waves” and obtaining emotional support if needed.

In conclusion, our study suggests that AS does not seem to challenge patients’ coping strategies either at the beginning of AS or at the first 3-year follow-up. However, in light of the very important role of coping strategies in the QoL of AS men, it is essential to monitor coping strategy trajectories and to longitudinally assess coping throughout the monitoring journey.

**Acknowledgments** The authors thank Fondazione Italo Monzino for support for the project “Per un sentire condiviso: l’uomo e il tumore alla prostrata.”

**Funding information** The study was financially supported by the Associazione Italiana Ricerca sul Cancro (AIRC IG16087).

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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